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August 1, 2001

40-8943

Mr. Melvyn Leach, Chief
Fuel Cycle Licensing Branch, FCSS
c/o Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Enclosed Report: *Regulatory Review of Ground Water Protection for In-Situ Leach Uranium Mining in the State of Nebraska*

Dear Mr. Leach:

Crow Butte Resources, Inc (CBR) is pleased to enclose our report entitled *Regulatory Review of Ground Water Protection for In-Situ Leach Uranium Mining in the State of Nebraska.* This report provides a detailed review of the underground injection control (UIC) program implemented in the State of Nebraska by the Nebraska Department of Environmental Quality (NDEQ). The purpose of this report is to assist NRC in determining the extent to which active regulatory oversight of groundwater protection issues at the Crow Butte Uranium Mine may be deferred to the NDEQ. CBR believes that the NRC and the NDEQ have similar, and in many cases identical, requirements for well design and construction, wellfield monitoring, and groundwater restoration. In Nebraska, these requirements are contained in the Nebraska Environmental Protection Act, in the implementing Rules and Regulations administered by the NDEQ, and by the individual UIC permits. The enclosed report reviews these requirements in detail.

Following the review of the State and EPA requirements, a comparison of the ground water protection requirements from CBR's source materials license and the State program is provided. Included in this comparison is a cross reference to allow your staff to determine the source of the complementary State requirements. Copies of the appropriate statutes, regulations, and permits are included as appendices to assist your review.

NMSSOIPublic



CBR believes that the NRC can rely with confidence on the NDEQ for groundwater protection issues at the Crow Butte Uranium Mine. We are ready to provide NRC with any assistance you may require to complete a timely review of these issues.

If you have any questions, please feel free to call the undersigned at (308) 665-2215.

Sincerely,
CROW BUTTE RESOURCES, INC.

Michael L. Griffin
Manager of Health, Safety, and Environmental Affairs

Attachments: As Stated

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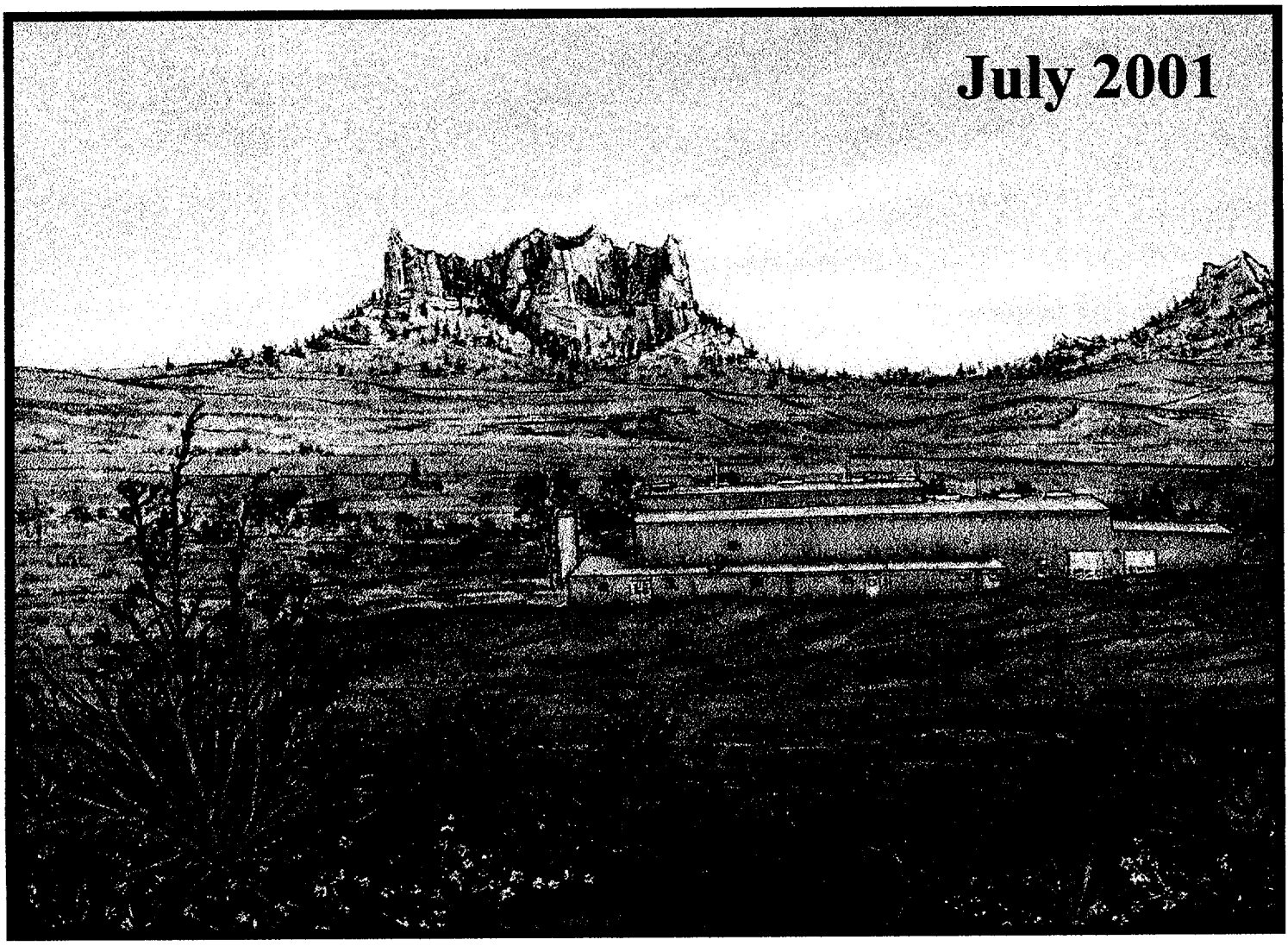
# Regulatory Review of Ground Water Protection for In-Situ Leach Uranium Mining in Nebraska




United States Environmental Protection Agency

CROW BUTTE RESOURCES, INC.

# Regulatory Review of Requirements for Groundwater Protection During In Situ Leach Uranium Mining in the State of Nebraska

**July 2001**

Prepared by: Crow Butte Resources, Inc.
86 Crow Butte Road
Crawford, Nebraska 69339

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# EXECUTIVE SUMMARY

The issue of dual jurisdiction over the underground portions of in situ leach (ISL) wellfields at uranium mines has long been a topic of concern within the uranium mining industry and the regulatory community. The Nuclear Regulatory Commission (NRC) regulates and licenses ISL uranium mines under authority of the Atomic Energy Act (AEA). The Environmental Protection Agency (EPA) and EPA-authorized States regulate underground injection under the Underground Injection Control (UIC) program authorized by Part C of the Safe Drinking Water Act (SDWA). These overlapping authorities potentially create duplicative regulatory programs, creating unnecessary burdens for industry and regulators alike. Most recently, this issue was raised by the National Mining Association (NMA) in a "White Paper" addressed to the NRC. In the White Paper, the NMA questioned NRC authority to regulate the groundwater protection issues at ISL facilities and noted the importance of this issue to the industry.

In response, the issue of dual jurisdiction was recently addressed by the NRC. The Commission has asserted that the NRC does have jurisdiction over these activities under the AEA. However, the NRC Commissioners have recognized the problem of dual regulation and have directed the NRC staff to explore methods to rely on the EPA and State UIC programs. In their Staff Requirements Memorandum (SRM-99-013) dated July 26, 2000, the Commissioners approved the NRC staff "...continuing discussions with EPA and appropriate States to determine the extent the NRC can rely on the EPA Underground Injection Control (UIC) program for groundwater protection issues, thereby minimizing NRC review of groundwater protection issues at ISL facilities." In the Commission Voting Record for SECY-99-0013, all of the Commissioners agreed that the NRC should base licensing determinations for groundwater protection at ISL facilities on the EPA or State UIC Program to the extent possible. The Commissioners expected that the discussions with EPA and EPA-authorized States would include appropriate methods to implements any agreements, including Memorandums of Understanding (MOUs), if necessary. As envisioned by Commissioner McGaffigan, while the "...NRC would maintain authority over the well field, the UIC permit would serve as the basis for NRC licensing determinations on all matters pertaining to protection of ground water at ISL facilities without further NRC review of protective measures."

Beginning with the initial promulgation of the UIC regulations in 1980, the EPA has developed a robust, technically sound program that has proven effective in controlling underground injection activities in the U.S. The EPA program has broad applicability, providing oversight for the underground injection of hazardous and nonhazardous aqueous wastes, brine from oil and gas production and industrial waste disposal in shallow aquifers in addition to the recovery of mineral resources. Waste injection activities involve the safe

disposal of over 9 billion gallons of hazardous waste each year and 2 billion gallons of oil and gas brine *each day*.

The UIC program developed by EPA includes specific requirements for the siting, design, construction, operation, and closure of injection wells that are designed to provide protection to underground sources of drinking water (USDWs). The implementing regulations are promulgated in 40 CFR Parts 144 through 147. In EPA-authorized States, similar or more stringent regulatory controls are in place. Recent studies completed by the EPA on the effectiveness of the UIC program at controlling waste injection activities under the Class I program have noted the success in limiting well failures and adverse affects on drinking water supplies.

During initial discussions between NRC and the EPA concerning the issue of reliance on the UIC program for groundwater protection at ISL uranium mines, the EPA indicated a belief that the NRC and EPA programs are complementary and not duplicative. In two areas, EPA believed that the UIC regulations did not provide adequate protection for the environment during ISL mining activities. The first perceived gap in coverage concerns the production wells that are used to remove the uranium-laden groundwater from the aquifer during mining activities. Since these wells are not injection wells by definition, the design, construction, operation, and closure requirements of the UIC program do not apply to their use. The second gap involves restoration of affected groundwater after mining operations. EPA does not require restoration of an "exempted" aquifer, since that area has been exempted as a source of drinking water. EPA would only require corrective action if there was an indication that water quality in adjacent areas outside the boundaries of the exempted aquifer could be affected. NRC has historically required groundwater restoration of the mining zone following completion of uranium mining activities. EPA recognized that some States that have been granted regulatory authority for the mineral extraction portions of the UIC program might have additional requirements that could fill these gaps.

The State of Nebraska is a "primacy" State under the EPA UIC program, which means that the State has developed a program that meets, at a minimum, the EPA program requirements. In fact, Nebraska, by statute, rule, and regulation, has developed a UIC program that is specifically tailored to the mineral extraction of uranium and the safe disposal of wastes generated by the process. The Nebraska Environmental Protection Act (the Act) provides the statutory requirements for adequate environmental protection during ISL mining. The Nebraska Department of Environmental Quality (NDEQ) is tasked with developing the rules and regulations that implement these statutory requirements and administering these rules through permitting activities. The EPA has approved the NDEQ program and incorporated it by reference in 40 CFR Part 147.

The NDEQ worked closely with the NRC and other regulatory agencies from other States with ISL uranium mining experience during development of the Nebraska UIC program as it relates to Crow Butte. Because of this consultation effort in the early days of the

Nebraska program, the program not only meets the federal UIC requirements but implements additional requirements that supplement the protections afforded by the federal program. In the two important areas where the EPA noted gaps in the federal program, the NDEQ provides the appropriate requirements to fill these gaps. By statute and regulation, mineral production wells are subject to the same requirements as injection wells in the State of Nebraska. More importantly, the Act and the UIC program require the restoration of affected groundwater to a quality that is consistent with the premining uses for which the water was suitable. In these important areas, the supplemental requirements of the Nebraska program, when combined with the basic program required by EPA, should provide the NRC with assurances that the obligations for groundwater protection at these facilities may be met by reliance on the State program.

NRC requirements at licensed facilities are contained in License Conditions. These License Conditions provide specific requirements for licensees beyond those contained in 10 CFR. For ISL uranium recovery facilities, NRC has developed License Conditions that specify requirements for well construction and testing, injection solution characteristics, wellfield monitoring, and groundwater restoration. These License Conditions have been developed in parallel with the requirements of the EPA and State UIC programs. Consequently, many of these Conditions are a duplication of regulatory and permit requirements issued under the UIC program. As such, the active oversight of these activities by NRC presents an unnecessary regulatory burden for licensees and regulators. In the case of the Crow Butte source materials license, many specific Conditions could be removed from the License with reliance on the NDEQ UIC program.

## Abbreviations

| | | |
|---|---|---|
| AEA | - | Atomic Energy Act |
| CBR | - | Crow Butte Resources, Inc. |
| CFR | - | Code of Federal Regulations |
| DNR | - | Nebraska Department of Natural Resources |
| EPA | - | Environmental Protection Agency |
| EQC | - | Environmental Quality Council |
| HHS | - | Nebraska Health and Human Services System |
| ISL | - | In situ leach |
| LRA | - | License Renewal Application |
| MCL | - | Maximum Contaminant Level |
| MCLG | - | Maximum Contaminant Level Goal |
| MIT | - | Mechanical integrity test |
| MMR | - | Mining Monitoring Report |
| NDEQ | - | Nebraska Department of Environmental Quality |
| NMA | - | National Mining Association |
| NPDWR | - | National Primary Drinking Water Regulations |
| NRC | - | Nuclear Regulatory Commission |
| PE | - | Professional Engineer |
| RCRA | - | Resource Conservation and Recovery Act |
| SDWR | - | Secondary Drinking Water Regulations |
| SDWA | - | Safe Drinking Water Act |
| SRM | - | Staff Requirements Memorandum |
| TDS | - | Total dissolved solids |
| UCL | - | Upper Control Limit |
| UIC | - | Underground Injection Control |
| USDW | - | Underground source of drinking water |

# 1 INTRODUCTION

Crow Butte Resources, Inc. (CBR) operates a uranium solution mine in Dawes County, Nebraska. The in situ leach (ISL) solution mining process involves the injection of an oxidant- and carbonate-charged groundwater solution ("lixiviant") into the production zone aquifer through injection wells. The reduced uranium is oxidized and dissolved. The uranium-rich solution ("pregnant" lixiviant) is then drawn to recovery wells where it is pumped to the surface and transferred to the process plant. At the process plant, the uranium is extracted and processed using typical ion exchange and separation technologies. The ISL method is an environmentally benign process when compared with other methods of uranium mining and milling. However, care must be taken to protect groundwater resources during and after mining operations.

The uranium solution mining process is regulated by several federal and State agencies. At the federal level, the U.S. Nuclear Regulatory Commission (NRC) regulates the use and possession of source and 11e.(2) byproduct material through a Source Materials License issued pursuant to the Atomic Energy Act (AEA). The U.S. Environmental Protection Agency (EPA) regulates underground injection through the Underground Injection Control (UIC) Program authorized by the Safe Drinking Water Act (SDWA). In the State of Nebraska, the Nebraska Department of Environmental Quality (NDEQ) has primacy from EPA to implement the underground injection control program. The UIC program is a part of the NDEQ's extensive regulatory program for the protection of the water resources of the State of Nebraska. In addition to the requirements of the NDEQ, the Nebraska Department of Natural Resources (DNR) and the Nebraska Health and Human Services System, Department of Regulation and Licensure (HHS) regulate various aspects of well construction, registration and transfers of groundwater that bear on the uranium solution mining process.

The NRC groundwater protection programs overlap in many respects with the EPA and NDEQ UIC programs. The result of this "dual jurisdiction" is significant duplication in efforts, resulting in increased costs for uranium producers and a waste of licensee, NDEQ, and NRC resources. In 1998, the National Mining Association (NMA) presented to NRC its "White Paper"[1] which expressed concerns on several issues. One issue addressed in the White Paper was the dual regulation of groundwater protection at ISL facilities. At least partly in response to the White Paper, the NRC staff prepared SECY-99-013[2]. In SECY-99-013, the NRC staff recommended that the NRC Commissioners approve a proposal for NRC to rely on the EPA UIC program for groundwater protection, thus removing NRC

[1] National Mining Association, *Recommendations For A Coordinated Approach To Regulation of The Uranium Recovery Industry: A White Paper*, April 1998.

[2] U.S. Nuclear Regulatory Commission, *Recommendations On Ways To Improve The Efficiency Of NRC Regulation At In Situ Leach Uranium Recovery Facilities*, SECY-99-013.

from the active review of groundwater protection issues at ISL facilities. On July 26, 2000, the NRC Commissioners voted to approve the staff recommendation to continue discussions with EPA and appropriate States to determine the extent to which NRC could rely on the UIC program for groundwater protection issues.

Based upon the Commissioners' comments in the voting record regarding dual regulation, it appeared that NRC did not fully appreciate the breadth and scope of the various State programs as they apply to ISL uranium recovery facilities. Furthermore, the voting record indicated that EPA did not agree that deferral to the UIC Program was practical. The record indicates that EPA was concerned that such an approach would leave gaps in coverage of ISL activities. Based upon these concerns, it was apparent that a detailed review of the relevant EPA and State regulatory programs was necessary to further the process.

In most States with active ISL facilities, the UIC program is part of a larger regulatory program that governs mining activities, wellfield operations, and groundwater protection issues. These programs were developed to adequately protect the State's groundwater resources. In Nebraska, the Nebraska Environmental Protection Act (the Act) has specifically addressed the environmental protection issues associated with ISL mining activities. The Act contains specific requirements to ensure that ISL mining is conducted in an environmentally sensitive manner. In implementing the requirements of the Act, the NDEQ has developed an extensive array of rules and regulations that govern underground injection control, groundwater protection, and mineral exploration activities. In many significant respects, these regulations build upon the requirements of the EPA UIC Program.

This document was prepared for the use of NRC in reviewing the UIC regulatory program implemented in the State of Nebraska as it applies to groundwater protection at the Crow Butte Uranium Mine. CBR is in a unique position to compare the regulatory requirements of the NRC, the EPA, and the NDEQ. The intricacies of ensuring compliance with these different regulatory programs over the years have led to an intimate knowledge of the various requirements. CBR believes that this knowledge places us in a position to provide the NRC with valuable assistance in determining which NRC programs may be deferred to NDEQ.

This review begins with a discussion of the EPA UIC program requirements contained in Title 40 Code of Federal Regulations (CFR). The review then discusses in detail the NDEQ groundwater protection statutes and programs. An analysis of the provisions of the State programs in comparison with the federal requirements is provided. Additional requirements that are implemented by the Nebraska regulatory program and the conditions set through the NDEQ permitting process are reviewed in detail. Finally, the areas where CBR's NRC Source Materials License overlaps the EPA and Nebraska programs are discussed.

The EPA UIC program defines five classes of injection wells. CBR has a "Class III" UIC permit for mining operations and a "Class I" permit for disposal of wastewater resulting from the mining operation. Since CBR has both permits, both Class I and Class III programs are discussed in this document. However, the issues involving dual NRC and State regulation of CBR's operations relate primarily to the Class III operation. NRC has historically relied largely on the EPA and State programs for issues related to Class I injection activities. Therefore, the focus of this document is on Class III regulation. The Class I program is presented as warranted to provide and understanding of the full scope of the EPA and NDEQ programs.

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# 2 U.S. ENVIRONMENTAL PROTECTION AGENCY REGULATORY PROGRAM

## 2.1 INTRODUCTION TO UNDERGROUND INJECTION CONTROL

The EPA is responsible for regulation of underground injection control under Part C of the SDWA.

Underground injection is the technology of placing fluids underground, in porous formations of rocks, through wells or other similar conveyance systems. While rocks such as sandstone and limestone appear to be solid, they can contain significant voids or pores that allow water and other fluids to fill and move through them. Man-made or produced fluids (liquids, gases or slurries) can move into the pores of rocks by the use of pumps or by gravity. The fluids may be water, wastewater, or water mixed with chemicals (e.g., lixiviant solutions for ISL operations). Injection well technology can predict the capacity of rocks to contain fluids and the technical details to do so safely. When wells are properly sited, constructed, and operated, underground injection is an effective and environmentally safe method to dispose of wastes or recover resources.

The SDWA established the Underground Injection Control (UIC) Program to provide safeguards to ensure that injection wells do not endanger current and future underground sources of drinking water (USDW). The UIC Program defines an injection well as any bored, drilled, or driven shaft or a dug hole, where the depth is greater than the largest surface dimension that is used to discharge fluids underground. This definition covers a wide variety of injection practices that range from technically sophisticated wells which pump fluids into isolated formations to the far more numerous on-site drainage systems, such as septic systems, cesspools, and storm water wells, that discharge fluids a few feet underground.

The EPA groups underground injection into five classes for regulatory control purposes. Each class includes wells with similar functions so that technical requirements can be applied consistently to the class. Class I wells involve the emplacement of hazardous and nonhazardous fluids (industrial and municipal wastes) into isolated formations beneath the lowermost USDW. Because they may inject hazardous waste, Class I wells are the most strictly regulated and, in some cases, may further be regulated under the Resource, Conservation and Recovery Act (RCRA). Class II wells are used for the injection of brines and other fluids associated with oil and gas production. Class III wells encompass the injection of fluids associated with solution mining of minerals. Class IV wells inject hazardous or radioactive wastes into or above a USDW and are banned unless authorized

under other Statutes for ground water remediation. Class V wells include all underground injection not included in Classes I through IV. Class V wells inject nonhazardous fluids into or above a USDW and are typically shallow, on-site disposal systems, such as floor and sink drains which discharge directly or indirectly to ground water, dry wells, leach fields, and similar types of drainage wells.

The UIC regulatory program has had significant success ensuring the safe injection of solutions in underground aquifers. Injection of waste solutions began in the 1930's with oil companies disposing of oil field brines and other waste solutions in depleted reservoirs.[3] Installation of these wells increased substantially in the 1960's and 1970's, growing at a rate of 20 new wells per year. Concerns over injection practices, including well failures, led EPA to oppose underground injection without strict controls. In 1974, Congress passed the SDWA, requiring EPA to establish regulations to protect USDWs. In 1980, EPA passed the UIC regulations.

The current UIC program reflects years of experience with the siting, construction, and operation of injection wells. The practices that led to well failures in the early years of underground injection have been addressed in the current program requirements. In an EPA study of more than 500 hazardous and nonhazardous Class I wells, a loss of mechanical integrity contributed to only four cases of significant migration of solutions, and none of these affected a USDW. Waste injection activities today involve the safe disposal of over 9 billion gallons of hazardous waste each year and 2 billion gallons of oil and gas brine *each day*. The UIC Program has clearly had great success ensuring the protection of USDWs while allowing for safe and economical waste disposal and mineral production activities. However, the potential risks of underground injection must be evaluated to understand the controls contained in the UIC program.

### 2.1.1 Risks Associated With Injection Wells

If an injection well is improperly designed, constructed, or operated outside of permitted limits, such a well has the potential to adversely affect the water quality of a USDW. In carrying out the mandate of the SDWA, EPA provides that no injection is authorized if it results in the movement of fluid containing any contaminant into a USDW. Once injected into a well, the injected fluids potentially can migrate to USDWs through the following pathways:

1. Failure of the well, or

2. Improperly plugged or completed wells near the well, or

[3] U.S. Environmental Protection Agency, EPA 816-R-01-007, *Class I Underground Injection Control Program: Study of the Risks Associated With Class I Underground Injection Wells*, March 2001.

3. Natural pathways if the well is improperly designed and/or sited.

*Well Failure*

A well failure may be caused by simultaneous leaks in the well tubing and casing, or when injected fluid is forced upward between the well casing and the well bore through an improperly cemented annulus. This type of failure is referred to as a loss of the mechanical integrity of the well. The well construction requirements of the UIC program are intended to address this potential. A mechanical integrity failure can result from corrosion or mechanical failure of the casing materials. To reduce the potential threat of well failures, operators must demonstrate the mechanical integrity of the injection well before it is allowed to operate, and for Class I wells, must continuously monitor the annulus integrity during well operations. In addition, operators must conduct appropriate mechanical integrity tests (MITs) every year (for Class I hazardous wells) and every 5 years (for Class I nonhazardous and Class III wells) thereafter to ensure the wells have mechanical integrity and are fit for operation. In addition, more frequent monitoring is required by some States.

*Improperly Plugged or Completed Wells*

Improperly plugged or completed wells that penetrate the confining zone near the injection well can provide a pathway for fluids to travel from the injection zone to USDWs. To protect against migration through this pathway, wells that penetrate the zone affected by injection pressure must be properly constructed or plugged. Before injecting, operators must identify all wells within the Area of Review that penetrate the injection or confining zone, and repair all wells that are improperly completed or plugged before a permit is issued. The area of review is the zone of endangering influence around the well, or the radius at which pressure due to injection could potentially cause the migration of the injection and/or formation fluid into a USDW, if a direct pathway for migration is present.

*Transmissive Faults*

Fluids could potentially be forced upward from the injection zone through transmissive (naturally-occurring) faults in the confining beds which, like abandoned wells, can act as pathways for fluid migration to USDWs. Further, fractures may be formed during injection, either by the injected solutions dissolving the rocks of the confining zone, or by injecting fluids at excessive pressures (e.g., pressures greater than the formation fracture pressure). To reduce this risk, EPA requires that injection wells be sited such that they inject below a confining bed that is free of known transmissive faults, and operating controls are implemented to prevent the creation of fractures in the confining zone.

EPA's extensive technical requirements for injection wells are designed to prevent contamination of USDWs via these potential pathways. The UIC Program prevents this contamination by setting minimum design, operational, and monitoring requirements, which are discussed in the following sections. These minimum requirements affect the siting of an injection well, and the construction, operation, maintenance, monitoring, testing, and finally, the closure of the well to achieve EPA's goal of preventing contamination of a USDW.

### 2.1.2 Criteria for Underground Injection Wells

EPA's siting, construction, operating, monitoring, and closure requirements provide multiple safeguards to prevent the movement of injected wastewaters to USDWs. The following sections describe the general criteria from the regulations in Title 40 CFR Part 146.

*Siting Requirements*

Injection wells must be sited so that injected fluids are injected into a formation that is isolated from a USDW. Operators must use geologic and hydrogeologic studies and studies of penetrations of the injection and confining zones to demonstrate that the proposed injection will not endanger USDWs. Well permitting decisions are based on whether the receiving formations are sufficiently permeable, porous, and thick enough to accept the injected fluids at the proposed injection rate without requiring excessive pressure. The confining zones should be of low vertical permeability to prevent upward or downward movement of injected materials.

Injected fluids must be geochemically compatible with the well materials and the rock and fluids in the injection and confining zones. Operators must demonstrate that the injected solution and its anticipated reaction products are compatible with both the geologic material of the injection zone and any native or previously injected fluids. Water analyses must be performed to characterize the geochemistry of the native water to predict potential interactions, and, for Class III operations, to provide baseline water quality information for the mining zone, and potentially, overlying USDWs.

*Area of Review*

The area of review (or the zone of endangering influence as defined by EPA) is the radius at which injection potentially could affect a USDW, if a pathway for fluid migration existed. This radius may be fixed or determined by mathematical computation. When a

fixed radius is used, the area of review must be, at a minimum, one-quarter mile. Within the area of review, all wells that penetrate the injection or confining zone must be identified. The permittee must determine whether any of these wells are improperly completed or plugged and thus could serve as pathways for migration. Before commencing injection, it must be demonstrated that all potential pathways for migration have been adequately addressed.

*Construction Requirements*

EPA requires that injection wells be designed and constructed to prevent the movement of injected solutions into USDWs. Construction requirements for Class I and III wells are set forth at Title 40 CFR Part 146. During the permit application process, the EPA or the implementing State reviews and approves the well design details. The design must be based on the depth of the well, the chemical and physical characteristics of the injected fluids, the injection pressure, rate, temperature, and volume, the size of the well casing and the cementing requirements. Any changes to the proposed design during construction must be approved before being implemented. During well construction, operators must run logs and tests (e.g., resistivity, temperature, gamma ray, density and cement bond logs, cut cores) to assess formation characteristics and demonstrate the integrity of the well. EPA or the implementing State at their discretion may witness construction activities.

*Operating Requirements*

EPA's operating requirements for injection wells provide multiple safeguards to ensure that injected solutions are fully confined within the injection zone and that the integrity of the confining zone is not compromised. At a minimum, all injection wells must be operated so that injection pressures will not initiate new fractures or propagate existing fractures (e.g., natural fractures or those created during well completion and stimulation of the injection zone during well completion). For Class I wells, the annular space between the tubing and the casing must be maintained at a specified pressure (e.g., a combination of fluid and applied surface pressure) such that a pressure change between the tubing and the annulus will indicate a loss of mechanical integrity.

*Monitoring and Testing Requirements*

Operators of injection wells must monitor and test for mechanical integrity, containment within the injection zone and characteristics of the injected wastewater. In addition, for Class III operations, they must also monitor USDWs for indications of fluid migration and pressure changes indicating a potential for contamination. Class I well operators must continuously monitor injection pressure, flow rates and volumes, and annular pressure.

Periodic testing of all injection wells is also required. Operators of Class I nonhazardous and Class III wells must demonstrate mechanical integrity every 5 years.

UIC regulations authorize the use of monitoring wells to monitor fluids and pressure. Monitoring wells are used to supplement required injection and pressure monitoring if needed. The location, target formation, and the types of monitoring wells are based on potential pathways of contaminant migration. Monitoring within the USDW can provide evidence of changes in water quality over time if any. Because typical Class I injection operations are at great depth into a zone isolated from USDWs, the use of monitoring wells generally is applicable to Class III, rather than Class I operations.

*Reporting and Record Keeping Requirements*

All injection well operators must report the results of required monitoring and testing to the State or EPA UIC Director.

*Closure Requirements*

Injection well operators must submit a plugging and abandonment report indicating that the well was plugged in accordance with the plugging and abandonment plan (submitted when the well was permitted).

### 2.1.3 EPA Administration of the UIC Program

Underground injection wells are regulated under the SDWA to ensure protection of USDWs. EPA may authorize State agencies to regulate underground injection wells, if the State meets the requirements specified under section 1422 of the SDWA. States that receive primary regulatory and enforcement responsibility are referred to as primacy States. EPA regional offices administer the UIC program for tribes and in States that do not have primacy authority, commonly referred to as direct implementation States. EPA may authorize State to implement the Class I, III, IV and V programs, the Class II program, or all programs.

## 2.2 EPA UNDERGROUND INJECTION CONTROL REGULATIONS

The implementing regulations for the EPA UIC program are contained in Title 40 CFR Parts 124 and 144 though 148:

- Part 124 contains the public participation requirements that must be met during permitting activities.
- Part 144 contains the permitting and other program requirements for all UIC Programs.
- Part 145 contains the elements of a State application for primacy to administer a UIC Program.
- Part 146 sets forth the technical criteria and standards that must be met in permits and authorizations by rule as required by Part 144.
- Part 147 sets forth the applicable UIC programs for each of the States, territories, and possessions.

Each of these Parts, except Part 124, is discussed briefly in the following sections.

### 2.2.1 Title 40 CFR Part 144 - Underground Injection Control Program

The provisions in 40 CFR Part 144 serve as the basic requirements of the UIC Program. State programs must meet these minimum requirements in order to obtain primacy from the EPA. This section of this document reviews the principal elements of Part 144.

*Classification of Wells*

The UIC Program provides for classification of five types of injection wells. 40 CFR §144.6 provides the following detailed definitions for Class I and Class III wells.

- Class I wells are segregated into hazardous and non-hazardous wells. Class I hazardous injection wells are used by generators of hazardous waste or owners or operators of hazardous waste management facilities for disposal by injection. Class I non-hazardous wells are used as industrial and municipal disposal wells for non-hazardous waste streams. Under EPA rules, Class I disposal wells must inject waste beneath the lowermost formation containing, within one-quarter mile of the well bore, a USDW.

- Class III injection wells are used for the extraction of minerals including mining of sulfur by the Frasch process and in situ production of uranium or other metals. This category includes only in-situ production from ore bodies that have not been conventionally mined.

Class II wells are used to inject waste produced during oil and gas production operations. Class IV wells involve the injection of hazardous or radioactive waste within ¼ mile of a USDW. Class V wells include all injection wells not included in Classes I, II, III, or IV.

For the purposes of the Crow Butte project, Class III mineral extraction wells are used for the mining process. CBR operates a Class I nonhazardous injection well for disposal of

waste, primarily a brine, generated during the restoration and mining processes. A Class I nonhazardous deep disposal well is also sited at Crow Butte for disposal of process solutions. In addition, the Crow Butte site sanitary system is regulated as a Class V injection well. Because the Class V permit does not relate directly to the Class III operations regulated by NRC, the Class V program will not be discussed further in this document.

*Identification of underground sources of drinking water and exempted aquifers*

40 CFR §144.3 defines a USDW as an aquifer or its portion thereof, which (1) supplies any public water system, or (2) which contains a sufficient quantity of ground water to supply a public water system, and (a) currently supplies drinking water for human consumption, or (b) contains fewer than 10,000 mg/l total dissolved solids (TDS). Further, a USDW cannot be an exempted aquifer.

A State can also designate (and request approval from EPA for) aquifers (or portions of aquifers) that meet the criteria for a USDW as exempted from this definition if they do not serve as a source of drinking water and will never serve as a drinking water source in the future using the criteria in 40 CFR §146.04. Exemptions typically are granted for aquifers that contain commercial minerals (such as oil, gas, uranium and table salt), or from which the use of the water as a public supply is technically or economically impractical. While an implementing State must approve an aquifer exemption, the EPA generally makes the final determination on all exemptions (some States have the authority to grant exemptions for waters between 3,000 and 10,000 TDS waters). EPA also offers a chance for a public hearing, if the water in the aquifer has less than 3,000 mg/l TDS. In order to obtain an aquifer exemption for Class III wells, the permit application must contain the necessary data to demonstrate that the aquifer contains minerals or hydrocarbons that are commercially producible. No aquifer is an exempted aquifer until it has been designated under the procedures in §144.7 and §146.04. Aquifers that do not fit the definition of a USDW are not exempted aquifers. They are simply not subject to the special protection afforded USDWs.

### 2.2.2 Title 40 CFR Part 145 - State UIC Program Requirements

EPA may authorize States to implement the UIC program. States have the option of applying for primary responsibility, or primacy, for the UIC program for all classes of injection wells; for only oil and gas related wells (Class II wells); or for all wells except oil and gas related wells (Classes I, III, IV and V). If a State does not obtain primacy for all or some of the well classes, then EPA implements the program directly through one of its Regional offices. EPA has delegated primacy for all well classes to 34 States including

Nebraska; it shares responsibility in 6 States and implements the program for all well classes in 10 States.

Part 145 specifies the procedures that EPA will follow in approving, revising, and withdrawing State programs under section 1422 of the SDWA. Part 145 includes the elements that must be part of submissions to EPA for program approval and the substantive provisions that must be present in State programs for them to be approved. These substantive provisions include requirements for permitting, compliance evaluation, enforcement, public participation, and sharing of information. The requirements are found in subpart B of Part 145. Many of the requirements for State programs are made applicable to States by cross-referencing other EPA regulations. In particular, many of the provisions of Parts 144 and 124 are made applicable to States by the references contained in §145.11.

State submissions for program approval must be made in accordance with the procedures in Subpart C of Part 145. This includes developing and submitting to EPA a program description (§145.23), an Attorney General's Statement (§145.24), and a Memorandum of Agreement with the Regional Administrator (§145.25). Upon submission of a complete program, EPA will conduct a public hearing, if interest is shown, and determine whether to approve or disapprove the program taking into consideration the requirements of Part 145, the SDWA and any public comments received.

Nothing in Part 145 precludes a State from adopting or enforcing requirements that are more stringent or more extensive than those required by EPA. A State may also operate a program with a greater scope of coverage than that required under Part 145. Where an approved State program has a greater scope of coverage than required by Federal law the additional coverage is not part of the federally approved program.

All State programs must have the legal authority to implement each of the permitting provisions from Part 144. States are not precluded from omitting or modifying any permitting provisions to impose requirements that are more stringent.

When a State UIC program is fully approved by EPA to regulate all classes of injections, the State assumes primary enforcement authority under section 1422(b)(3) of the SDWA.

### 2.2.3 Title 40 CFR Part 146 - Underground Injection Control Program: Criteria and Standards

Title 40 CFR Part 146 provides detailed technical criteria and standards for the Underground Injection Control Program. These criteria include construction, testing, operating, monitoring, and reporting requirements for each classification of injection well. Part 146 also provides the requirements for proper plugging and abandonment of wells following completion of injection activities.

Following a discussion of the standards and criteria that apply to all injection wells, Part 146 is arranged according to the classification of well. Subpart B is applicable to Class I wells and Subpart D applies to Class III wells. Subpart G applies to Class I hazardous waste injection wells. While CBR does not operate a Class I hazardous waste injection well, many of the criteria for this Class of well in Subpart G of Part 146 are the basis for the Nebraska requirements for Class I non-hazardous wells. These more stringent requirements for Class I wells are discussed in detail in Section 4 of this document.

An important criteria defined in Part 146 is that for an exempted aquifer.

*Criteria for exempted aquifers*

40 CFR §146.4 states that "*an aquifer or a portion thereof which meets the criteria for an ``underground source of drinking water'' in §146.3 may be determined under 40 CFR §144.8 to be an ``exempted aquifer'' if it meets the following criteria:*

*(a) It does not currently serve as a source of drinking water; and*

*(b) It cannot now and will not in the future serve as a source of drinking water because:*

*(1) It is mineral, hydrocarbon or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible.*

*(2) It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical;*

*(3) It is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption; or*

*(4) It is located over a Class III well mining area subject to subsidence or catastrophic collapse; or*

*(c) The total dissolved solids content of the ground water is more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water system.*

*Criteria and Standards Applicable to Class I Injection Wells*

The EPA requires in Subpart B of Part 146 that Class I injection wells be sited in such a fashion that they inject into a formation which is beneath the lowermost formation containing, within one quarter mile of the well bore, a USDW. All Class I wells must be cased and cemented to prevent the movement of fluids into or between USDWs. The casing and cement used in the construction of each newly drilled well must be designed for the life expectancy of the well. Specific well construction techniques are provided to ensure the integrity of the well. Appropriate logs and other tests are required during the drilling and construction of new Class I wells (i.e., those wells installed after the promulgation of the UIC regulations).

Operating requirements specify that the combination of injection pressure at the wellhead plus the pressure (hydrostatic head) of the injected fluid do not exceed the fracture pressure of the disposal zone. Minimum monitoring requirements include the analysis of the injected fluids, the installation and use of continuous recording devices to monitor injection pressure, flow rate and volume, and the pressure on the annulus between the tubing and the long string of casing, and the demonstration of mechanical integrity at least once every five years during the life of the well.

Subpart B also requires an annual ambient monitoring program to determine the site-specific potential for fluid movement from the well or injection zone. This requirement includes monitoring of the pressure in the injection zone including a shut down of the well for a time sufficient to conduct a valid observation of the pressure fall-off curve.

*Criteria and Standards Applicable to Class III Wells*

Subpart D of Part 146 requires that all new Class III wells must be cased and cemented to prevent the migration of fluids into or between underground sources of drinking water. The casing and cement used in the construction of each newly drilled injection well must be designed for the life expectancy of the well. Specific well construction techniques are provided to ensure the integrity of the well. Appropriate logs and other tests are required during the drilling and construction of new Class III wells.

Subpart D also requires that where Class III injection is into a formation that contains water with less than 10,000 mg/l TDS, monitoring wells must be completed into the injection zone and into any underground sources of drinking water above the injection zone that potentially could be affected by the mining operation. These monitoring wells are located to detect an excursion of injection fluids, if such an event were to occur, outside the

mining area or zone. Where injection is into a formation that contains water in excess of 10,000 mg/l TDS, no monitoring wells are necessary in the injection stratum.

Operating requirements in Subpart D specify that the injection pressure at the wellhead not exceed a calculated maximum that assures that the pressure in the injection zone does not initiate new fractures or propagate existing fractures. Minimum monitoring requirements include the analysis of the injected fluids.

*Criteria and Standards Applicable to Class I Hazardous Waste Injection Wells*

Due to the type of fluids injected in a Class I hazardous waste injection well, stringent criteria are provided by EPA in Subpart G of Part 146. These criteria modify or are in addition to those in Subpart B for Class I nonhazardous wells. The purpose of reviewing these more stringent requirements in this document is that many of the Subpart G provisions for Class I hazardous waste wells have been adopted by the NDEQ in their rules and regulations for Class I nonhazardous wells.

The area of review for Class I hazardous wells is 2 miles from the well bore instead of ¼ mile radius specified for Class I non-hazardous and Class III wells. The owner or operator must identify all wells penetrating the confining zone or injection zone within this expanded area of review and determine whether the wells are adequately completed or plugged. For wells that are improperly plugged, completed, or abandoned, corrective action is required to prevent movement of fluids into or between USDWs. Construction, logging, sampling, and testing requirements before operation are more stringent for hazardous waste wells. During operation, the annulus pressure must exceed the operating injection pressure. Automatic alarms and shutoff systems are required in addition to continuous recording. In addition to the annual fall-off test, an internal MIT must be performed annually. An external MIT is required every five years. Finally, a closure plan is required that provides for post-closure care with specific requirements that financial responsibility be provided through approved instruments.

### 2.2.4 Title 40 CFR Part 147 - State Underground Injection Control Programs

EPA is required to codify State UIC programs in the Code of Federal Regulations. This is necessary so the public can easily identify the entity that implements the Federal UIC program in all jurisdictions. EPA is also required under Sections 1421, 1423, and 1449 of the SDWA to be able to directly enforce in States. EPA is able to comply with this requirement by adopting by reference the laws and regulations that the State uses to implement its UIC program.

Information on State UIC programs, including statutes, regulations and other documents relevant to the legal status of the programs, is found in Part 147. The applicable UIC program for a State is either a State-administered program approved by EPA, or a federally administered program promulgated by EPA. As previously noted, the UIC program may consist of a State-administered program applicable to some classes of wells and a federally administered program applicable to other classes of wells.

Approval of a State program is based upon a determination by the Administrator that the program meets the requirements of section 1422 or section 1425 of the SDWA and the applicable provisions of Parts 124, 144, and 146 of Title 40. A federally administered program is promulgated in those instances where the State has failed to submit a program for approval or where the submitted program does not meet the minimum statutory and regulatory requirements.

The Nebraska program for all classes of injection wells is codified in Subpart CC of Part 147. EPA approved the program in 1984 with the requirements of Nebraska statutes and regulations incorporated by reference. This incorporation by reference includes the statutes contained in the Nebraska Environmental Protection Act and Title 122 - Rules and Regulations for Underground Injection and Mineral Production Wells. Therefore, the Nebraska statutes and Title 122 are enforceable by EPA as federal regulatory requirements.

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# 3 STATE OF NEBRASKA REGULATORY PROGRAM

The environmental protection program in the State of Nebraska is based upon the Nebraska Environmental Protection Act, Revised Statutes of Nebraska Sections 81-1501 through 81-1532. The NDEQ is responsible for the promulgation of rules and regulations to implement the provisions of the statutes. This responsibility includes the implementation of the UIC program within the State.

Nebraska was granted primacy for the UIC program by EPA in 1984. In addition to the specific statutes and regulations that were incorporated by reference in Title 40 Part 147, other statutes and regulations that are not directly related to the EPA UIC program apply to mining operations at Crow Butte. This section discusses the relevant statutes and regulations that make up the Nebraska program and their effectiveness at protecting groundwater resources during solution mining activities.

## 3.1 NEBRASKA ENVIRONMENTAL PROTECTION ACT

The statutes contained in the Revised Statutes of Nebraska, sections 81-1501 through 81-1532 are collectively referred to as the Nebraska Environmental Protection Act (the Act). These statutes form the basis of environmental protection laws in the State of Nebraska. The following sections are directly relevant to operations at Crow Butte.

### 3.1.1 Statute §81-1502, Definitions

The definitions section of the statute provides definitions for mineral production wells, injection wells, mineral exploration holes, solution mining, and uranium. EPA does not define mineral production wells in the UIC regulations. Nebraska by statute defines a mineral production well as:

*(33) Mineral production well shall mean a well drilled to promote extraction of mineral resources or energy, including, but not limited to, a well designed for (a) mining of sulfur by the Frasch process, (b) solution mining of sodium chloride, potash, phosphate, copper, uranium, or any other mineral which can be mined by this process, (c) in situ combustion of coal, tar sands, oil shale, or any other fossil fuel, or (d) recovery of geothermal energy for the production of electric power.*

The inclusion of mineral production wells in the statute and regulations is an important addition to the federal program. The NDEQ regulates mineral production wells in the same

manner as Class III injection wells. The importance of this provision is discussed in more detail in Section 4.2 of this document.

### 3.1.2 Statute §81-1504; Powers and Duties of the Department of Environmental Quality

Section 81-1504 sets forth the powers and duties of the Nebraska Department of Environmental Quality. The NDEQ has exclusive general supervision in the State of Nebraska to administer and enforce the Act and any rules and regulations promulgated under the Act. The NDEQ has the duty to develop comprehensive programs for the prevention and control of pollution of the air, waters and land of the State. In performing this duty, the statute provides NDEQ with the authority to issue rules and regulations and permits.

### 3.1.3 Statute §81-1505; Standards of Air, Land, and Water Quality

Section 81-1505 of the statute requires the Environmental Quality Council (EQC) to adopt standards of air, land, and water quality. Article (9) is related to mineral exploration and mineral production and injection wells (i.e., Class III wells). Article (9)(a) requires the EQC to adopt rules for regulating mineral exploration, production, and injection wells. The EQC must consider the quality of existing groundwater, the effects of any exemptions from standards, and the requirements for restoration of the affected aquifer. Article (9)(c) states:

> *With respect to mineral production wells, the council shall adopt and promulgate rules and regulations which require restoration of air, land, water, and subsurface resources and require mineral production well permit applications to include a restoration plan for the air, land, water, and subsurface resources affected.*

The statute at Article (9)(c) goes beyond the EPA program requirements for Class III wells in two important provisions. First, the federal UIC program does not specifically regulate mineral *production* wells since these do not meet the definition of an injection well. Therefore, in the EPA program, major provisions such as construction, monitoring, operation, and testing requirements do not apply to mineral production wells. In the Nebraska statute, these wells are specifically defined and are included in all of the requirements for injection wells.

The second important provision where the Nebraska statute exceeds the federal program is the requirement for restoration of "*...the air, land, water, and subsurface resources affected*"... by mining operations. The EPA has no similar provisions in the federal Class III UIC program. Under the EPA, restoration of an affected resource (including

groundwater) is not required. In Nebraska, for Class III wells, restoration is required by statute.

Another important stipulation of §81-1505 in Article (9)(c) is the provisions for permitting Class III wells. The statute allows for issuance of a Research and Development (R&D) permit. A commercial Class III permit may only be issued after "*...a finding by the department that the injection and restoration procedures authorized by the research and development permit have been successful in demonstrating the applicant's ability to inject and restore in a manner which meets the standards required by this subsection and the rules and regulations*". The requirement for the successful completion of a pilot program under an R&D permit including successful aquifer restoration before a commercial permit will be issued is not envisioned in the federal program.

Finally, §81-1505 Article (9)(d) clearly defines restoration as it relates to Class III mineral exploration and mineral production as "*...the employment, during and after an activity, of procedures reasonably designed to control, minimize, and eliminate hazards to humans, animals, and the environment, to protect the public health and welfare and air, land, water, and subsurface resources, and to return each resource to a quality of use consistent with the uses for which the resource was suitable prior to the activity*".

A copy of the Nebraska Environmental Protection Act contained in the Revised Nebraska Statutes, Sections 81-1501 through 81-1532 is included as Appendix A. The rules and regulations that directly govern groundwater protection at Crow Butte are discussed in the following sections.

## 3.2 NEBRASKA UNDERGROUND INJECTION CONTROL PROGRAM

Title 122 - *Rules and Regulations for Underground Injection and Mineral Production Wells* was specifically developed by the State of Nebraska for ISL uranium mining and was incorporated by EPA in Title 40 CFR Part 147, Subpart CC. Appendix B provides a detailed analysis of the provisions of Title 122 that relate directly to those required by the EPA in Title 40 CFR Part 144. Section 4 of this document reviews the provisions of Title 122 that set criteria that are more stringent than those required by EPA.

A copy of Title 122 – Rules and Regulations for Underground Injection and Mineral Production Wells is included in Appendix C.

The NDEQ has proposed changes to Title 122 that will tentatively presented to the EQC in September 2001. The proposed revisions primarily affect Class V wells to meet revised federal standards and improve the Class V program. There are minor proposed revisions to

the Class I and Class III UIC Programs that could affect the Crow Butte operation. These proposed changes include the following:

1. Move mineral production wells from a separate classification to classification as a Class III well;
2. Add the requirement that well be closed if not in use or if directed by the NDEQ Director;
3. The design for Class I and Class III wells would need the approval of a Professional Engineer (PE) licensed in the State of Nebraska;
4. Construction of all wells would need to be performed by a licensed Water Well Contractor under the rules of the Nebraska HHS;
5. Reference to mineral production wells would be added to the operating requirements provisions;
6. Discussion of restoration would be added to the Plugging and Abandonment chapter. These new provisions require the submission of a restoration plan for Class III well fields that underlie or are in an exempted aquifer.

Since these revisions are currently proposed and are subject to the public comment process and review by the Nebraska EQC before approval, a copy of the proposed revision is not included. CBR will notify NRC when the final revision is approved. However, based upon the proposed changes, it is not expected that there will be any changes that would affect an NRC conclusion concerning the areas of duplication with NDEQ.

## 3.3 NEBRASKA GROUND WATER PROTECTION STANDARDS

Title 118 - *Groundwater Quality Standards and Use Classification*, provides NDEQ rules and regulations concerning the classifications and water quality standards for groundwater in the State of Nebraska. As stated in Chapter 2 of Title 118, 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.*

As the foundation for groundwater protection in the State of Nebraska, Title 118 is the basis for the excursion control and restoration provisions related to Class III operations. Title 118 also provides important additional protection for groundwater from potential point source pollution events that could occur at a solution uranium mine.

Title 118 applies to all ground waters in the State of Nebraska with several exceptions, including the following:

> *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 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.*

This exception would apply to the portion of the basal sandstone of the Chadron Formation included in the CBR aquifer exemption approved by the NDEQ and the EPA. Therefore, Title 118 specifically excepts the aquifer exemption area from the standards established for contaminants that are directly related to in-situ leach mining for uranium during the period that the aquifer is exempted.

Another important provision of Title 118 is the antidegradation clause contained in Chapter 3. It is the stated policy of the State of Nebraska to protect and improve the quality of groundwater for all beneficial uses and, where existing groundwater quality is better than the quality established by the standards, the water quality would be maintained and protected. Degradation of high quality water is only allowed after public notice and hearing and a determination that economic and social development justifies such degradation.

### 3.3.1 Numerical Groundwater Standards

Chapter 4 of Title 118 provides the numerical standards for wastes, toxic substances, and pollutants introduced into groundwater by human activity. These standards are based upon drinking water standards and health advisories established by the EPA. Chapter 5 of Title 118 lists the sources of the standards. The primary sources are 40 CFR Part 141, National Primary Drinking Water Regulations (NPDWR); 40 CFR Part 143, National Secondary Drinking Water Regulations (SDWR); and the Nebraska Safe Drinking Water Act, Nebraska Revised Statutes, Section 71-5301.

For the most part, the numerical standards in Title 118 are based upon the NPDWR; however, for some parameters the SDWR have been used. The following definitions for these standards and advisories must be understood to comprehend the basis for the groundwater quality standards.

The NPDWR promulgate Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) for contaminants in water. The *MCL* is the highest level of a contaminant allowed in drinking water. MCLs are set as close to the MCLG as

feasible using best available treatment technology and considering cost. MCLs are enforceable standards for drinking water. The *MCLG* is a non-enforceable health goal that is set at a level at which there is no known or anticipated adverse health affect, allowing an adequate margin of safety.

The *SDWRs* are non-enforceable federal guidelines regarding cosmetic affects, such as tooth or skin discoloration, or aesthetic affects, such as odor, taste and color. At significantly higher concentrations, some of the parameters listed in the SDWRs may cause health affects. The SDWRs are intended as guidelines for the States.

An additional category of concentrations that have been used by NDEQ to set the Crow Butte restoration standards are *health advisories.* Health advisories are an estimate of acceptable drinking water concentrations based on health affects information and are not legally enforceable. Health advisories are intended to serve as technical guidance and are categorized in one day, ten day, and lifetime exposure concentrations that are not expected to cause adverse affects.

The Title 118 standards are used as the basis for the groundwater restoration standards established in CBR's Class III UIC permit. However, the permit also establishes restoration standards for many parameters that are not included in Title 118. These additional restoration parameters are ammonium, molybdenum, nickel, uranium, vanadium, calcium, total carbonate, potassium, magnesium, sodium, and total dissolved solids.

The following table compares the current EPA drinking water standards and health advisories (EPA 822-B-00-001, attached as Appendix D) with the groundwater protection standards from Title 118 and the restoration standards from CBR's Class III UIC permit.

## Sources of Groundwater Quality and Restoration Standards

| Parameter | EPA Standard/Advisory[1] | NDEQ Title 118 Chapter 4 | Class III UIC Permit[2] |
|---|---|---|---|
| Ammonium (mg/l) | 30[3] | None | 10 |
| Arsenic (mg/l) | 0.05 | 0.05 | 0.05 |
| Barium (mg/l) | 2 | 1 | 1 |
| Cadmium (mg/l) | 0.005 | 0.005 | 0.005 |
| Chloride (mg/l) | 250[4] | 250 | 250 |
| Copper (mg/l) | 1.3[5] | 1 | 1 |
| Fluoride (mg/l) | 4 | 4 | 4 |
| Iron (mg/l) | 0.3[4] | 0.3 | 0.3 |
| Mercury (mg/l) | 0.002 | 0.002 | 0.002 |
| Manganese (mg/l) | - | 0.05 | 0.05 |
| Molybdenum (mg/l) | - | Reserved | 1.0 |
| Nickel (mg/l) | - | Reserved | 0.15 |
| Nitrate as N (mg/l) | 10 | 10 | 10 |
| Lead (mg/l) | 0.015[6] | 0.05 | 0.05 |
| Radium (pCi/l) | 5 | 5 | 5 |
| Selenium (mg/l) | 0.05 | 0.05 | 0.05 |
| Sulfate (mg/l) | 250[4] | 250 | 250 |
| Uranium (mg/l) | 0.03[7] | Reserved | 5 |
| Vanadium (mg/l) | - | Reserved | 0.2 |
| Zinc (mg/l) | 5[4] | 5 | 5 |
| pH (SU) | 6.5 – 8.5 | 6.5 – 8.5 | 6.5 – 8.5 |
| Calcium (mg/l) | - | - | Note 8 |
| Total Carbonate (mg/l) | - | - | Note 9 |
| Potassium (mg/l) | - | - | Note 8 |
| Magnesium (mg/l) | - | - | Note 8 |
| Sodium (mg/l) | - | Reserved | Note 8 |
| Total Dissolved Solids | 500[4] | - | Note 10 |

Notes:

1 EPA standard is the Maximum Contaminant Level (MCL) unless otherwise noted.

2 For parameters with baseline concentrations that exceed the standard from the permit, the restoration standard is set at the preoperational baseline average plus two standards deviations.

3 Lifetime health advisory level.

4 Secondary drinking water level.

5 1.3 mg/l Action Level/MCLG; 1.0 mg/l secondary drinking water level.

6 0.015 mg/l Action Level/ 0.0 mg/l MCLG.

7 0.03 mg/l MCL phased in by December 2003.

8 The restoration standard for these parameters is set at one order of magnitude above baseline due to ability of certain ions to vary with pH.

9 Total carbonate cannot exceed 50% of the TDS value.

10 TDS must be restored to the baseline mean plus one standard deviation.

It should be noted that the use of the Title 118 standards, which were intended for application to public drinking water supplies, is conservative when applied to an exempted aquifer. By definition, an exempted aquifer does not now and will not in the future serve as a source of public or private drinking water. However, Chapter 6 of Title 118 requires that the groundwater of the State of Nebraska be protected from impairment for beneficial use. Since drinking water is the highest and most sensitive beneficial use, this standard is used for groundwater protection in the CBR permit.

### 3.3.2 Groundwater Classification

Chapter 7 of Title 118 classifies groundwater in the State of Nebraska in three categories based upon existing and potential drinking water use. The classification is determined by the baseline condition of the aquifer. The three classifications are as follows.

- Class GA groundwater is currently being used (or is proposed to be used) as a public drinking water supply.
- Class GB groundwater is currently being used or has the potential to be used as a public or private drinking water supply but currently cannot be classified as Classes GA or GC.
- Class GC groundwater is not being used and has little potential to be used as a public or private drinking water supply.

The groundwater in the mining zone aquifer at Crow Butte has been classified as Class GB. Chapter 8 notes that an aquifer does not have to be reclassified as a Class GC for an aquifer exemption petition to be considered or granted by NDEQ.

### 3.3.3 Point Source Regulation

When regulating potential point sources, the NDEQ considers the classification of the groundwater, vulnerability to pollution, potential beneficial uses and characteristics of a potential point source. This regulatory control includes all point sources for which the NDEQ has regulatory authority including injection wells (under Title 122) and mineral exploration holes (under Title 135).

### 3.3.4 Remedial Action Provisions

Title 118 Chapter 10 requires remediation of groundwater that has been adversely affected by a point source pollution event. Specifically, Chapter 10 states that:

*"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".*

The provisions of this chapter are intended to protect groundwater from impacts, including those caused by an injection activity permitted under Title 122, unless the permit contains an approved Remedial Action plan. Appendix A of Title 118 contains a detailed remedial action program that requires immediate actions in response to an event with an immediate threat. These immediate actions are supplemented by final remedial actions to return the affected aquifer to an acceptable quality. Appendix A provisions would apply to any pollution event that occurs at Crow Butte and affects groundwater quality that is not covered by an approved plan.

The CBR Restoration Plan has been approved by the NDEQ, so aquifer restoration efforts would not be covered by this provision of Title 118. However, any unintentional surface or subsurface release that affected groundwater would require remediation under Title 118. Potential events in this category could include surface spills or well casing leaks that reach a shallow aquifer.

A copy of Title 118 - Ground Water Quality Standards and Use Classification is included in Appendix E.

## 3.4 NEBRASKA MINERAL EXPLORATION STANDARDS

Title 135 - Rules and Regulations for Mineral Exploration Holes (NDEQ). applies to mineral exploration holes that are drilled for exploration of any mineral resource, excluding oil and gas. In order to conduct such exploration, Title 135 implements the requirements discussed in the following sections.

### 3.4.1 Permitting

A mineral exploration permit is required for these activities in the State of Nebraska. The permit application must include legal information concerning the permittee, a map showing the location of the activities and a description including the number of holes and the surface disturbances. The application must describe the drilling activity and schedule

and address the environmental protection requirements. Financial responsibility for plugging and abandonment and surface restoration is also required.

### 3.4.2 Environmental Protection

All operations must be conducted in accordance with applicable federal and State regulations to protect the air, water, land, and subsurface resources of the State of Nebraska. In addition, consultation with the Nebraska Game and Parks Commission is specified to protect fisheries and wildlife habitat.

Immediately following collection of geological and geophysical information, holes must be properly plugged in accordance with the plugging plan submitted with the permit application. This requirement is intended to protect from surface and subsurface contamination and commingling of aquifer fluids. Surface restoration including backfilling any pits, topsoil placement and vegetation restoration is required.

A copy of Title 135 - Rules and Regulations for Mineral Exploration Holes is included in Appendix F.

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# 4 NEBRASKA PROTECTION PROVISIONS BEYOND THE FEDERAL PROGRAM

As noted in Section 3.1, the Nebraska Environmental Protection Act stipulates many requirements that build on the federal UIC program. These statutory requirements are reflected in Title 122, which implements a program that is more restrictive than the requirements of Title 40 Part 144 in several areas. This section of this document discusses the areas where the Nebraska program has built upon the requirements of the EPA to provide a comprehensive program to minimize the environmental impacts of injection activities in Nebraska.

In several areas, the UIC program promulgated by the EPA does not provide the regulatory requirements that have been considered necessary by the implementing States and the NRC for ISL uranium projects. The most important area where there is a perceived gap in the EPA program is groundwater monitoring and restoration. The EPA program has no monitoring or restoration requirements for an exempted aquifer under the SDWA and the UIC regulations. EPA stated during the Crow Butte aquifer exemption process that groundwater monitoring, restoration, and other requirements are not provided by the SDWA and should be a condition of the permits issued by the implementing State. In issuing an exemption, EPA is affirming that an aquifer is not considered a potential source of drinking water. As such, no restoration would be required. EPA has stated that "corrective action" could be required if an adjacent USDW could be affected by an exempted mining zone.

Another area where the EPA program has a perceived weakness is in regulation of mineral production wells. The UIC program governs underground *injection* activities. There are no provisions for the permitting, construction, testing, monitoring, plugging and abandonment, and reporting for mineral production wells.

Finally, the federal UIC program provides financial responsibility requirements that apply only to Class I hazardous wells. There are no similar requirements for Class I non-hazardous and Class III injection wells. NRC and the implementing States have historically required that ISL uranium operators provide acceptable financial assurances that will ensure that the environment in the mining zone, impacted USDWs (if any) and the land surface directly affected by the ISL mining operation will be restored following mining activities.

## 4.1 RESTORATION

The federal UIC program does not specifically require restoration of the affected environment. However, Title 122 in several locations requires that a restoration plan be submitted and approved before mining activities are permitted.

- In Chapter 1, related to Class III ISL operations, NDEQ provides the following definition of restoration:

  *"Restoration" shall mean the employment, during and after an activity, of procedures reasonably designed to control, minimize, and eliminate hazards to humans, animals, and the environment, to protect the public health and welfare and air, land, water, and subsurface resources, and to return each resource to a quality of use consistent with the "uses for which the resource was suitable" prior to the activity. Restoration shall be considered not accomplished if, after subsurface operations end, an aquifer is unsuitable for any use for which it was suitable before the subsurface operations began or if the post-activity water quality is such that treatment is preferable hydrologically, as determined by the Department in the exercise of its discretion, for the conduct of any such use.*

- In Chapter 11, related to Class III operations, the informational requirements for the permit application states that the applicant must submit:

  *006.26 A plan demonstrating the resources (Chapter 37) necessary to close, plug or abandon the well (as required by Chapter 36) and to conduct restoration of the affected aquifer and of the affected surface resources.*

  NDEQ has a regulatory requirement to show available resources to abandon the well(s) and restore the affected (e.g., mining zone) aquifer, which carries through from the statutory requirements discussed in Section 3.1.3.

- Chapter 17 includes specific operating requirements for Class I and Class III wells. In addition, Chapter 17 states the following for Class III wells:

  *003 Restoration and Financial Responsibility Requirements During Operation*

  *Any person conducting Class III activities shall comply with the restoration plan as approved by the Director (Chapter 9, 008) and maintain financial responsibility as per Chapter 37.*

EPA does not have a similar financial responsibility requirement for Class III wells in the federal program. The only financial responsibility requirements (contained in 40 CFR §146.73) apply to post-closure care of Class I hazardous wells.

- Chapter 36 implements the provisions of 40 CFR §146.10 for plugging and abandoning Class I and Class III wells. However, Chapter 36 adds the following provisions:

  *In the case of a Class III well field which underlies or is in an aquifer which has been exempted, the plugging and abandonment plan shall also address the restoration of the aquifer (Chapter 9, 008 and Chapter 11).*

  40 CFR §146.10 requires that the permittee demonstrate protection of USDWs. For Class III operations, the NDEQ Director may include "aquifer cleanup and monitoring where he deems it necessary and feasible to insure adequate protection of USDWs." The permissive provision in Part 146 has been changed to a requirement in Title 122, Chapter 36.

## 4.2 MINERAL PRODUCTION WELLS

The well classification provisions in Chapter 2 of Title 122 meet the EPA requirements and add several classes of wells to Class III. More significantly, Chapter 2 provides a separate classification for mineral production wells, which are not covered by the EPA UIC regulations since these wells are not "injection" wells. Following classification in Chapter 2, mineral production wells are included with Class III injection wells throughout Title 122.

The significance of this provision is that, whereas the EPA regulations only apply to injection wells, Nebraska has specifically included mineral production wells under the UIC regulations. Therefore, regulatory provisions from Title 122 that apply to permitting, construction, testing, monitoring, plugging and abandonment, and reporting programs are applicable to mineral production wells. The proposed revision to Title 122 would add mineral production wells to the Class III definition, which would ensure that all Class III requirements would apply to these wells.

Mineral production wells are currently referenced in the following chapters of Title 122:

- Chapter 1, *Definitions* includes a definition for mineral production wells;
- Chapter 2, *Classification of Injection Wells and Mineral Production Wells* currently lists mineral production wells after the classifications for Class I through V. (The proposed revision to Title 122 would add mineral production wells to the Class III classification).

- Chapter 3, *Prohibition of Unauthorized Injection and Construction* includes reference to mineral production wells.
- Chapter 4, *Prohibition of Movement of Fluids Into Underground Sources of Drinking Water* includes mineral production wells in the prohibition of movement of fluids into USDWs and subjects operators to additional requirements imposed by the NDEQ if monitoring indicates affects to a USDW.
- Chapter 8, *Authorization of Underground Injection Wells and Mineral Production Wells By Permit; When Required* requires a permit to operate mineral production wells.
- Chapter 9, *Permit Conditions; General* requires maintenance of financial responsibility for closure of mineral production wells. There is a proposed revision to require closure of wells no longer in use or if deemed necessary by the NDEQ Director that would include mineral production wells.
- Chapter 15, *Construction requirements; Class I and III Injection Wells and Mineral Production Wells* include mineral production wells in the siting and construction requirements for Class III wells. Proposed revisions would require construction to a design approved by a PE and construction by a licensed water well contractor under the Nebraska HHS rules.
- Chapter 16, *Mechanical Integrity* includes mineral production wells in the mechanical integrity testing requirements for Class III wells.
- Chapter 17, *Operating Requirements*, would contain requirements for mineral production wells under the proposed changes to Title 122.
- Chapter 19, *Reporting Requirements* requires notification of completion and opportunity to inspect before production wells can be placed in service. Reporting of MIT results and monitoring data is also included for mineral production wells.
- Chapter 26, *Permit Transfer* includes reference to mineral production wells.
- Chapter 27, *Permit Modification, Revocation and Reissuance* includes mineral production wells with the requirements for Class III wells.
- Chapter 35, *Corrective Action* requires applicants for Class III or mineral production wells to comply with the corrective action.
- Chapter 36, *Plugging and Abandonment* includes mineral production wells in the plugging and abandonment requirements for Class III injection wells.

As indicated by this extensive list, mineral production wells are currently required to meet the important provisions of Title 122 and are listed throughout the regulation. The proposed NDEQ revision to the classification of Class III wells (i.e., to include mineral production wells in the Class III definition) would ensure that all Class III provisions would apply.

## 4.3 IDENTIFICATION OF UNDERGROUND SOURCES OF DRINKING WATER AND EXEMPT AQUIFERS

The criteria for an exempted aquifer referenced in §146.4 are listed in Title 122 Chapter 5. In order to be exempted, an aquifer in Nebraska must not currently serve as a source of drinking water. In addition, the permittee must show that the aquifer will not serve as a source of drinking water in the future because it is mineral producing, at a depth or location that makes recovery impractical, or be so contaminated that it cannot be treated. The EPA criteria for an aquifer exemption also provides that an aquifer may be exempted if the TDS content of the ground water is more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water system. The NDEQ criteria do not include this provision for an aquifer exemption based simply on the TDS of the aquifer.

## 4.4 ZONE OF ENDANGERING INFLUENCE AND AREA OF REVIEW

The EPA defines the area of review as the zone of endangering influence around the well, or the radius at which pressure due to injection could potentially cause the migration of the injection and/or formation fluid into a USDW, if a pathway for such migration exists. The EPA regulations require a mathematical computation of the zone of endangering influence or use of a fixed ¼ mile radius, and the greater of the two applies. For Class I hazardous waste injection wells, this area of review is increased to a 2-mile radius. As noted, improperly plugged or completed wells that penetrate the confining zone within the area of review near the injection well could provide a pathway for fluids to travel from the injection zone to USDWs.

In Title 122, the zone of endangering influence either is defined as a fixed ¼ mile radius or is determined mathematically, similar to EPA requirements. The area of review is then defined as a two-mile radius *around the zone of endangering influence*. Therefore, the total area of review under Nebraska regulations would be a minimum of 2 to 2 ¼ miles from the well. The expanded area of review defined in the Nebraska regulations is significant because operators must identify all wells that penetrate the injection or confining zone within this area and determine whether any of these wells are improperly completed or plugged and thus could serve as pathways for migration of wastewaters. Along with the permit application, the operator must submit a corrective action plan containing the necessary steps or modifications to address improperly completed or plugged wells. Before commencing injection, the operator must demonstrate that all potential pathways for migration have been adequately addressed. The expanded Nebraska requirements for determining the areal extent of the area of review provide additional assurances of confinement and protection for USDWs.

## 4.5 ADDITIONAL REQUIREMENTS FOR CLASS I WELLS

Title 122 Chapter 18 contains specific monitoring requirements for Class I and III wells as required in Title 40 CFR 146 Subparts B and D. In addition to the requirements of the federal program, Chapter 18 requires a MIT for Class I non-hazardous wells on a two-year schedule. The EPA places Class I nonhazardous wells on a five-year MIT schedule.

Title 122 Chapter 20 provides requirements for performing an annual monitoring program on Class I wells to determine the pressure buildup in the injection zone. This program includes, at a minimum, shutting in the well for a period and observing the pressure fall-off curve. This requirement is similar to those contained in 40 CFR §146.68, which applies to Class I hazardous waste wells; however, this is not a federal requirement for Class I non-hazardous waste wells.

## 4.6 PERMIT TRANSFER

For the transfer of a permit for Class I and III injection and mineral production wells, additional information beyond that required by EPA must be submitted to the NDEQ Director including:

- A written agreement between the existing and proposed new permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them, received at least 90 days before the proposed transfer;
- The method by which the proposed new transferee shall meet the financial responsibility requirements;
- The Director re-examines the amount constituting financial responsibility in view of the change of circumstances arising from the proposed transfer;
- The proposed new permittee furnishes to the Director information including the operators technological expertise to construct and operate the facility and a description of all related underground injection projects that the operator is or has been involved including any citations, notices of violation, or lawsuits associated with these projects; and
- The transfer must be by modification of the permit to reflect any changes made by the Director.

## 4.7 CORRECTIVE ACTION

The provisions of Chapter 35 for corrective actions for wells that penetrate the injection zone generally are similar to those contained in 40 CFR §144.55 and §146.7. However, there are two significant differences. The first is the inclusion of mineral production wells.

In addition, due to the large area of review (i.e., two mile radius) implemented by NDEQ as discussed in Section 4.4, corrective actions may be required for a much larger number of wells.

## 4.8 FINANCIAL RESPONSIBILITY

Chapter 37 provides financial responsibility requirements for each permit application. These requirements are significantly more stringent than EPA. The EPA, in 40 CFR Part 144, Subpart F, *Financial Responsibility: Class I Hazardous Waste Injection Wells*, requires adequate financial resources for closure and post-closure care of Class I hazardous waste wells. There is no similar requirement for Class I non-hazardous or Class III injection wells or for other tasks associated with site decommissioning.

Chapter 37 requires adequate financial resources for all permits to "*...undertake environmental protection measures necessary to prevent contamination of ground water having 10,000 mg/l or less TDS during and after the cessation of operations*". These measures include, but are not limited to:

> *Any improper management techniques committed during the term of the permit;*
>
> *The proper closing, plugging, and abandonment of a well(s);*
>
> *The proper disassembly, decontamination, and restoration of the aquifer site;*

When estimating these costs, the permittee must consider the probable difficulty of completing the requirements due to such factors as topography, geology of the site, hydrology and any post-operational monitoring that may be required by the Environmental Protection Act, the regulations of Title 122, and/or the permit. The permittee must also provide for any additional estimated costs to Nebraska that may arise from public contracting requirements or the need to bring personnel and equipment to the permit area to complete the restoration.

Chapter 37 also describes the different forms of financial assurance that are acceptable to NDEQ. Appendices I through IV contain specific examples of Environmental Protection Trust Agreements, Financial Guarantee Bonds, Irrevocable Standby Letters of Credit, and Letters from the Chief Financial Officer.

## 4.9 PENALTIES FOR NONCOMPLIANCE

Chapter 39 provides administrative enforcement provisions for failure to comply with the requirements of Title 122. The federal UIC regulations do not contain the enforcement provisions because it was the intention of Congress that the States implement the SDWA since groundwater resource protection is traditionally the responsibilities of the States.

# 5 UNDERGROUND INJECTION CONTROL PERMITTING

The Nebraska statutes and regulations require that the NDEQ ensure that all underground injection activities in the State be conducted by rule or permit. As noted in Appendix B, Nebraska allows injection by rule for Class V injection wells only. There are no provisions for injection by rule into Class I or III wells.

CBR holds two UIC permits from the NDEQ. A Class I non-hazardous injection well permit authorizes disposal of process wastes into a deep disposal well. The Class I permit is discussed briefly in this section. A Class III UIC permit authorizes mining uranium in the approved permit area. The provisions of the Class III permit are discussed in detail in this Section.

## 5.1 CLASS I UIC PERMIT

CBR is authorized to operate a Class I non-hazardous injection well under UIC Permit number NE0206369. The permit was modified on October 30, 2000 and is effective through September 29, 2004. The permit allows injection of wastewater into the Morrison and Sundance Formations. A copy of CBR's Class I UIC Permit is included as Appendix G.

## 5.2 CLASS III UIC PERMIT

CBR is authorized for underground injection and mineral production wells under Class III UIC Permit number NE0122611. The permit became effective on April 23, 1990. The permit was last modified on March 9, 2001 and is effective for the life of the facility unless revoked and reissued, or terminated. The modification in March 2001 included the required five-year permit review by NDEQ, including public notice and opportunity for public hearings.

The permit allows CBR to operate a Class III uranium mining operation involving the operation of injection and mineral production wells. The permit implements the requirements of the NDEQ Rules and Regulations in Titles 122 and 118 and includes specific requirements suited to the facility. In many areas, the NRC source materials license and the Class III UIC permit mirror each other since they were developed in parallel. A short description of each Part of the permit is included in the section. A copy of CBR's Class III UIC Permit is included as Appendix H.

### 5.2.1 Part I – Specific Permit Conditions

Part I of the Class III UIC permit contains specific requirements governing the Crow Butte mining operation. A general description of the permitted activity is provided. Following this description, the requirements for the Notice of Intent to Operate are delineated. CBR is required to submit this notice for each mine unit or portion thereof. The information requirements include well completion information for each injection, production and monitor well, baseline sampling data used for determination of restoration values and UCLs, and MIT results for each well. CBR is not allowed to begin production in new mining areas until the Director of NDEQ has reviewed and approved the Notice of Intent to Operate.

Part I discusses the waste streams created by the permitted activity and the approved disposal methods. Liquid radioactive wastes must be disposed in lined evaporation ponds or the permitted deep disposal well. Solid radioactive wastes must be disposed in accordance with Source Materials License SUA-1534.

Section E of Part I contains requirements for development drilling and abandonment of uncased holes. This section also contains requirements for soil conservation and reclamation of drill pits. Hole abandonment reports must be submitted quarterly.

### 5.2.2 Part II – Injection Limitations, Monitoring Requirements, and Determination of Restoration

Section A of Part II contains limitations on the quantity and quality of injection solution. The monitoring requirements and limitations on the composition and chemical characteristics of the lixiviant are defined. NDEQ has also implemented limitations on the number of mine units that CBR can have in operation, restoration, and constructed at any given time. The areas of influence for the three pump tests conducted to demonstrate confinement and hydrologic conditions are provided in Section A and Figure 2. CBR is not allowed to construct any mine units outside these areas of influence until additional pump tests have been performed.

Section A also implements protections for archeological and architectural sites that have been identified within the permit area.

Section B of Part II includes the permit monitoring requirements. This section includes the monitor well sampling regime and excursion determination criteria in Table 2.3. Evaporation pond monitoring requirements and leak determination procedures are included. Pond monitoring is required in accordance with Source Materials License SUA-1534 with the addition of specific requirements contained in Part II.

Section C of Part II contains the requirements for restoration determination. CBR must designate one injection or restoration well per acre as a restoration well with a minimum of ten wells per mine unit. Monitor wells that have experienced an excursion also become restoration wells. The baseline restoration wells are identified in the Notice of Intent to Operate for the mine unit.

The establishment of restoration parameters is provided in Section C. Those parameters that have a ground water standard in Title 118 must be restored to the standard value unless the standard is exceeded by the baseline mean. Any change to the standards in Title 118 would be effective immediately under this provision and would not require the modification of the permit and Table 2.6, Restoration Table. Determination of the restoration values for those parameters where the baseline mean exceeds the standard is specified.

At the cessation of mining, CBR must notify the NDEQ in writing and determine post-mining water quality. A restoration plan must be submitted for the NDEQ approval before restoration is begun. NDEQ may require the installation of additional wells to evaluate restoration success. When restoration is complete, CBR must submit the data to NDEQ and obtain split samples from the designated restoration wells for submission to NDEQ's independent laboratory.

Section C also contains specific requirements for stabilization and determination of restoration. Procedures are provided for restoration where all parameters meet the standards. If the restoration standards are not achieved, CBR must propose alternate restoration values and provide justification demonstrating the application of best available technology. The NDEQ may approve alternate values after reviewing the current and expected use of the groundwater and the efforts made to meet the standards. This includes the determination that further efforts would waste the energy, water, or other natural resources of the Sate without providing a corresponding benefit. If the NDEQ does not approve alternate values, CBR must submit a plan for additional restoration efforts.

### 5.2.3 Part III – Well Construction, Spacing, Sampling and Reporting

Part III provides specific requirements for well construction including cement and grout specifications, monitor well spacing requirements, mine unit and evaporation pond monitor well sampling procedures, and preoperational sampling for newly constructed restoration and monitor wells. CBR must notify the NDEQ five days before construction of shallow monitor wells. Part III also specifies requirements for a quarterly Mining Monitoring Report (MMR).

### 5.2.4 Part IV – Plugging and Abandonment of Cased Holes

Part IV provided the requirements for abandonment of cased holes, including abandonment cement specifications and surface reclamation requirements. These requirements are different from those contained in Part I for uncased holes. CBR must submit a plugging and abandonment plan for NDEQ approval that meets the requirements of Title 122 Chapter 36. Plugging procedures must prohibit movement of water from the injection zone into or between USDWs. CBR must notify the NDEQ seven days before plugging a cased well.

### 5.2.5 Part V- Other Permits and Licenses

Part V requires that CBR must have all other permits and licenses required by the NDEQ or other federal, State, or local agencies.

### 5.2.6 Part VI – Corrective Action

Part VI specifies the actions that CBR must take in response to lixiviant movement from the mine unit, including overrecovery of solutions, reordering the wellfield, or cessation of injection. Any mining solution release that affects the shallow aquifer (e.g., well casing leak or surface release) must be addressed through an approved corrective action plan that meets the requirements of Title 118, Appendix A as discussed in Section 3.3.4 above. A release of mining solutions that affect surface water must also be addressed by an approved corrective action plan.

### 5.2.7 Parts VII through IX

Parts VII through IX provide permit definitions, evidence of financial responsibility requirements, and standard permit conditions. The sections serve to include by reference many of the commitments made in the permit application and the regulatory requirements contained in Title 122.

# 6 OVERLAPPING NRC LICENSING CONDITIONS

## 6.1 INTRODUCTION

As discussed in the preceding sections of this review, the EPA has promulgated an extensive program under the SDWA to protect groundwater. In addition to the federal program, the State of Nebraska, through statute, rule and regulation, and permit, has met the criteria set by the EPA and has exceeded that federal standard in many important regards.

The adequacy of the program of controls promulgated by the NRC and the NDEQ has been shown over the course of the Crow Butte project to date. Both agencies permitted the initial R&D efforts. After the commercial production of uranium from the Chadron Formation was proven, CBR successfully completed groundwater restoration to appropriate standards in the R&D wellfield. Based on this success, a full Class III UIC permit and commercial NRC operating license were issued to CBR in 1991.

In the ten years since the commercial permit was approved, CBR has safely produced in excess of 7 million pounds of yellowcake ($U_3O_8$). During that ten-year period, CBR has successfully completed its first commercial wellfield restoration and met the stringent groundwater standards set by the State of Nebraska. Operational challenges, while few, have been successfully detected and dealt with under the permitting and licensing requirements. These challenges have included a production zone monitor well excursion in Mine Unit 5 and a shallow monitor well excursion caused by a casing failure that affected a shallow aquifer. In each case, the requirements of the groundwater program were implemented and found to be effective for environmental protection. Furthermore, as the project has gained commercial experience, improvements have been made to the program to ensure the continued protection of the groundwater resources.

This section reviews the conditions specified in CBR's NRC Source Materials License. The review is based on Amendment 11 of SUA-1534 dated June 26, 2001. Many of the License Conditions restate the requirements of the EPA and the State of Nebraska. As such, these License Conditions are duplicative, requiring the expenditure of scarce CBR and NRC resources. Where the Nebraska requirements meet the NRC licensing conditions and acceptance criteria, it is hoped that NRC can defer active regulation to the NDEQ.

The specific NRC requirements from CBR's source materials license are stated in each section. The NRC acceptance criteria for these requirements are then discussed as provided

in NUREG-1569[4]. Note that NUREG-1569 is a draft document that has not been issued by NRC in final form. The uranium recovery industry submitted extensive comments on this document. Therefore, any changes that NRC proposes in a final NUREG-1569 in response to public comment are not reflected in the comparisons made in this document.

After defining the NRC licensing conditions, this review discusses the appropriate regulatory requirements of the State of Nebraska under the Nebraska Environmental Protection Act statutes and the NDEQ Rules and Regulations. In most areas, the licensing and guidance provisions of NRC are implemented in Nebraska through statute and regulation. Finally, following the review of the Nebraska statutory and regulatory programs, the specific requirements of the UIC permit are discussed.

To aid in reviewing this comparison, Figure 1 contains a matrix that allows cross-referencing the NRC requirements and acceptance criteria and the appropriate provisions of the Nebraska regulatory program that relate to Class III operations.

[4] US Nuclear Regulatory Commission, *DRAFT STANDARD REVIEW PLAN for In Situ Leach Uranium Extraction License Applications*, NUREG-1569, October 1997.

# Figure 1 – Regulatory Matrix – Class III Operations

| NRC License Requirement | Lixiviant Composition (LC 10.1) | Well Construction and Testing (LC 10.2) | | Preoperational Baseline Groundwater Quality and Aquifer Restoration (LC 10.3) | | | Determination of Excursion Indicators and UCLs (LC 10.4) |
|---|---|---|---|---|---|---|---|
| | | Well Construction Methods | Well MIT | Sample Collection (LC 10.3A) | Sample Parameters (LC 10.3B) | Restoration Standards (LC 10.3C) | |
| **NRC Acceptance Criteria (NUREG-1569)** | **3.1.3(3)(d)** | **3.1.3(2)(a)** | **3.1.3(2)(b)** | **5.7.8.3(1)** | **5.7.8.3(1) Table 2.7-1** | **6.1.3** | **5.7.8.3** |
| **Nebraska State Regulatory Program Element** | **Statutory and Regulatory Requirements** | | | | | | |
| **Nebraska Environmental Protection Act (Statute 81-1501 to 81-1532)** | §81-1505 (9)(a) | §81-1505 (9)(a)(iv) | | §81-1505 (9)(a)(iii); §81-1505 (9)(c); §81-1505, (9)(d) | | | §81-1504 (2); §81-1509 (9) |
| **Title 122 – Underground Injection Control** | Chapter 11, 006.16; Chapter 11, 006.17; Chapter 15, 002.02D | Chapter 11, 006.25; Chapter 15 | Chapter 16; Chapter 18, 003.03 | Chapter 1 | | Chapter 1; Chapter 9, 008; Chapter 11, 006.26; Chapter 17, 003; Chapter 36, 004 | Chapter 4; Chapter 11, 006.22; Chapter 15, 002.02F; Chapter 18, 003; |
| **Title 118 – Groundwater Protection Standards** | | | | Chapter 1 | Chapter 2, 002 | Chapter 1; Chapter 4 | |
| **Permit Requirements** | | | | | | | |
| **Class III UIC Permit NE0122611** | Part I, A.2; Part I, B.8.c; Part II, A.1 | Part III | Part I, B; Part III, A.1.d; Part IX, A.2 | Part II, C; Part III, D | | | Part III, B; Part III, D; Part II, B; Part I, B.5 |

| NRC License Requirement | Production Zone Monitor Well Spacing (LC 10.16) | Injection and Recovery Well Monitoring (LC 11.1) | Monitor Well Sampling and Excursion Reporting (LC 11.2) | Excursion Reporting LC 12.2) |
|---|---|---|---|---|
| **NRC Acceptance Criteria (NUREG-1569)** | **5.7.8.3(3)** | **3.1.3(3)** | **5.7.8.3(5) 5.7.8.3(6)** | **5.7.8.3(6)** |
| **Nebraska State Regulatory Program Element** | **Statutory and Regulatory Requirements** | | | |
| **Nebraska Environmental Protection Act (Statute 81-1501 to 81-1532)** | §81-1504 (2); §81-1509 (9) | | §81-1504 (2); §81-1509 (9) | §81-1504 (25); §81-1505 (16) |
| **Title 122 – Underground Injection Control** | Chapter 15, 002.02F; Chapter 15, 002.02I; Chapter 18, 003 | Chapter 11, 006.16; Chapter 17, 002.02; Chapter 18, 003.02. | Chapter 4; Chapter 11, 006.22 Chapter 18, 003; | Chapter 19, 001.06 |
| **Title 118 – Groundwater Protection Standards** | | | | |
| **Permit Requirements** | | | | |
| **Class III UIC Permit NE0122611** | Part III, B.1 | Part II. | Part II, B. | Part II, B. |

## 6.2 LICENSE SECTION 10 – OPERATIONS, CONTROLS, LIMITS, AND RESTRICTIONS

### 6.2.1 License Condition 10.1 – Composition of Lixiviant

License Condition 10.1 describes the approved composition of the lixiviant used at Crow Butte:

*10.1 The licensee shall use a lixiviant composed of native groundwater, with added sodium carbonate/bicarbonate and oxygen or hydrogen peroxide, as described in the approved license application.*

NUREG-1569 requires that the makeup of the lixiviant be described in Section 3.0, Description of Proposed Facility. The acceptance criteria in section 3.1.3(3)(d) states that lixiviants containing oxidants (such as oxygen or hydrogen peroxide) and carbonates (such as sodium carbonate and sodium bicarbonate) have been demonstrated to be suitable.

*Nebraska Regulatory Requirements*

Nebraska Revised Statutes §81-1505, (9)(a) requires that the EQC adopt rules and regulations to control the operation of injection wells to protect the public health and welfare and the air, land, water and subsurface resources of the State of Nebraska. Title 122, Chapter 11 requires that a permit application contain sufficient data to determine the potential affects of a proposed project. Paragraph 006.16 requires the submittal of proposed operating data, including the "*...source and an analysis of the chemical, physical, radiological and biological characteristics of injection fluids*;" Paragraph 006.17 of Chapter 11 requires a formation testing program to determine the chemical, physical and radiological characteristics of the receiving formation and formation fluids. In Chapter 15, paragraph 002.02D requires that, where injection is into a water bearing formation, the fluid pressure, temperature, fracture pressure, physical and chemical characteristics of the injection zone and formation fluids, and the compatibility of injected fluids with formation fluids be determined for new Class III wells. The required information was included in Section 10 of the UIC Permit Application submitted to NDEQ. Similar information is contained in the License Renewal Application[5] (LRA) submitted to NRC.

[5] Crow Butte Resources, Inc., *Application for Renewal of USNRC Source Materials License SUA-1534*, December 1995.

*UIC Permit Requirements*

UIC Permit NE0122611 incorporates the information provided by CBR concerning lixiviant composition. Part I, A.2. states in part: *"The mining consists of injection of a sodium carbonate/bicarbonate solution along with an oxidant (oxygen or hydrogen peroxide) to the uranium-bearing formation through a pattern of injection wells."* The permit in Part I, B.8.c requires that the permittee submit the following information with the Notice of Intent submitted before operation of each mine unit or portion of a mine unit: *"Compatibility of injected materials with fluids in the injection zone and the minerals in both the injection zone and the confining zone."*

In Part II of the permit, Section A.1. provides injection well limitations, stating that CBR *"...is authorized to inject sodium carbonate/bicarbonate and an oxidant or a restoration reductant to the wells designated as injection wells."* Section A.1. also includes Table 2.1: Injection Well Requirements, which further limits the concentrations of selected parameters in the lixiviant. CBR is required to analyze 24-hour composite samples for chloride, sodium, sulfate, alkalinity, and pH and compare the analytical results with the limitations contained in Table 2.1. This requirement is more restrictive than the License Condition, because NRC does not have any similar limitations on these parameters in the lixiviant.

*Conclusion*

The Nebraska regulatory requirements ensure that a permit applicant determines the compatibility of the injection solution. The specific composition of the lixiviant at Crow Butte is incorporated in the permit and meets the acceptance criteria of NUREG-1569.

For License Condition 10.1, the requirements of the NDEQ regulatory program meet the NRC licensing conditions and acceptance criteria.

### 6.2.2 License Condition 10.2 – Well Construction and Testing

License Condition 10.2 describes the approved well construction and testing requirements at Crow Butte and states the following:

*10.2 The licensee shall construct all wells in accordance with methods described in Section 3.1.2 of the approved license application.*

*Mechanical integrity tests shall be performed on each injection and production well before the wells are utilized and on wells that have been serviced with*

*equipment or procedures that could damage the well casing. Additionally, each well shall be retested at least once every five (5) years it is in use. The integrity test shall pressurize the well to 125 percent of the maximum operating pressure and shall maintain 90 percent of this pressure for 20 minutes to pass the test. A single point resistance test may be used only in conjunction with another approved well integrity testing method. If any well casing failing the integrity test cannot be repaired, the well shall be plugged and abandoned.*

NUREG-1569 discusses well construction and testing methods in Section 3.0, Description of Proposed Facility. The acceptance criteria in Section 3.1.3(2)(a) discuss acceptable well design and construction methods. Acceptable methods must include the use of a casing material that is inert to the injection and formation fluids and has adequate structural strength for the planned application. Backfilling the annular space with cement or cement-bentonite grout is recommended. Well integrity testing is recommended for all injection and production wells in Section 3.1.3(2)(b). The preferred approach involves pressurizing the casing to maximum injection pressure and monitoring the pressure in the casing for 10 minutes. If the pressure does not drop 10 percent below the maximum applied, the casing is deemed acceptable. MITs are recommended after initial construction, once every five years if it is in use, and if the well has been serviced with equipment or procedures that could damage the casing.

*Nebraska Regulatory Requirements*

Nebraska Revised Statutes §81-1505, (9)(a) requires that the Environmental Quality Council adopt rules and regulations to control the construction of injection and mineral production wells to protect the public health and welfare and the air, land, water and subsurface resources of the State. §81-1505(9)(a)(iv) requires the adoption of standards for design of wells to provide this protection.

The well construction methods in use at Crow Butte were presented in the approved LRA and determined to meet the requirements of Title 122, Chapter 11, paragraph 006.25. These construction methods were developed to meet the specific requirements of Title 122 Chapter 15. The approved construction requirements include well casing and cementing specifications for Class III injection and mineral production wells. Note that the proposed revisions to Title 122 would add the requirement that the well design is approved by a PE and that construction be performed by a licensed water well contractor.

The NDEQ general mechanical integrity testing requirements are contained in Chapter 16 of Title 122. These requirements apply to injection and mineral production wells. Chapter 18 contains monitoring requirements and requires that a MIT be performed at least once every five years during the life of the well.

*UIC Permit Requirements*

In addition to the NDEQ regulatory requirements from Title 122, the Class III UIC Permit, Part III – *Well Construction, Spacing, Sampling, and Reporting* provides detailed well construction requirements including well completion methods and cement and bentonite grout specifications. Part III also ties well construction to the CBR Permit application, which provides well construction methods similar to those presented to NRC in the approved LRA.

The Class III UIC Permit in Part I.B., Notice of Intent to Operate, contains the specific requirement for performance of a MIT at 125 percent of maximum operating pressure with successful completion determined by maintaining 90 percent of this pressure for 20 minutes. Use of a single point resistivity method is only allowed in conjunction with the results of casing cementing pressure monitoring. These MIT performance requirements are identical to License Condition 10.2.

Part III of the UIC permit in Section A.1 contains requirements for performance of MITs on wells that have had a workover with a drilling rig before returning them to service. This requirement is intended to ensure that no physical damage has occurred during maintenance that may affect the integrity of the well casing.

Part IX of the UIC permit in Section A.2 contains the requirements for performance of a MIT at least once every five years of the life of the well. CBR is also required to provide five days advance notification to NDEQ so that the test may be witnessed, if so desired.

*Conclusion*

The Nebraska regulatory requirements ensure that a permit applicant submits proposed well design and construction methods that protect the environment. Chapter 15 of Title 122 specifies the criteria for determining appropriate casing materials and annulus cementing methods similar to those contained in the acceptance criteria of NUREG-1569. The Class III UIC permit expands these general requirements to specify construction methods and cement and grout specifications. In this area, the Nebraska program exceeds the NRC acceptance criteria.

The MIT requirements from Title 122 Chapter 16 and the UIC permit meet the requirements of License Condition 10.2 and exceed the acceptance criteria from NUREG-1569. CBR is required to perform an MIT and maintain 90 percent of the test pressure for 20 minutes. The NUREG-1569 acceptance criteria allow a ten-minute test. Chapter 18

requires that a MIT be performed at least once every five years during the life of the well. This requirement is more stringent than the NUREG-1569 criteria and the License Condition requirement since performing a five-year MIT under NRC requirements is predicated on whether the well is *in use*. Title 122 requires testing throughout the life of the well, regardless of whether the well is in use. Under the Nebraska regulatory and permit requirements, CBR must test all wells until they are properly plugged and abandoned.

For License Condition 10.2, the requirements of the NDEQ regulatory program meet and exceed the NRC licensing conditions and acceptance criteria.

### 6.2.3 License Condition 10.3 – Preoperational Baseline Groundwater Quality and Aquifer Restoration

License Condition 10.3 describes the approved method for determination of baseline groundwater quality and requires restoration of the affected groundwater. The required parameters are listed and the groundwater restoration goals are stated. License Condition 10.3 states the following:

*10.3 The licensee shall establish pre-operational baseline groundwater quality data for all mine units. Baseline water quality sampling shall provide representative pre-mining groundwater quality data and restoration criteria as described in the approved license application.*

*The data shall consist, at a minimum, of the following sampling and analyses:*

*A. Three samples shall be collected from production and injection wells at a minimum density of one production or injection well per 4 acres. These samples shall be collected at least 14 days apart.*

*B. The samples shall be analyzed for ammonia, arsenic, barium, cadmium, calcium, chloride, copper, fluoride, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, nitrate, pH, potassium, radium-226, selenium, sodium, sulfate, total carbonate, total dissolved solids, uranium, vanadium, and zinc.*

*C. Groundwater restoration goals shall be established on a parameter-by-parameter basis for the constituents identified in License Condition 10.3B. The primary goal of restoration shall be on a parameter-by-parameter basis to return the average wellfield unit concentration to baseline conditions. The secondary goal of groundwater restoration shall be on a parameter-by-parameter basis to return the average wellfield unit concentration to the numerical class-of-use standards established by the Nebraska Department of Environmental Quality, as described in*

*section 6.1.3 of the approved license application. The licensee shall conduct ground-water restoration activities in accordance with the groundwater restoration plan submitted by letter dated November 26, 1996.*

NUREG-1569 contains an extensive discussion of acceptable baseline determination and restoration methods, and groundwater restoration criteria. Section 5.7.8.3(1) discusses the acceptance criteria for determination of baseline concentrations of restoration parameters as contained in License Condition 10.3A. The acceptance criteria states that at least four sets of samples taken 2 weeks apart at a sampling density of one well per 4 acres of wellfield is an acceptable approach. Note that License Condition 10.3A allows the use of three sets of samples taken at a similar frequency and density for determination of baseline concentrations at Crow Butte.

Section 5.7.8.3(1) also discusses the acceptable parameter list, which is contained in Table 2.7-1 of NUREG-1569. Table 2.7-1 lists 34 parameters, including several parameters that are not included in License Condition 10.3B (e.g., boron, chromium, silver, gross alpha and gross beta). However, the list in License Condition 10.3B is more appropriate for the Crow Butte operation and was recently modified in Amendment 11 to remove many of these unnecessary parameters. NUREG-1569 envisions tailoring the proposed list to the site as allowed in Section 5.7.8.3(1).

Section 6.1.3 of NUREG-1569 discusses the acceptance criteria for groundwater restoration programs. The primary goal of restoration is to return the groundwater to baseline water quality. Baseline may be determined using statistical methods, including determination of the average for each parameter and applying a confidence interval of 99 percent or using the baseline mean plus 3 standard deviations.

NUREG-1569 recognizes that it is unlikely that restoration of all parameters to baseline will be achievable. In this case, secondary goals are allowed, which are based on the class of use standards for the aquifer. If restoration cannot return a parameter to the secondary standard, the licensee would have to demonstrate to NRC that leaving the parameter at a higher concentration would not be a threat to public health and safety or the environment.

*Nebraska Regulatory Requirements*

As discussed in detail in Section 4.1 above, the Nebraska regulatory program related to Class III operations includes statutory and regulatory requirements for groundwater restoration that are not a requirement of the federal UIC program. Nebraska Revised Statutes §81-1505, Article (9)(a)(iii) requires the determination of the quality of existing groundwater, the effects of an exemption for any aquifer, and the requirements for restoration of the aquifer. §81-1505, Article (9)(c) requires that any permit application

include a restoration plan for air, land, water, and subsurface resources affected by mining operations. §81-1505, Article (9)(d) provides the regulatory definition of restoration, requiring employment of procedures reasonably designed to eliminate hazards and *"...return each resources to a quality of use consistent with the uses for which the resource was suitable prior to the activity."* These statutory requirements pertain to the sampling and restoration standard determinations included in License Condition 10.3(A) and 10.3(C).

In Title 122 Chapter 1, NDEQ provides the regulatory definition of restoration. This definition includes the statutory definition and further clarifies that restoration is not complete if the aquifer is unsuitable for a pre-activity use or if the NDEQ believes that treatment is preferable for such use. Title 118 Chapter 1 also contains a definition of restoration that requires returning the affected aquifer to background quality.

In Title 122 Chapter 9, paragraph 008 requires that the permittee maintain financial responsibility to restore affected resources in accordance with the plan submitted under Chapter 11 and approved by the Director. Chapter 11, paragraph 006.26 requires that a permit application contain a plan demonstrating the ability to conduct restoration of the affected aquifer and the affected surface resources. Title 122 Chapter 17 requires that the permittee maintain the financial responsibility to conduct restoration during operations. Finally, Chapter 36 requires that the plugging and abandonment plan for any Class III wellfield that underlies or is in an aquifer that has been exempted address restoration of the aquifer.

Title 118 Chapter 2 provides that the numerical groundwater standards do not apply to an aquifer exempted under Title 122 *"...only for the groundwater contaminants directly related to the activity requiring exemption."* Through the UIC permit, NDEQ has determined a list of 27 parameters for which baseline concentrations must be determined and restoration standards apply. These 27 parameters are the same as those contained in License Condition 10.3B.

*UIC Permit Requirements*

The regulatory requirements for restoration are implemented throughout the Class III UIC permit. Part III D.1 contains the requirements for preoperational sampling of restoration wells. Sampling is required at a density of one well per four acres for the parameters from Table 2.6, which is similar to License Conditions 10.3A and 10.3B. However, the permit requires a minimum of one sample per well, while NRC requires three samples taken at least 14 days apart. NDEQ may require additional sampling if the analytical results are anomalous.

Part II C, Restoration Determination contains the specific instructions for determination of baseline concentrations of the 27 restoration parameters and determination of the effectiveness of restoration activities. Baseline restoration wells must be sampled at a frequency of one well per 4 acres, Specific requirements are provided for proper selection of restoration wells, which then must be approved by NDEQ in the Notice of Intent to Operate before placing the mine unit in operation. Parameters that have a numerical standard in Title 118 must be restored to that standard unless the baseline concentration exceeds the standard. CBR is required to submit the proposed restoration standards for a mine unit to NDEQ for approval with the Notice of Intent to Operate.

Part II C.3 provides detailed procedures for notifications, submittal of restoration plans, and provisions for split sampling with the NDEQ before, during, and after the restoration process. Section 4 outlines the factors that will be considered by the NDEQ in reviewing the results of restoration efforts. The restoration provisions of the NDEQ UIC permit have previously been discussed in detail in Sections 4.1 and 5.2.2.

*Conclusion*

The permit requirements for determination of background concentrations for affected parameters are similar to those contained in License Condition 10.3A and NUREG-1569 with the exception of the number of baseline samples obtained from each restoration well. NDEQ requires a minimum of one, with the proviso that additional samples may be required if the results are anomalous. The requirement for three samples at a 14-day interval was included in Part III C.2 of the permit until the modification issued on April 3, 1997. At that time, the requirement was apparently unintentionally removed. Other portions of the permit continue to reference three samples, such as Part II C.2.b., which states that "*...all three values obtained from Part II, C. shall be averaged to obtain the assigned restoration value*". The requirement for three samples would need to be reinstated in the permit or NRC would need to maintain the sampling frequency provisions of License Condition 10.3A in the license to ensure that three baseline samples were obtained.

The restoration parameters contained in License Condition 10.3B are identical to those contained in Table 2.6 of the UIC permit. As noted above, this License Condition was recently amended (Amendment 11) in part to reconcile the two parameter lists.

The statutory and regulatory restoration provisions in Nebraska require that resources, including water and subsurface resources, be restored to a quality of use similar to that for which the resource was suitable before mining. Title 118 defines restoration as returning the affected aquifer to background quality. If this is not achievable, the UIC permit specifies restoration standards based upon the State groundwater standards contained in

Title 118, Chapter 4. These groundwater standards are based on the federal standards in the NPDWR and the SDWR as discussed in Section 3.3.1. The standards set by NDEQ meet the criteria for secondary restoration standards discussed in NUREG-1569.

If restoration is not successful in achieving the secondary restoration goals for all parameters, the NRC provides guidance in Section 6.1.3(4)(c) of NUREG-1569 concerning staff review of any proposal of alternative standards. These provisions for alternative standards are not included in CBR's approved LRA or source materials license. However, the NDEQ UIC permit provides, in Part II C.4.b, detailed procedures for consideration of alternative restoration standards. These alternate standards procedures meet the acceptance criteria in Section 6.1.3(4)(c) of NUREG-1569.

For License Condition 10.3, the requirements of the NDEQ regulatory program meet NRC licensing conditions and acceptance criteria with the exception of specifying the number of baseline samples required. This issue can be corrected through a minor modification to the permit.

### 6.2.4 License Condition 10.4 – Determination of Excursion Indicators and UCLs

License Condition 10.4 describes the approved methods for determination of monitor well upper control limits at Crow Butte. The purpose of baseline sampling and determination of UCLs for shallow and perimeter monitor wells is to ensure that the mining solutions are confined to the mining zone and are not allowed to escape to a USDW. License Condition 10.4 states the following:

*10.4 The licensee shall establish Upper Control Limits (UCLs) in designated upper aquifer and perimeter monitoring wells before lixiviant is injected in each wellfield unit. The UCLs shall be established by collecting and analyzing ground-water samples from those designated wells according to the following criteria:*

*A. Three samples shall be collected from each designated monitoring well at a minimum density of: (1) one upper aquifer monitoring well per 5 acres of wellfield area, and (2) all perimeter monitoring wells. These samples shall be collected at least 14 days apart. The results of these analyses shall constitute the baseline for each designated well.*

*B. The samples shall be analyzed for the following indicator parameters: chloride, sodium, sulfate, conductivity, and total alkalinity.*

*C. The UCLs shall be calculated for each indicator parameter, in each monitoring well, as equal to 20 percent above the maximum concentration measured for that parameter, among the three baseline samples. For those indicator*

*parameters with baseline concentrations that average 50 mg/L or less, the UCL for that parameter may be calculated as equal to 20 percent above the maximum baseline concentration, the baseline average plus 5 standard deviations, or the baseline average plus 15 mg/L.*

NUREG 1569 provides the NRC acceptance criteria for determination of UCLs for perimeter and production zone monitor wells. In Section 5.7.8.3(1), NRC recommends four samples taken at least two weeks apart from each monitor well. The determination of appropriate excursion parameters and statistical and calculational methods is discussed in detail in Section 5.7.8.3(2).

*Nebraska Regulatory Requirements*

Nebraska Revised Statutes §81-1504(2) gives the NDEQ the power and duty to develop comprehensive programs to prevent and control pollution of the air, land, and waters of the State. In §81-1505(9) requires that the EQC adopt rules and regulations to provide standards for operation of mineral production and injection wells that will protect the public health and welfare and the air, land, water, and subsurface resources of the State. This statutory requirement is the basis for the excursion monitoring requirements.

Title 122 Chapter 4 prohibits the movement of fluids into a USDW. If water quality monitoring indicates that mining activities have had an affect on a USDW, the NDEQ is authorized to prescribe additional requirements for construction, corrective action, operation, monitoring, or reporting. The potential actions available to NDEQ in case of adverse impacts to a USDW include the closure of injection and mineral production wells and modification or termination of the UIC permit.

Title 122 Chapter 15 contains construction requirements for Class I and Class III injection wells and mineral production wells. Section 002.02F requires that, where injection is into an aquifer with a TDS of less than 10,000 mg/l, monitor wells be placed in the injection zone and any overlying USDW to detect migration of injection fluid. The determination of acceptable locations, monitoring parameters, and baseline concentrations in these monitor wells is necessary to meet this requirement.

Title 122 Chapter 18 contains monitoring requirements for UIC programs including Class III wells. Sections 003.04 and 003.05 require that water level and parameters selected by NDEQ be monitored to detect migration from the injection zone. Title 122 Chapter 11 Section 006.22 requires that the plan for meeting the monitoring requirements in Chapter 18 be submitted with the permit application.

*UIC Permit Requirements*

The UIC Permit implements the specific requirements for determining the location of monitor wells, the baseline concentrations of the selected excursion parameters, and the determination of UCLs for each parameter.

Part III, Section B of the permit contains the spacing and sampling requirements for the shallow monitor wells. The permit requires that CBR install one shallow monitor well for every four acres included in the mine unit, which is more stringent than the one well per five acres spacing contained in License Condition 10.4A. However, the permit does not specifically require that three baseline samples be obtained 14 days apart as required in License Condition 10.4A. This provision was contained in the permit in Part III, Section D until the modification approved on April 3, 1997, which removed reference to the number of baseline samples and the required sample frequency. This is an area where the current NDEQ regulatory and permit requirements would not meet the criteria established by NRC. The permit would need to be modified or the NRC would need to retain the sample frequency provisions of License Condition 10.4A.

Part III, Section D of the permit requires that shallow monitor wells be sampled for the restoration parameters from Table 2.6. This list of 27 water quality parameters contains the five excursion parameters required by NRC in License Condition 10.4B.

Part II, Section B of the permit contains the methods used for determination of UCLs. The methods are listed as a footnote to Table 2.3, which contains the monitor well parameters. Note that in addition to the five excursion parameters contained in License Condition 10.4C, the permit requires that the water level and barometric pressure be determined during sampling.

The methods used to calculate the UCLs are identical to those contained in License Condition 10.4C. The calculational methods were modified in the UIC permit by the NDEQ in early 2001 in response to a modification request by CBR. CBR was also required to submit a parallel License Amendment request to NRC to amend 10.3C to match the proposed calculational methods. Coordination between CBR, NRC, and NDEQ was necessary during the modification and amendment process. In spite of this coordination, the final license amendment and modified permit contained slight differences that were corrected in a subsequent license amendment. This is a recent example of the duplicative effort and cost associated with overlapping regulatory requirements by different agencies.

Part I, Section B requires that the permittee submit monitoring information with the Notice of Intent to Operate for approval before placing a mine unit in operation.

*Conclusion*

The permit requirements for determination of background concentrations for indicator parameters are similar to those contained in License Condition 10.4A and NUREG-1569 with the exception of the number of samples obtained from each monitor well. As with the requirements for baseline sampling for restoration wells discussed in Section 6.2.3 above, the requirement for three samples at a 14-day interval was included in Part III C.2 of the permit until the modification issued on April 3, 1997. At that time, the requirement was apparently unintentionally removed. Other portions of the permit continue to reference multiple samples. For instance, the UCL calculational methods rely on determination of average and maximum concentrations for the indicator parameters. These methods would require multiple samples. The requirement for three samples would need to be reinstated in the permit or NRC would need to return the sampling frequency provisions of License Condition 10.4A in the license to ensure that three baseline samples were obtained.

The excursion parameters contained in License Condition 10.4B are included in Table 2.3 of the UIC permit. As noted above, the UIC permit also specifies that water level and barometric pressure will be monitored. NUREG-1569 recommends that a minimum of three indicator parameters be proposed. The three indicators proposed as the best for identification of excursions (i.e., chloride, conductivity, and total alkalinity) are included in the required parameters under Table 2.3 of the permit. NUREG-1569 does not recommend the use of the other two CBR parameters (i.e., sodium and sulfate) because their concentration may be affected by natural processes such as cation exchange on clay or oxidization at the well bore.

The UCL calculational methods contained in Part II B of the permit, Table 2.3 are identical to those contained in License Condition 10.4C. These calculational methods were the subject of a recent license amendment application and concurrent UIC permit modification request made by CBR. Specifically, CBR requested that alternative calculational methods be provided for monitor wells with good water quality (i.e., shallow aquifer monitor wells). These proposed calculational methods were based upon the acceptable methods from Section 5.7.8.3(2) of NUREG-1569. NRC and NDEQ approved the requested changes in Amendment 10 to SUA-1534 and the modified permit issued March 9, 2001.

For License Condition 10.4, the requirements of the NDEQ regulatory program meet NRC licensing conditions and acceptance criteria with the exception of specifying the number of baseline samples required. This issue can be corrected through a minor modification to the permit.

### 6.2.5 License Condition 10.16 – Production Zone Monitor Well Spacing

License Condition 10.16 describes the approved spacing for installation of production zone monitor wells at Crow Butte. The purpose of this requirement is to ensure that monitor wells are properly located to ensure that an excursion of mining solutions is detected before there is a significant impact to a USDW. License Condition 10.16 states the following:

*10.16 Production zone monitor wells drilled after April, 1999, shall be spaced no greater than 300 feet from a mine unit and no greater than 400 feet between the wells.*

NUREG-1569 addresses approval criteria for the determination of locations of monitor wells in Section 5.7.8.3(3). The goals for determining proper locations are discussed in detail. One acceptable method for determining the location of horizontal (i.e., perimeter) monitor wells is locating them 400 feet from the edge of the injection or production wells and 400 feet from each other.

*Nebraska Regulatory Requirements*

Nebraska Revised Statutes §81-1504(2) gives the NDEQ the power and duty to develop comprehensive programs to prevent and control pollution of the air, land, and waters of the State. In §81-1505(9) requires that the EQC adopt rules and regulations to provide standards for operation of mineral production and injection wells that will protect the public health and welfare and the air, land, water, and subsurface resources of the State.

Title 122 Chapter 15 contains the construction requirements for Class I and Class III injection wells. Paragraph 002.02F discusses monitor well installation:

*002.02F Where injection is into a formation which contains water with less than 10,000 mg/l TDS, monitoring wells shall be completed into the injection zone and into any underground sources of drinking water above the injection zone which could be affected by the mining operation. These wells shall be located in such a fashion as to detect any migration of injection fluids, process by-products, or formation fluids outside the mining area or zone.*

Chapter 15, Paragraph 002.02I further addresses the spacing of monitor wells:

*002.02I In determining the number, location, construction and frequency of monitoring of the monitor wells the following criteria shall be used:*

*002.02I1 The population relying on the USDW affected or potentially affected by the injection operation;*
*002.02I2 The proximity of the injection operation to points of withdrawal of drinking g water;*
*002.02I3 The local geology and hydrology;*
*002.02I4 The operating pressures and whether a negative pressure gradient is being maintained;*
*002.02I5 The toxicity and volume of the injected fluid, the formation water, and the process by-products; and*
*002.02I6 The injection well density.*

Title 122 Chapter 18 contains the monitoring requirements under the UIC program. Paragraphs 003.04 and 003.05 specify monitoring requirements for Class III injection wells:

*03.04 Monitoring of fluid level and the parameters chosen to measure water quality in the injection zone as specified by the Department;*
*03.05 Monitoring of wells adjacent to the injection site to detect any migration from the injection zone into a USDW as specified by the Department;*

*UIC Permit Requirements*

As required by Title 122, the NDEQ specifies the installation interval for monitor wells in the UIC permit based upon a number of factors. The goal in determining the location of the monitor wells is to ensure that an excursion of mining solutions is detected in a timely manner as discussed in Title 122 Chapter 15. The Class III UIC permit in Part III, Section B sets spacing requirements for production zone and shallow monitoring wells. Paragraph B.1 contains the production zone spacing requirements of no greater than 300 feet from a mine unit and no greater than 400 feet between the wells. These are the same spacing requirements as those contained in License Condition 10.16.

*Conclusion*

The installation interval for monitor wells in License Condition 10.16 is identical to those specified in the UIC permit and is more stringent than those recommended in NUREG-1569. It should be noted that the spacing requirements in License Condition 10.16 were added to License SUA-1534 in Amendment 4 issued in April 1999. NRC requested, and CBR agreed to, this amendment to bring SUA-1534 into line with other ISL licenses. The

installation intervals were selected to match those contained in the UIC permit. Before that time, SUA-1534 had not contained monitor well spacing requirements.

For License Condition 10.16, the requirements of the NDEQ regulatory program meet the NRC licensing conditions and acceptance criteria. The fact that this License Condition was added to the NRC License in 1999, after almost ten years of commercial operation, indicates that this condition is duplicative.

## 6.3 LICENSE SECTION 11: MONITORING, RECORDING, AND BOOKKEEPING REQUIREMENTS

### 6.3.1 License Condition 11.1 – Injection and Recovery Well Monitoring

License Condition 11.1 describes the monitoring requirements and limitations for injection and recovery wells and manifolds. License Condition 11.1 states the following:

*11.1 Flow rates on each injection and recovery well, and manifold pressures on the entire system, shall be measured and recorded daily. During well-field operation, injection pressure shall not exceed the integrity test pressure at the injection well heads.*

NUREG-1569 addresses operational aspects of the ISL process in Section 3.0, Description of Proposed Facility. However, no acceptance criteria in this section details the specific monitoring requirements contained in License Condition 11.1. The acceptance criteria in section 3.1.3(3) relate to the monitoring parameters discussed in this License Condition. Overall injection and production flowrates must be estimated and material and flow balances described. NUREG-1569 also requires that downhole pressure be demonstrated to remain below well construction limitations and the fracture pressure of the formation. The maximum injection pressure at Crow Butte is based on ensuring that the fracture pressure in the formation is not exceeded. However, NUREG-1569 has no acceptance criteria that require that the flow rates for each individual injection and production well and the manifold pressure be monitored and recorded daily.

*Nebraska Regulatory Requirements*

In Title 122, Chapter 11 requires that a permit application contain sufficient data to determine the potential affects of a proposed project. Paragraph 006.16 requires the submittal of proposed operating data, including the "*...average and maximum daily rate*

*and volume of the fluid to be injected or withdrawn*" and the "*...average and maximum injection pressure.*"

Title 122 Chapter 17 requires that the maximum injection pressure at the wellhead be determined to prevent the initiation of new fractures or propagation of existing fractures.

Title 122 Chapter 18 contains the monitoring requirements under the UIC program. Paragraph 003.02 requires the "*...installation and uses of devices to monitor injection pressure, flow rate and volume as specified by the Department;*

*UIC Permit Requirements*

Part II of the Class III permit contains the injection limitations and monitoring requirements. CBR must monitor injection pressure daily by manifold gauge. The total injection and production rate for the facility is determined on a daily basis. However, the permit does not require determination of the flow rates for individual injection and production wells.

Table 2.1 of Part II of the permit limits injection pressure at the wellhead to 100 psig. This is defined as the maximum operating pressure that will protect the formation from damage. It should be noted that License Condition 11.1 limits injection pressure at the wellhead to *the integrity test pressure.* The integrity test pressure is set at 125 percent of the maximum operating pressure in accordance with License Condition 10.2. Therefore, License Condition 11.1 actually limits injection to the integrity test pressure of 125 psig instead of the maximum operating pressure limitation of 100 psig. This limitation would allow operation of a well above the safe injection pressure. Table 2.1 of the permit specifically sets 100 psig as the maximum operating pressure and has been used by CBR to limit injection pressure.

*Conclusion*

License Condition 11.1 requires monitoring the flow rates on each injection and production well and the manifold pressures and recording this information on a daily basis. The UIC permit requires determination of total injection and production flows and monitoring manifold pressures. Therefore, the Nebraska program would not implement the same monitoring requirements as the license. However, it is arguable whether daily monitoring of the flow rates for individual wells should be included in a License Condition. This requirement is not included in the acceptance criteria in NUREG-1569. Wellfield balancing between individual groups of wells and the mine as a whole and determination of total injection and production flows could be accomplished through the use of manifold

flow meters. In fact, this flow monitoring method is used at other ISL facilities. If NRC believes that daily flow monitoring for individual wells should remain as a licensing requirement, this portion of License Condition 11.1 would need to be retained.

The limitation on injection pressure at the wellhead is incorrectly restricted in License Condition 11.1 to the integrity test pressure. The UIC permit specifically limits injection pressure to 100 psi, which is the approved maximum injection pressure based upon downhole limitations.

For License Condition 11.1, the requirements of the NDEQ regulatory program meet the NRC licensing conditions and acceptance criteria with the exception of daily injection and production flow monitoring by individual well.

### 6.3.2 License Condition 11.2 – Monitor Well Sampling and Excursion Reporting

License Condition 11.2 describes the approved monitor well sampling and excursion reporting requirements at CBR. License Condition 11.2 states the following:

*11.2 All designated perimeter and upper aquifer monitor wells shall be sampled and tested no more than 14 days apart, except in the event of the situations identified in the licensee's submittal dated March 19, 1998. If a designated monitor well is not sampled within 14 days of the previous sampling event, the reasons for the postponement of sampling shall be documented. Sampling shall not be postponed for greater than five days.*

*If two UCLs are exceeded in a well or if a single UCL is exceeded by 20 percent, the licensee shall take a confirming water sample within 48 hours after the results of the first analyses are received and analyze the sample for the indicator parameters. If the second sample does not indicate an exceedance, a third sample shall be taken and analyzed in a similar manner with 48 hours after the second set of samples was acquired. If neither the second nor the third sample indicate an exceedance, the first sample shall be considered in error.*

*If either the second or third sample confirms that a UCL(s) has been exceeded, the well in question shall be placed on excursion status. Upon confirmation of an excursion, the licensee shall notify NRC in accordance with License Condition 12.2, implement corrective action, and increase sampling frequency for the indicator parameters at the excursion well to once every seven (7) days. Corrective actions for confirmed excursions may be, but are not limited to, those described in Section 5.7.8.1 of the approved license application. An excursion is considered concluded when the concentrations of the indicator parameters are below the concentration levels defining an excursion for three (3) consecutive weekly samples.*

NUREG-1569 provides the acceptance criteria for excursion monitoring programs in Section 5.7.8.3(5). NRC recommends that all monitor wells be sampled at least every two weeks during mining operations. An excursion is considered to have occurred if any two excursion parameters exceed their respective UCL or if any single parameter exceeds its UCL by 20 percent. The verification sampling requirements in NUREG-1569 are identical to those contained in License Condition 11.2.

NUREG-1569 discusses acceptable corrective action for horizontal excursions in Section 5.7.8.3(6). The only means of corrective action discussed in NUREG-1569 is over recovery of process solutions in the area by adjusting injection and production flow rates. This is the same method discussed in Section 5.7.8.1 of the approved LRA and referenced in License Condition 11.2. NUREG-1569 does not specifically recommend increasing the sampling frequency for the monitor well on excursion status to weekly. An excursion is considered concluded when samples show that parameters are below the excursion criteria and stability is demonstrated. The acceptance criteria do not specify a three week period for this determination of stability.

*Nebraska Regulatory Requirements*

Nebraska Revised Statutes §81-1504(2) gives the NDEQ the power and duty to develop comprehensive programs to prevent and control pollution of the air, land, and waters of the State. §81-1505(9) requires that the EQC adopt rules and regulations to provide standards for operation of mineral production and injection wells that will protect the public health and welfare and the air, land, water, and subsurface resources of the State.

Title 122 Chapter 4 prohibits the movement of fluids into a USDW. If water quality monitoring indicates that mining activities have had an affect on a USDW, the NDEQ is authorized to prescribe additional requirements for construction, corrective action, operation, monitoring, or reporting. These potential actions available to NDEQ include closure of injection and mineral production wells and modification or termination of the UIC permit.

Title 122 Chapter 18 contains monitoring requirements for UIC programs including Class III wells. Sections 003.04 and 003.05 require that water level and parameters selected by NDEQ be monitored to detect migration from the injection zone. Title 122 Chapter 11 Section 006.22 requires that the plan for meeting the monitoring requirements in Chapter 18 be submitted with the permit application.

*UIC Permit Requirements*

Part II Section B of the Class III UIC permit contains monitoring requirements for monitor wells. Sampling is required biweekly. The results of this sampling are then used to determine whether an excursion exists. The requirements contained in Table 2.3 and its footnotes are virtually the same as those contained in License Condition 11.2 with the following exceptions:

- The UIC permit requires that the second confirming sample be obtained within 24 hours of when the results of the first analysis are received; License Condition 11.2 requires this sample within 48 hours of when the analytical results are received;
- The UIC permit requires that the third confirming sample be taken within 48 hours of the time the *first* sample was taken; License Condition 11.2 requires the third sample within 48 hours of the time the second sample was taken; and
- The UIC permit requires that NDEQ be notified by telephone within 24 hours of the time the confirmation sample was taken; NRC (in License Condition 12.2, discussed in Section 6.4.1) requires notification within 24 hours of when the excursion is confirmed, which would be when the analytical results are received.

There are several other slight differences in the excursion requirements:

- A formal report must be submitted with the quarterly Mining Monitor Report submitted to NDEQ, detailing corrective action taken and results achieved.
- If the corrective actions are not effective within 90 days, injection *shall* be terminated in the affected area. Resumption of injection requires the written approval of the Director of the NDEQ.
- Weekly sampling must be continued for three weeks *after* three consecutive weekly samples are below the excursion criteria.

*Conclusions*

The excursion monitoring requirements from License Condition 11.2 are met or exceeded by those contained in the Class III UIC permit. However, the excursion determination requirements are slightly different from those contained in License Condition 11.2. The combined affect of these slight differences between the UIC permit and NRC License Condition is to accelerate the process to determine and report an excursion. Furthermore, these minor differences in how and when an excursion is reported to NRC and NDEQ are an example of the complexity experienced by licensees in complying with dual regulatory requirements that are not identical.

## 6.4 LICENSE SECTION 12 – REPORTING REQUIREMENTS

### 6.4.1 License Condition 12.2 – Excursion Reporting

License Condition 12.2 describes the excursion reporting requirements at Crow Butte. License Condition 12.2 states the following:

*12.2 In the event of lixiviant excursion is confirmed by groundwater monitoring, NRC shall be notified by telephone within 24 hours and by letter within seven (7) days from the time the excursion is confirmed, in accordance with License Condition 9.2. In addition, a written report shall be submitted to NRC within 60 days of excursion confirmation. The report shall describe the excursion event, corrective actions taken, and results obtained. If the well(s) are still on excursion when the report is submitted, the report also must contain a schedule for the submittal of future reports to NRC which will provide an update of corrective actions taken and the results obtained. In addition, if the well(s) are still on excursion at the time the 60-day report is submitted, the licensee shall terminate injection of lixiviant into the wellfield on excursion until such time that the aquifer cleanup is completed.*

NUREG-1569 in Section 5.7.8.3(6) provides acceptable excursion reporting requirements. These requirements are identical to those contained in License Condition 12.2. However, License Condition 12.2 does not provide the option of an increase in surety should an excursion not be concluded at the time of the 60-day report. NUREG-1569 provides that a licensee may increase the surety in an amount agreeable to NRC to cover cleanup and corrective action costs to correct the excursion.

*Nebraska Regulatory Requirements*

Nebraska Revised Statutes §81-1504(25) gives the NDEQ the power and duty to develop compliance schedules to prevent and control pollution. §81-1505(16) requires reporting as specified by the standards adopted by the NDEQ.

Chapter 19 of Title 122 provides the reporting requirements for the UIC program. Paragraph 001.06 requires that "*...the permittee shall report any noncompliance which may endanger health or the environment, such as fluid migration into or between USDWs. Any information shall be provided orally within twenty four hours from the time that the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; and if the noncompliance has*

*not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.*"

*UIC Permit Requirements*

Part II Section B of the Class III UIC permit contains monitoring requirements for monitor wells. The footnote to Table 2.3 contains the reporting requirements in the event an excursion is confirmed. CBR must notify the NDEQ by telephone within 24 hours from the time the *confirmation sample was taken.* CBR must mail the laboratory data and a plan of corrective action within five days of the time the *confirmation sample was taken.*

A formal report containing all laboratory data and corrective actions taken must be submitted with the quarterly MMR. In addition, if the excursion has not been corrected within 90 days, injection in the affected area must be terminated. The Director of NDEQ must approve any resumption of injection.

*Conclusion*

The reporting requirements of the NDEQ are similar to those specified in License Condition 12.2, but CBR must provide the initial verbal and written reports to NDEQ in a shorter period. The initial 24-hour verbal report and the five-day written report are based on the time that the confirmation sample was taken. CBR has considered an excursion confirmed, which is the NRC criteria, when the analytical results from the confirmation sample are received. Therefore, to meet the NDEQ reporting requirements, sample analytical efforts must be completed in an accelerated manner to allow reporting within the required 24-hour period after the sample was collected. In addition, NDEQ requires a written report within five days instead of seven days allowed by License Condition 12.2. These reporting schedules in the permit are taken directly from Title 122.

Subsequent reporting to NDEQ is required with the regular quarterly MMR. NDEQ allows 90 days for corrective actions to be effective before requiring injection termination, which exceeds the 60 days allowed by NRC.

For License Condition 12.2, the requirements of the NDEQ regulatory program meet and exceed the NRC licensing conditions and acceptance criteria with the exception of the 60-day reporting criteria.

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# 7 CONCLUSIONS

The solution mining process is the primary uranium extraction technology for commercial uranium production in the United States. The process is safe and environmentally benign, allowing the cost-effective recovery of low-grade uranium deposits. The process does not involve any crushing or grinding of ore and does not produce tailings. Unlike conventional uranium mining and milling processes, only the uranium is removed from its place in nature. During the mining process, temporary changes in the groundwater quality occur. The EPA aquifer exemption process ensures that the mined aquifer is suitable for solution mining and that a usable USDW is not affected. EPA grants these aquifer exemptions where high mineral content and radionuclide concentrations render the native groundwater unusable.

The solution mining technique is regulated by the EPA and EPA-authorized States under the UIC provisions of the SDWA. Since the final product, uranium, is defined as source material under the AEA, the process is also regulated by the NRC. If the final product were not source material, NRC would not have a regulatory role in the solution mining process. For example, a solution mine extracting sodium bicarbonate recently began production in the State of Colorado. Protection of the groundwater associated with this mine is adequately addressed under the UIC requirements of the EPA through the direct implementation of the Class III program in Colorado. It is reasonable to conclude that, if the Class III UIC program directly administered by EPA adequately protects groundwater resources during solution mining for products other than source material, then the program should provide the same protections during solution mining for uranium.

In the State of Nebraska, the UIC program is implemented by the NDEQ. Elements of the program were developed specifically with the Crow Butte mine in consideration, so the program reflects specific requirements that have been developed over the years to address uranium solution mining. Many of these elements supplement the EPA program. Most significant of these additional elements in the Nebraska program are the requirement for restoration of the affected aquifer and the inclusion of mineral production wells in the program.

This document has reviewed the basic UIC Program established by the EPA. The document has provided a comparison of the statutory, regulatory, and permitting provisions of the Nebraska UIC Program. Finally, the specific License Conditions and acceptance criteria established by the NRC for groundwater protection at Crow Butte are compared and cross-referenced to NDEQ requirements that provide the same or greater protection for the State's resources. Based upon this review of the specific areas where NRC and NDEQ requirements overlap, CBR believes that the NRC can defer active

regulation of groundwater at the Crow Butte mine to the NDEQ. This action would be similar to the NRC's position in reference to the Class I UIC program. In Appendix D[6] to NUREG-1569, the NRC discusses acceptable effluent disposal methods. In the section related to deep well injection, the NRC states that "...in general, applications that satisfy the EPA regulations under the UIC program will be approved by the NRC staff." This document has shown that the NRC can rely with confidence and "without further NRC review of protective measures" on the groundwater protection program administered by the NDEQ.

[6] US Nuclear Regulatory Commission, NUREG-1569, *Appendix D: Effluent Disposal at Licensed Uranium Recovery Facilities*, October 1997.

# Appendix A

## Nebraska Environmental Protection Act
## Revised Statutes of Nebraska
## Sections 81-1501 through 81-1532

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81-1501

**Department; declaration of legislative purpose.**

Whereas the water, land, and air of this state are among its most precious resources and the pollution thereof becomes a menace to the health and welfare of each person, and the public in general, in this state and whereas pollution of these resources in this state is likewise a concern in adjoining states, the public policy of this state is hereby declared to be:

(1) To conserve the water in this state and to protect and improve the quality of water for human consumption, wildlife, fish and other aquatic life, industry, recreation, and other productive, beneficial uses;

(2) To achieve and maintain such a reasonable degree of purity of the natural atmosphere of this state that human beings and all other animals and plants which are indigenous to this state will flourish in approximately the same balance as they have in recent history and to adopt and promulgate laws, rules, and regulations and enforce uniformly the same in such a manner as to give meaningful recognition to the protection of each element of the environment, air, water, and land;

(3) To cooperate with other states and the federal government to accomplish the objectives set forth in the Environmental Protection Act, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act; and

(4) To protect human health through environmental enforcement.

**Source:**

Laws 1971, LB 939, § 1; Laws 1987, LB 152, § 1; Laws 1992, LB 1257, § 75; Laws 1994, LB 570, § 4; Laws 1998, LB 1209, § 17.

**81-1502**
**Terms, defined.**

For purposes of the Environmental Protection Act, unless the context otherwise requires:

(1) Air contaminant or air contamination shall mean the presence in the outdoor atmosphere of any dust, fume, mist, smoke, vapor, gas, other gaseous fluid, or particulate substance differing in composition from or exceeding in concentration the natural components of the atmosphere;

(2) Air pollution shall mean the presence in the outdoor atmosphere of one or more air contaminants or combinations thereof in such quantities and of such duration as are or may tend to be injurious to human, plant, or animal life, property, or the conduct of business;

(3) Chairperson shall mean the chairperson of the Environmental Quality Council and council shall mean the Environmental Quality Council;

(4) Complaint shall mean any charge, however informal, to or by the council, that any person or agency, private or public, is polluting the air, land, or water or is violating the Environmental Protection Act or any rule or regulation of the department in respect thereof;

(5) Control and controlling shall include prohibition and prohibiting as related to air, land, or water pollution;

(6) Department shall mean the Department of Environmental Quality, which department is hereby created;

(7) Director shall mean the Director of Environmental Quality, which position is hereby established;

(8) Disposal system shall mean a system for disposing of wastes, including hazardous wastes, either by surface or underground methods, and includes sewerage systems and treatment works, disposal wells and fields, and other systems;

(9) Emissions shall mean releases or discharges into the outdoor atmosphere of any air contaminant or combination thereof;

(10) Person shall mean any: Individual; partnership; limited liability company; association; public or private corporation; trustee; receiver; assignee; agent; municipality or other governmental subdivision; public agency; other legal entity; or any officer or governing or managing body of any public or private corporation, municipality, governmental subdivision, public agency, or other legal entity;

(11) Rule or regulation shall mean any rule or regulation of the department;

(12) Sewerage system shall mean pipelines, conduits, pumping stations, force mains, and all other constructions, devices, appurtenances, and facilities used for collecting or

conducting wastes to an ultimate point for treatment or disposal;

(13) Treatment works shall mean any plant or other works used for the purpose of treating, stabilizing, or holding wastes;

(14) Wastes shall mean sewage, industrial waste, and all other liquid, gaseous, solid, radioactive, or other substances which may pollute or tend to pollute any air, land, or waters of the state;

(15) Refuse shall mean putrescible and nonputrescible solid wastes, except body wastes, and includes garbage, rubbish, ashes, incinerator ash, incinerator residue, street cleanings, and solid market and industrial wastes;

(16) Garbage shall mean rejected food wastes, including waste accumulation of animal, fruit, or vegetable matter used or intended for food or that attend the preparation, use, cooking, dealing in, or storing of meat, fish, fowl, fruit, or vegetables, and dead animals rejected by rendering plants;

(17) Rubbish shall mean nonputrescible solid wastes, excluding ashes, consisting of both combustible and noncombustible wastes, such as paper, cardboard, tin cans, yard clippings, wood, glass, bedding, crockery, or litter of any kind that will be a detriment to the public health and safety;

(18) Junk shall mean old scrap, copper, brass, iron, steel, rope, rags, batteries, paper, trash, rubber debris, waste, dismantled or wrecked automobiles, or parts thereof, and other old or scrap ferrous or nonferrous material;

(19) Land pollution shall mean the presence upon or within the land resources of the state of one or more contaminants or combinations of contaminants, including, but not limited to, refuse, garbage, rubbish, or junk, in such quantities and of such quality as will or are likely to (a) create a nuisance, (b) be harmful, detrimental, or injurious to public health, safety, or welfare, (c) be injurious to plant and animal life and property, or (d) be detrimental to the economic and social development, the scenic beauty, or the enjoyment of the natural attractions of the state;

(20) Water pollution shall mean the manmade or man-induced alteration of the chemical, physical, biological, or radiological integrity of water;

(21) 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;

(22) 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;

(23) Effluent limitation shall mean any restriction,

including a schedule of compliance, established by the council on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into waters of the state;

(24) Schedule of compliance shall mean a schedule of remedial measures including an enforceable sequence of actions or operations leading to compliance with an effluent limitation, other limitation, prohibition, or standard;

(25) Hazardous waste shall mean a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (a) cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness or (b) pose a substantial present or potential hazard to human or animal health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed;

(26) Solid waste shall mean any garbage, refuse, or sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, and mining operations and from community activities, but solid waste shall not include solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Clean Water Act, as amended, 33 U.S.C. 1251 et seq., or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended, 68 Stat. 923;

(27) Storage, when used in connection with hazardous waste, shall mean the containment of hazardous waste, either on a temporary basis or for a period of years, in such manner as not to constitute disposal of such hazardous waste;

(28) Manifest shall mean the form used for identifying the quantity, composition, origin, routing, and destination of hazardous waste during its transportation from the point of generation to the point of disposal, treatment, or storage;

(29) Processing shall mean to treat, detoxify, neutralize, incinerate, biodegrade, or otherwise process a hazardous waste to remove such waste's harmful properties or characteristics for disposal in accordance with regulations established by the council;

(30) Well shall mean a bored, drilled, or driven shaft or a dug hole, the depth of which is greater than the largest surface dimension of such shaft or hole;

(31) Injection well shall mean a well into which fluids are injected;

(32) Fluid shall mean a material or substance which flows or moves whether in a semisolid, liquid, sludge, gas, or other form or state;

(33) Mineral production well shall mean a well drilled to promote extraction of mineral resources or energy, including,

but not limited to, a well designed for (a) mining of sulfur by the Frasch process, (b) solution mining of sodium chloride, potash, phosphate, copper, uranium, or any other mineral which can be mined by this process, (c) in situ combustion of coal, tar sands, oil shale, or any other fossil fuel, or (d) recovery of geothermal energy for the production of electric power. Mineral production well shall not include any well designed for conventional oil or gas production, for use of fluids to promote enhanced recovery of oil or natural gas, or for injection of hydrocarbons for storage purposes;

(34) Mineral exploration hole shall mean a hole bored, drilled, driven, or dug in the act of exploring for a mineral other than oil and gas;

(35) Solution mining shall mean the use of an injection well and fluids to promote the extraction of mineral resources;

(36) Uranium shall mean tri-uranium oct-oxide;

(37) Solid waste management facility shall mean a facility as defined in section 13-2010; and

(38) Livestock waste control facility shall have the same meaning as in section 54-2402.

**Source:**
Laws 1971, LB 939, § 2; Laws 1972, LB 1435, § 1;
Laws 1973, LB 538, § 1; Laws 1980, LB 853, § 1;
Laws 1981, LB 216, § 2; Laws 1983, LB 356, § 2;
Laws 1984, LB 742, § 1; Laws 1984, LB 1078, § 1;
Laws 1986, LB 1008, § 1; Laws 1992, LB 1257, § 76;
Laws 1993, LB 121, § 538; Laws 1994, LB 570, § 5;
Laws 1998, LB 1209, § 18.

**81-1503**
**Environmental Quality Council; membership; appointment; compensation; Director of Environmental Quality; appointment; oath; duties.**

(1) The Environmental Quality Council is hereby created. The council shall consist of sixteen members to be appointed by the Governor with the advice and consent of the Legislature as follows:

(a) One representative of the food products manufacturing industry;

(b) One representative of conservation;

(c) One representative of the agricultural processing industry;

(d) One representative of the automotive or petroleum industry;

(e) One representative of the chemical industry;

(f) One representative of heavy industry;

(g) One representative of the power generating industry;

(h) One representative of agriculture actively engaged in crop production;

(i) One representative of labor;

(j) One professional engineer experienced in control of air and water pollution and solid wastes;

(k) One physician knowledgeable in the health aspects of air, water, and land pollution;

(l) One representative from county government;

(m) Two representatives from municipal government, one of whom shall represent cities other than those of the primary or metropolitan class;

(n) One representative of the livestock industry; and

(o) One representative of the public at large.

(2) Members shall serve for terms of four years. All appointments shall be subject to confirmation by the Legislature when initially made. As the term of an appointee to the council expires, the succeeding appointee shall be a representative of the same segment of the public as the previous appointee. In the case of appointees to vacancies occurring from unexpired terms, each successor shall serve out the term of his or her predecessor. Members whose terms have expired shall continue to serve until their successors have been appointed. All members shall be citizens and residents of the State of Nebraska.

(3) Members may be removed by the Governor for inefficiency, neglect of duty, or misconduct in office but only after delivering to the member a copy of the charges and affording him or her an opportunity to be publicly heard in person or by counsel, in his or her own defense, upon not less

than ten days' notice. Such hearing shall be held before the Governor. When a member is removed, the Governor shall file, in the office of the Secretary of State, a complete statement of all charges made against such member and the findings thereon, together with a complete record of the proceedings.

(4) The council shall elect from its members a chairperson and a vice-chairperson, who shall hold office at the pleasure of the council. The vice-chairperson shall serve as chairperson in case of the absence or disability of the chairperson. The director shall serve as secretary of the council and shall keep all records of meetings of and actions taken by the council. He or she shall be promptly advised as to such actions by the chairperson.

(5) The members of the council, while engaged in the performance of their official duties, shall receive a per diem of forty dollars while so serving, including travel time. In addition, members of the council shall receive reimbursement for actual and necessary expenses as provided in sections 81-1174 to 81-1177.

(6) The council shall hold at least four meetings, once each calendar quarter, at a time and place fixed by the council and shall keep a record of its proceedings which shall be open to the public for inspection. Special meetings may be called by the chairperson. Such special meetings must be called by him or her upon receipt of a written request signed by two or more members of the council. Written notice of the time and place of all meetings shall be mailed in advance to the office of each member of the council by the secretary. A majority of the members of the council shall constitute a quorum.

(7) The council shall submit to the Governor a list of names from which he or she shall appoint the Director of Environmental Quality who shall be experienced in air, water, and land pollution control and who may be otherwise an employee of state government. The director shall be responsible for administration of the department and all standards, rules, and regulations adopted pursuant to Chapter 81, article 15, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act. All such standards, rules, and regulations shall be adopted by the council after consideration of the recommendations of the director. All grants to political subdivisions under the control of the department shall be made by the director in accordance with priorities established by the council. A majority of the members of the council shall constitute a quorum for the transaction of business. The affirmative vote of a majority of all members of the council shall be necessary for the adoption of standards, rules, and regulations.

(8) Before the director enters upon the duties of his or her office, he or she shall take and subscribe to the constitutional oath of office and shall, in addition thereto, swear and affirm that he or she holds no other public office nor any position under any political committee or party, that he or

she has not during the two years immediately prior to his or her appointment received a significant portion of his or her income directly or indirectly from permitholders or applicants for a permit under the Environmental Protection Act, and that he or she will not receive such income during his or her term as director, except that such requirements regarding income prior to the term of office shall not apply to employees of any agency of the State of Nebraska or any political subdivision which may be a permitholder under the Environmental Protection Act. Such oath and affirmation shall be filed with the Secretary of State.

**Source:**
Laws 1971, LB 939, § 3; Laws 1972, LB 1435, § 2;
Laws 1974, LB 1029, § 1; Laws 1979, LB 321, § 2;
Laws 1981, LB 204, § 195; Laws 1983, LB 356, § 3;
Laws 1992, LB 1257, § 77; Laws 1998, LB 1209, § 19.

**81-1504**
**Department; powers; duties.**

The department shall have and may exercise the following powers and duties:

(1) To exercise exclusive general supervision of the administration and enforcement of the Environmental Protection Act, the Integrated Solid Waste Management Act, the Livestock Waste Management Act, and all rules and regulations and orders promulgated under such acts;

(2) To develop comprehensive programs for the prevention, control, and abatement of new or existing pollution of the air, waters, and land of the state;

(3) To advise and consult, cooperate, and contract with other agencies of the state, the federal government, and other states, with interstate agencies, and with affected groups, political subdivisions, and industries in furtherance of the purposes of the acts;

(4) To act as the state water pollution, air pollution, and solid waste pollution control agency for all purposes of the Clean Water Act, as amended, 33 U.S.C. 1251 et seq., the Clean Air Act, as amended, 42 U.S.C. 7401 et seq., the Resource Conservation and Recovery Act, as amended, 42 U.S.C. 6901 et seq., and any other federal legislation pertaining to loans or grants for environmental protection and from other sources, public or private, for carrying out any of its functions, which loans and grants shall not be expended for other than the purposes for which provided;

(5) To encourage, participate in, or conduct studies, investigations, research, and demonstrations relating to air, land, and water pollution and causes and effects, prevention, control, and abatement of such pollution as it may deem advisable and necessary for the discharge of its duties under the Environmental Protection Act, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act, using its own staff or private research organizations under contract;

(6) To collect and disseminate information and conduct educational and training programs relating to air, water, and land pollution and the prevention, control, and abatement of such pollution;

(7) To issue, modify, or revoke orders (a) prohibiting or abating discharges of wastes into the air, waters, or land of the state and (b) requiring the construction of new disposal systems or any parts thereof or the modification, extension, or adoption of other remedial measures to prevent, control, or abate pollution;

(8) To administer state grants to political subdivisions for solid waste disposal facilities and for the

construction of sewage treatment works and facilities to dispose of water treatment plant wastes;

(9) To (a) hold such hearings and give notice thereof, (b) issue such subpoenas requiring the attendance of such witnesses and the production of such evidence, (c) administer such oaths, and (d) take such testimony as the director deems necessary, and any of these powers may be exercised on behalf of the director by a hearing officer designated by the director;

(10) To require submission of plans, specifications, and other data relative to, and to inspect construction of, disposal systems or any part thereof prior to issuance of such permits or approvals as are required by the Environmental Protection Act, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act;

(11) To issue, continue in effect, revoke, modify, or deny permits, under such conditions as the director may prescribe and consistent with the standards, rules, and regulations adopted by the council, (a) to prevent, control, or abate pollution, (b) for the discharge of wastes into the air, land, or waters of the state, and (c) for the installation, modification, or operation of disposal systems or any parts thereof;

(12) To require proper maintenance and operation of disposal systems;

(13) To exercise all incidental powers necessary to carry out the purposes of the Environmental Protection Act, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act;

(14) To establish bureaus, divisions, or sections for the control of air pollution, water pollution, mining and land quality, and solid wastes which shall be administered by full-time salaried bureau, division, or section chiefs and to delegate and assign to each such bureau, division, or section and its officers and employees the duties and powers granted to the department for the enforcement of Chapter 81, article 15, the Integrated Solid Waste Management Act, the Livestock Waste Management Act, and the standards, rules, and regulations adopted pursuant thereto;

(15)(a) To require access to existing and available records relating to (i) emissions or discharges which cause or contribute to air, land, or water pollution or (ii) the monitoring of such emissions or discharges; and

(b) To require, for purposes of developing or assisting the development of any regulation or enforcing any of the provisions of the Environmental Protection Act which pertain to hazardous waste, any person who generates, stores, treats, transports, disposes of, or otherwise handles or has handled hazardous waste, upon request of any officer, employee, or representative of the department, to furnish information relating to such waste and any permit involved. Such person shall have access at all reasonable times to a copy of all results relating to such waste;

(16) To obtain such scientific, technical,

administrative, and operational services including laboratory facilities, by contract or otherwise, as the director deems necessary;

(17) To encourage voluntary cooperation by persons and affected groups to achieve the purposes of the Environmental Protection Act, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act;

(18) To encourage local units of government to handle air, land, and water pollution problems within their respective jurisdictions and on a cooperative basis and to provide technical and consultative assistance therefor;

(19) To consult with any person proposing to construct, install, or otherwise acquire an air, land, or water contaminant source or a device or system for control of such source, upon request of such person, concerning the efficacy of such device or system or concerning the air, land, or water pollution problem which may be related to the source, device, or system. Nothing in any such consultation shall be construed to relieve any person from compliance with the Environmental Protection Act, the Integrated Solid Waste Management Act, the Livestock Waste Management Act, rules and regulations in force pursuant to the acts, or any other provision of law;

(20) To require all persons engaged or desiring to engage in operations which result or which may result in air, water, or land pollution to secure a permit prior to installation or operation or continued operation;

(21) To enter and inspect, during reasonable hours, any building or place, except a building designed for and used exclusively for a private residence;

(22) To receive or initiate complaints of air, water, or land pollution, hold hearings in connection with air, water, or land pollution, and institute legal proceedings in the name of the state for the control or prevention of air, water, or land pollution, and for the recovery of penalties, in accordance with the Environmental Protection Act, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act;

(23) To delegate, by contract with governmental subdivisions which have adopted local air, water, or land pollution control programs approved by the council, the enforcement of state-adopted air, water, or land pollution control regulations within a specified region surrounding the jurisdictional area of the governmental subdivisions. Prosecutions commenced under such contracts shall be conducted by the Attorney General or county attorneys as provided in the Environmental Protection Act, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act;

(24) To conduct tests and take samples of air, water, or land contaminants, fuel, process materials, or any other substance which affects or may affect discharges or emissions of air, water, or land contaminants from any source, giving the owner or operator a receipt for the sample obtained;

(25) To develop and enforce compliance schedules, under

such conditions as the director may prescribe and consistent with the standards, rules, and regulations adopted by the council, to prevent, control, or abate pollution;

(26) To employ the Governor's Keep Nebraska Beautiful Committee for such special occasions and projects as the department may decide. Reimbursement of the committee shall be made from state and appropriate federal matching funds for each assignment of work by the department as provided in sections 81-1174 to 81-1177;

(27) To provide, to the extent determined by the council to be necessary and practicable, for areawide, selective, and periodic inspection and testing of motor vehicles to secure compliance with applicable exhaust emission standards for a fee not to exceed five dollars to offset the cost of inspection;

(28) To enforce, when it is not feasible to prescribe or enforce any emission standard for control of air pollutants, the use of a design, equipment, a work practice, an operational standard, or a combination thereof, adequate to protect the public health from such pollutant or pollutants with an ample margin of safety;

(29) To establish the position of public advocate to be located within the department to assist and educate the public on departmental programs and to carry out all duties of the ombudsman as provided in the Clean Air Act, as amended, 42 U.S.C. 7661f;

(30) Under such conditions as it may prescribe for the review, recommendations, and written approval of the director, to require the submission of such plans, specifications, and other information as it deems necessary to carry out the Environmental Protection Act, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act or to carry out the rules and regulations adopted pursuant to the acts. When deemed necessary by the director, the plans and specifications shall be prepared and submitted by a professional engineer licensed to practice in Nebraska;

(31) To carry out the provisions of the Petroleum Products and Hazardous Substances Storage and Handling Act; and

(32) To consider the risk to human health and safety and to the environment in evaluating and approving plans for remedial action.

**Source:**

Laws 1971, LB 939, § 4; Laws 1972, LB 1435, § 3;
Laws 1973, LB 254, § 1; Laws 1974, LB 1029, § 2;
Laws 1979, LB 342, § 1; Laws 1980, LB 853, § 2;
Laws 1981, LB 204, § 196; Laws 1983, LB 356, § 4;
Laws 1984, LB 1078, § 2; Laws 1986, LB 217, § 15;
Laws 1992, LB 1257, § 78; Laws 1994, LB 570, § 6;
Laws 1996, LB 1226, § 13; Laws 1997, LB 622, § 124;
Laws 1998, LB 1209, § 20.

**81-1504.01**
**Department of Environmental Quality; reports required; contents.**

(1) Except as provided in subsection (2) of this section, the Department of Environmental Quality shall provide the following information to the Clerk of the Legislature by December 1 of each year:

(a) A report by type of service or aid provided by the use and distribution of federal funds received by the department. The report shall also include user fees, permit fees, license fees, and application fees authorized by the federal Environmental Protection Agency as follows:

(i) Actual expenditure of each grant or authorized fees for the most recently completed state fiscal year, including state matching funds;

(ii) Current budget and planned use and distribution of each grant and authorized fees for the current state fiscal year, including state matching funds;

(iii) A summary of the projected funding level of each grant and authorized fees and the impact of federal mandates and regulations upon the future use of each grant and authorized fees; and

(iv) Program summaries including statistical summaries when applicable for the most recently completed state fiscal year and program activity goals for the current state fiscal year;

(b) A summary of regulations of the federal Environmental Protection Agency which the department is required to implement and which do not include federal funding assistance and the possible financial impact to the state and political subdivisions;

(c) A report by type of service or aid provided by the use and distribution of state general and cash funds, including user fees, permit fees, license fees, and application fees, to carry out activities that are not funded by federal grants as follows:

(i) Actual expenditure of state funds, by agency sections, for the most recently completed state fiscal year, including a breakdown of
expenditures by personal services, operations, travel, capital outlay, and consulting and contractual services;

(ii) Current budget and planned use and distribution of state funds, by agency sections, for the current state fiscal year, including a breakdown of expenditures for personal services, operations, travel, capital outlay, and consulting and contractual services;

(iii) A summary of projected program funding needs based upon the statutory requirements and public demand for services and the department's assessment of anticipated needs

statewide; and

(iv) Program summaries including statistical summaries when applicable for the most recently completed state fiscal year and program activity goals for the current state fiscal year;

(d) A report regarding staff turnover by job class and the department's assessment of its ability to hire and retain qualified staff considering the state's personnel pay plan;

(e) A report listing the method used by each new or existing licensee, permittee, or other person who is required by the department to establish proof of financial responsibility; and

(f) A report of funds credited to the Nebraska Litter Reduction and Recycling Fund under the Nebraska Litter Reduction and Recycling Act.

(2) By December 1, 1996, the department shall provide a status report on the statewide scrap tire program developed pursuant to section 81-15,161.01, including applications for grants and loans from the Scrap Tire Reduction and Recycling Incentive Fund, grants and loans made from the fund, the current status of each loan, the contributions each grant and loan have made to the development of the statewide scrap tire program, and the current status of the scrap tire problem in the state.

**Source:**
Laws 1991, LB 528, § 1; Laws 1993, LB 3, § 47;
Laws 1993, LB 203, § 1; Laws 1994, LB 1034, § 2.

**81-1505**
**Council; rules and regulations; standards of air, land, and water quality.**

(1) In order to carry out the purposes of the Environmental Protection Act, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act, the council shall adopt and promulgate rules and regulations which shall set standards of air, water, and land quality to be applicable to the air, waters, and land of this state or portions thereof. Such standards of quality shall be such as to protect the public health and welfare. The council shall classify air, water, and land contaminant sources according to levels and types of discharges, emissions, and other characteristics which relate to air, water, and land pollution and may require reporting for any such class or classes. Such classifications and standards made pursuant to this section may be made for application to the state as a whole or to any designated area of the state and shall be made with special reference to effects on health, economic and social factors, and physical effects on property. Such standards and classifications may be amended as determined necessary by the council.

(2) In adopting the classifications of waters and water quality standards, the primary purpose for such classifications and standards shall be to protect the public health and welfare and the council shall give consideration to:

(a) The size, depth, surface area, or underground area covered, the volume, direction, and rate of flow, stream gradient, and temperature of the water;

(b) The character of the area affected by such classification or standards, its peculiar suitability for particular purposes, conserving the value of the area, and encouraging the most appropriate use of lands within such area for domestic, agricultural, industrial, recreational, and aquatic life purposes;

(c) The uses which have been made, are being made, or are likely to be made, of such waters for agricultural, transportation, domestic, and industrial consumption, for fishing and aquatic culture, for the disposal of sewage, industrial waste, and other wastes, or other uses within this state and, at the discretion of the council, any such uses in another state on interstate waters flowing through or originating in this state;

(d) The extent of present pollution or contamination of such waters which has already occurred or resulted from past discharges therein; and

(e) Procedures pursuant to section 401 of the Clean Water Act, as amended, 33 U.S.C. 1251 et seq., for certification by the department of activities requiring a federal license or

permit which may result in a discharge.

(3) In adopting effluent limitations or prohibitions, the council shall give consideration to the type, class, or category of discharges and the quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable or other waters of the state, including schedules of compliance, best practicable control technology, and best available control technology.

(4) In adopting standards of performance, the council shall give consideration to the discharge of pollutants which reflect the greatest degree of effluent reduction which the council determines to be achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, when practicable, a standard permitting no discharge of pollutants.

(5) In adopting toxic pollutant standards and limitations, the council shall give consideration to the combinations of pollutants, the toxicity of the pollutant, its persistence, degradability, the usual or potential presence of the affected organisms in any waters, the importance of the affected organisms, and the nature and extent of the effect of the toxic pollutant on such organisms.

(6) In adopting pretreatment standards, the council shall give consideration to the prohibitions or limitations to noncompatible pollutants, prohibitions against the passage through a publicly owned treatment works of pollutants which would cause interference with or obstruction to the operation of publicly owned treatment works, damage to such works, and the prevention of the discharge of pollutants therefrom which are inadequately treated.

(7) In adopting treatment standards, the council shall give consideration to providing for processes to which wastewater shall be subjected in a publicly owned wastewater treatment works in order to make such wastewater suitable for subsequent use.

(8) In adopting regulations pertaining to the disposal of domestic and industrial liquid wastes, the council shall give consideration to the minimum amount of biochemical oxygen demand, suspended solids, or equivalent in the case of industrial wastewaters, which must be removed from the wastewaters and the degree of disinfection necessary to meet water quality standards with respect to construction, installation, change of, alterations in, or additions to any wastewater treatment works or disposal systems, including issuance of permits and proper abandonment, and requirements necessary for proper operation and maintenance thereof.

(9)(a) The council shall adopt and promulgate rules and regulations for controlling mineral exploration holes and mineral production and injection wells. The rules and regulations shall include standards for the construction, operation, and abandonment of such holes and wells. The standards shall protect the public health and welfare and air, land, water, and

subsurface resources so as to control, minimize, and eliminate hazards to humans, animals, and the environment. Consideration shall be given to:

(i) Area conditions such as suitability of location, geologic formations, topography, industry, agriculture, population density, wildlife, fish and other aquatic life, sites of archeological and historical importance, mineral, land, and water resources, and the existing economic activities of the area including, but not limited to, agriculture, recreation, tourism, and industry;

(ii) A site-specific evaluation of the geologic and hydrologic suitability of the site and the injection, disposal, and production zones;

(iii) The quality of the existing ground water, the effects of exemption of the aquifer from any existing water quality standards, and requirements for restoration of the aquifer;

(iv) Standards for design and use of production facilities, which shall include, but not be limited to, all wells, pumping equipment, surface structures, and associated land required for operation of injection or production wells; and

(v) Conditions required for closure, abandonment, or restoration of mineral exploration holes, injection and production wells, and production facilities in order to protect the public health and welfare and air, land, water, and subsurface resources.

(b) The council shall establish fees for regulated activities and facilities and for permits for such activities and facilities. The fees shall be sufficient but shall not exceed the amount necessary to pay the department for the direct and indirect costs of evaluating, processing, and monitoring during and after operation of regulated facilities or performance of regulated activities.

(c) With respect to mineral production wells, the council shall adopt and promulgate rules and regulations which require restoration of air, land, water, and subsurface resources and require mineral production well permit applications to include a restoration plan for the air, land, water, and subsurface resources affected.

Such rules and regulations may provide for issuance of a research and development permit which authorizes construction and operation of a pilot plant by the permittee for the purpose of demonstrating the permittee's ability to inject and restore in a manner which meets the standards required by this subsection and the rules and regulations.

The rules and regulations adopted and promulgated may also provide for issuance of a commercial permit after a finding by the department that the injection and restoration procedures authorized by the research and development permit have been successful in demonstrating the applicant's ability to inject and restore in a manner which meets the standards required by this subsection and the rules and regulations.

(d) For the purpose of this subsection, unless the context otherwise requires, restoration shall mean the employment, during and after an activity, of procedures reasonably designed to control, minimize, and eliminate hazards to humans, animals, and the environment, to protect the public health and welfare and air, land, water, and subsurface resources, and to return each resource to a quality of use consistent with the uses for which the resource was suitable prior to the activity.

(10) In adopting livestock waste control regulations, the council shall consider the discharge of livestock wastes into the waters of the state or onto land not owned by the livestock operator, conditions under which permits for such operations may be issued, including design, location, and proper management of such facilities, protection of ground water from such operations, and revocation, modification, or suspension of such permits for cause and all requirements of the Livestock Waste Management Act.

(11) In adopting regulations for the issuance of permits under the National Pollutant Discharge Elimination System created by the Clean Water Act, as amended, 33 U.S.C. 1251 et seq., the council shall consider when such permits shall be required and exemptions, application and filing requirements, terms and conditions affecting such permits, notice and public participation, duration and review of such permits, and monitoring, recording, and reporting under the system.

(12) The council shall adopt and promulgate rules and regulations for air pollution control which shall include:

(a) A construction permit program which requires the owner or operator of an air contaminant source to obtain a permit prior to construction;

(b) An operating permit program consistent with requirements of the Clean Air Act, as amended, 42 U.S.C. 7401 et seq., and an operating permit program for minor sources of air pollution, which programs shall require permits for both new and existing sources;

(c) Provisions for operating permits to be issued after public notice, to be terminated, modified, or revoked for cause, and to be modified to incorporate new requirements;

(d) Provisions for applications to be on forms provided by the department and to contain information necessary to make a determination on the appropriateness of issuance or denial. The department shall make a completeness determination in a timely fashion and after such determination shall act on the application within time limits set by the council. Applications for operating permits shall include provisions for certification of compliance by the applicant;

(e) Requirements for operating permits which may include such conditions as necessary to protect public health and welfare, including, but not limited to (i) monitoring and reporting requirements on all sources subject to the permit, (ii) payment of annual fees sufficient to pay the reasonable direct and indirect costs of developing and administering the air

quality permit program, (iii) retention of records, (iv) compliance with all air quality standards, (v) a permit term of no more than five years from date of issuance, (vi) any applicable schedule of compliance leading to compliance with air quality regulations, (vii) site access to the department for inspection of the facility and records, (viii) emission limits or control technology requirements, (ix) periodic compliance certification, and (x) other conditions necessary to carry out the purposes of the Environmental Protection Act. For purposes of this subsection, control technology shall mean a design, equipment, a work practice, an operational standard which may include a requirement for operator training or certification, or any combination thereof;

(f) Classification of air quality control regions;

(g) Standards for air quality that may be established based upon protection of public health and welfare, emission limitations established by the United States Environmental Protection Agency, and maximum achievable control technology standards for sources of toxic air pollutants. For purposes of this subdivision, maximum achievable control technology standards shall mean an emission limit or control technology standard which requires the maximum degree of emission reduction that the council, taking into consideration the cost of achieving such emission reduction, any health and environmental impacts not related to air quality, and energy requirements, determines is achievable for new or existing sources in the category or subcategory to which the standard applies through application of measures, processes, methods, systems, or techniques, including, but not limited to, measures which accomplish one or a combination of the following:

(i) Reduce the volume of or eliminate emissions of the pollutants through process changes, substitution of materials, or other modifications;

(ii) Enclose systems or processes to eliminate emissions; or

(iii) Collect, capture, or treat the pollutants when released from a process, stack, storage, or fugitive emission point;

(h) Restrictions on open burning and fugitive emissions;

(i) Provisions for issuance of general operating permits, after public notice, for sources with similar operating conditions and for revoking such general authority to specific permittees;

(j) Provisions for implementation of the sulfur dioxide allowance system of the Clean Air Act, as amended, 42 U.S.C. 7401 et seq., through the operating permit program;

(k) A provision that operating permits will not be issued if the Environmental Protection Agency objects in a timely manner;

(l) Provisions for periodic reporting of emissions;

(m) Limitations on emissions from process operations,

fuel-burning equipment, and incinerator emissions and such other restrictions on emissions as are necessary to protect the public health and welfare;

(n) Time schedules for compliance;

(o) Requirements for owner or operator testing and monitoring of emissions;

(p) Control technology requirements when it is not feasible to prescribe or enforce an emission standard; and

(q) Procedures and definitions necessary to carry out payment of the annual emission fee set in section 81-1505.04.

(13)(a) In adopting regulations for hazardous waste management, the council shall give consideration to generation of hazardous wastes, labeling practices, containers used, treatment, storage, collection, transportation including a manifest system, processing, resource recovery, and disposal of hazardous wastes. It shall consider the permitting, licensing, design and construction, and development and operational plans for hazardous waste treatment, storage, and disposal facilities, and conditions for licensing or permitting of hazardous waste treatment, storage, and disposal areas. It shall consider modification, suspension, or revocation of such licenses and permits, including requirements for waste analysis, site improvements, fire prevention, safety, security, restricted access, and covering and handling of hazardous liquids and materials. Licenses and permits for hazardous waste, treatment, storage, and disposal facilities shall not be issued until certification by the State Fire Marshal as to fire prevention and fire safety has been received by the department. The council shall further consider the need at treatment, storage, or disposal facilities for required equipment, communications and alarms, personnel training, and contingency plans for any emergencies that might arise and for a coordinator during such emergencies.

In addition the council shall give consideration to (i) ground water monitoring, (ii) use and management of containers and tanks, (iii) surface impoundments, (iv) waste piles, (v) land treatment, (vi) incinerators, (vii) chemical or biological treatment, (viii) landfills including the surveying thereof, and (ix) special requirements for ignitable, reactive, or incompatible wastes.

In considering closure and postclosure of hazardous waste treatment, storage, or disposal facilities, the council shall consider regulations that would result in the owner or operator closing his or her facility so as to minimize the need for future maintenance, and to control, minimize, or eliminate, to the extent necessary to protect humans, animals, and the environment, postclosure escape of hazardous waste, hazardous waste constituents, and leachate to the ground water or surface waters, and to control, minimize, or eliminate, to the extent necessary to protect humans, animals, and the environment, waste decomposition to the atmosphere. In considering corrective action for hazardous waste treatment, storage, or disposal facilities, the council shall consider regulations that would

require the owner or operator, or any previous owner or operator with actual knowledge of the presence of hazardous waste at the facility, to undertake corrective action or such other response measures necessary to protect human health or the environment for all releases of hazardous waste or hazardous constituents from any treatment, storage, or disposal facility or any solid waste management unit at such facility regardless of the time at which waste was placed in such unit.

Such regulations adopted pursuant to this subsection shall in all respects comply with the Environmental Protection Act and the Resource Conservation and Recovery Act, as amended, 42 U.S.C. 6901 et seq.

(b) In adopting regulations for hazardous waste management, the council shall consider, in addition to criteria in subdivision (a) of this subsection, establishing criteria for (i) identifying hazardous waste including extraction procedures, toxicity, persistence, and degradability in nature, potential for accumulation in tissue, flammability or ignitability, corrosiveness, reactivity, and generation of pressure through decomposition, heat, or other means, and other hazardous characteristics, (ii) listing all materials it deems hazardous and which should be subject to regulation, and (iii) locating treatment, storage, or disposal facilities for such wastes. In adopting criteria for flammability and ignitability of wastes pursuant to subdivision (b)(i) of this subsection, no regulation shall be adopted without the approval of the State Fire Marshal.

(c) In adopting regulations for hazardous waste management, the council shall establish a schedule of fees to be paid to the director by licensees or permittees operating hazardous waste processing facilities or disposal areas on the basis of a monetary value per cubic foot or per pound of the hazardous wastes, sufficient but not exceeding the amount necessary to reimburse the department for the costs of monitoring such facilities or areas during and after operation of such facilities or areas. The licensees may assess a cost against persons using the facilities or areas. The director shall remit any money collected from fees paid to him or her to the State Treasurer who shall credit the entire amount thereof to the General Fund.

(d) In adopting regulations for solid waste disposal, the council shall consider storage, collection, transportation, processing, resource recovery, and disposal of solid waste, developmental and operational plans for solid waste disposal areas, conditions for permitting of solid waste disposal areas, modification, suspension, or revocation of such permits, regulations of operations of disposal areas, including site improvements, fire prevention, ground water protection, safety and restricted access, handling of liquid and hazardous materials, insect and rodent control, salvage operations, and the methods of disposing of accumulations of junk outside of solid waste disposal areas. Such regulations shall in all respects comply with the Environmental Protection Act, the Integrated

Solid Waste Management Act, and the Resource Conservation and Recovery Act, as amended, 42 U.S.C. 6901 et seq.

(14) In adopting regulations governing discharges or emissions of oil and other hazardous materials into the waters, in the air, or upon the land of the state, the council shall consider the requirements of the Integrated Solid Waste Management Act, methods for prevention of such discharges or emissions, and the responsibility of the discharger or emitter for cleanup, toxicity, degradability, and dispersal characteristics of the substance.

(15) In adopting regulations governing composting and composting sites, the council shall give consideration to:

(a) Approval of a proposed site by the local governing body, including the zoning authority, if any, prior to issuance of a permit by the department;

(b) Issuance of permits by the department for such composting operations, with conditions if necessary;

(c) Submission of construction and operational plans by the applicant for a permit to the department, with approval of such plans before issuance of such permit;

(d) A term of five years for such permits, which shall not be transferable;

(e) Renewal of permits if the operation has been in substantial compliance with composting regulations adopted pursuant to this subsection, permit conditions, and operational plans;

(f) Review by the department of materials to be composted, including chemical analysis when found by the department to be necessary;

(g) Inspections of such compost sites at least semiannually followed by ratings, with a copy of such ratings to be given to the site management. Operations out of compliance with composting regulations, permit conditions, or operational plans shall be given a reasonable time for voluntary compliance, and failure to do so within the specified time shall result in a hearing after notice is given, at which time the owner or operator shall appear and show cause why his or her permit should not be revoked;

(h) Special permits of the department for demonstration projects not to exceed six months;

(i) Exemptions from permits of the department; and

(j) The Integrated Solid Waste Management Act.

(16) Any person operating or responsible for the operation of air, water, or land contaminant sources of any class for which the rules and regulations of the council require reporting shall make reports containing information as may be required by the department concerning quality and quantity of discharges and emissions, location, size, and height of contaminant outlets, processes employed, fuels used, and the nature and time periods or duration of discharges and emissions, and such other information as is relevant to air, water, or land pollution and is available.

(17) Prior to adopting, amending, or repealing standards and classifications of air, water, and land quality and rules and regulations under the Integrated Solid Waste Management Act or the Livestock Waste Management Act, the council shall, after due notice, conduct public hearings thereon. Notice of public hearings shall specify the waters or the area of the state for which standards of air, water, or land are sought to be adopted, amended, or repealed and the time, date, and place of such hearing. Such hearing shall be held in the general area to be affected by such standards. Copies of such notice shall be:

(a) Published at least twice in a newspaper regularly published or circulated in a county or counties bordering or through which flow the waters or the atmosphere of which is affected, or the particular portion of land which is affected, for which standards are sought to be adopted. The first date of publication shall not be more than thirty days nor less than twenty days before the date fixed for such hearing; and

(b) Mailed at least twenty days before such hearing to such persons and political subdivisions as the council has reason to believe may be affected by the proposed standards.

(18) Standards of quality of the air, water, or land of the state and rules and regulations adopted under the Integrated Solid Waste Management Act or the Livestock Waste Management Act or any amendment or repeal of such standards or rules and regulations shall become effective upon adoption by the council and filing in the office of the Secretary of State. In adopting standards of air, water, and land quality or making any amendment thereof, the council shall specify a reasonable time for persons discharging wastes into the air, water, or land of the state to comply with such standards and upon the expiration of any such period of time may revoke or modify any permit previously issued which authorizes the discharge of wastes into the air, water, or land of this state which results in reducing the quality of such air, water, or land below the standards established therefor by the council.

(19) All standards of quality of air, water, or land and all rules and regulations adopted pursuant to law by the council prior to May 29, 1981, and applicable to specified air, water, or land are hereby approved and adopted as standards of quality of and rules and regulations for such air, water, or land.

(20) In addition to such standards as are heretofore authorized, the council shall adopt and promulgate rules and regulations to set standards of performance, effluent standards, pretreatment standards, treatment standards, toxic pollutant standards and limitations, effluent limitations, effluent prohibitions, and quantitative limitations or concentrations which shall in all respects conform with and meet the requirements of the National Pollutant Discharge Elimination System in the Clean Water Act, as amended, 33 U.S.C. 1251 et seq.

(21)(a) The council shall adopt and promulgate rules and regulations requiring all new or renewal permit or license

applicants regulated under the Environmental Protection Act, the Integrated Solid Waste Management Act, or the Livestock Waste Management Act to establish proof of financial responsibility by providing funds in the event of abandonment, default, or other inability of the permittee or licensee to meet the requirements of its permit or license or other conditions imposed by the department pursuant to the acts. The council may exempt classes of permittees or licensees from the requirements of this subdivision when a finding is made that such exemption will not result in a significant risk to the public health and welfare.

(b) Proof of financial responsibility shall include any of the following made payable to or held in trust for the benefit of the state and approved by the department:

(i) A surety bond executed by the applicant and a corporate surety licensed to do business in this state;

(ii) A deposit of cash, negotiable bonds of the United States or the state, negotiable certificates of deposit, or an irrevocable letter of credit of any bank or other savings institution organized or transacting business in the United States in an amount or which has a market value equal to or greater than the amount of the bonds required for the bonded area under the same terms and conditions upon which surety bonds are deposited;

(iii) An established escrow account; or

(iv) A bond of the applicant without separate surety upon a satisfactory demonstration to the director that such applicant has the financial means sufficient to self-bond pursuant to bonding requirements adopted by the council consistent with the purposes of this subdivision.

(c) The director shall determine the amount of the bond, deposit, or escrow account which shall be reasonable and sufficient so the department may, if the permittee or licensee is unable or unwilling to do so and in the event of forfeiture of the bond or other financial responsibility methods, arrange to rectify any improper management technique committed during the term of the permit or license and assure the performance of duties and responsibilities required by the permit or license pursuant to law, rules, and regulations.

(d) In determining the amount of the bond or other method of financial responsibility, the director shall consider the requirements of the permit or license or any conditions specified by the department, the probable difficulty of completing the requirements of such permit, license, or conditions due to such factors as topography, geology of the site, and hydrology, and the prior history of environmental activities of the applicant.

This subsection shall apply to hazardous waste treatment, storage, or disposal facilities which have received interim status.

(22) The council shall adopt and promulgate rules and regulations no more stringent than the provisions of section 1453 et seq. of the federal Safe Drinking Water Act for public water

supply system source water assessment programs.

The council may adopt and promulgate rules and regulations to implement a source water petition program no more stringent than section 1454 et seq. of the federal Safe Drinking Water Act.

**Source:**

Laws 1971, LB 939, § 5; Laws 1972, LB 1435, § 4;
Laws 1973, LB 538, § 2; Laws 1974, LB 1029, § 3;
Laws 1979, LB 342, § 2; Laws 1980, LB 853, § 3;
Laws 1981, LB 216, § 3; Laws 1983, LB 356, § 5;
Laws 1984, LB 1078, § 3; Laws 1986, LB 1008, § 2;
Laws 1992, LB 1257, § 79; Laws 1993, LB 623, § 3;
Laws 1994, LB 570, § 7; Laws 1994, LB 1031, § 1;
Laws 1997, LB 517, § 25; Laws 1998, LB 1209, § 21;
Laws 1999, LB 784, § 1.
Effective date August 28, 1999.

**81-1505.01**
**Department of Environmental Quality Cash Fund; created; use; investment.**

There is hereby created the Department of Environmental Quality Cash Fund which shall be used to pay the expenses of the department. The department shall remit all fees collected pursuant to subsection (9) of section 81-1505 and section 81-1521.09 to the State Treasurer for credit to the fund. Any fee collected pursuant to section 81-1521.09 shall be used to pay the expenses related to the notice of intent for which the fee was paid. Any money in the fund available for investment shall be invested by the state investment officer pursuant to the Nebraska Capital Expansion Act and the Nebraska State Funds Investment Act.

**Source:**
Laws 1983, LB 356, § 8; Laws 1987, LB 114, § 1; Laws 1992, LB 1257, § Laws 1993, LB 3, § 48; Laws 1994, LB 1066, § 112; Laws 1995, LB 429,

**81-1505.02**
**Mineral exploration holes; rules and regulations.**

The council may adopt and promulgate rules and regulations governing mineral exploration holes prior to August 1, 1983, but such rules and regulations shall not be effective until such date.

The council shall adopt and promulgate rules and regulations authorized by the amendments made by Laws 1983, LB 356, to subsection (9) of section 81-1505 within one hundred twenty days of May 26, 1983. All requirements of the Environmental Protection Act shall apply to any permit application regardless of the date of submission, except that the department shall continue to diligently process any application submitted prior to May 26, 1983.

**Source:**
Laws 1983, LB 356, § 9.

**81-1506**
**Unlawful acts.**

(1) It shall be unlawful for any person:

(a) To cause pollution of any air, waters, or land of the state or to place or cause to be placed any wastes in a location where they are likely to cause pollution of any air, waters, or land of the state; or

(b) To discharge or emit any wastes into any air, waters, or land of the state which reduce the quality of such air, waters, or land below the air, water, or land quality standards established therefor by the council. Any such action is hereby declared to be a public nuisance. A livestock operation is not a nuisance if:

(i) Reasonable techniques are employed to keep dust, noise, insects, and odor at a minimum;

(ii) It is in compliance with applicable regulations adopted by the council and zoning regulations of the local governing body having jurisdiction; and

(iii) The action is brought by or on behalf of a person whose date of lawful possession of the land claimed to be affected by a livestock operation is subsequent to the issuance of an appropriate permit by the department for such operation or is subsequent to the operation of the feedlot and an onsite inspection by the department is made, before or after filing of the suit, and the inspection reveals that no permit is required for such operation.

(2) It shall be unlawful for any person to:

(a) Discharge any pollutant into waters of the state without obtaining a permit as required by the National Pollutant Discharge Elimination System created by the Clean Water Act, as amended, 33 U.S.C. 1251 et seq., and by rules and regulations adopted and promulgated pursuant to section 81-1505;

(b) Construct, install, modify, or operate any disposal system or part thereof or any extension or addition thereto without obtaining necessary permits from the department;

(c) Increase in volume or strength any waste in excess of permitted discharges specified under any existing permit;

(d) Construct, install, or operate any industrial, commercial, or other facility or extend, modify, or add to any such facility if the operation would cause an increase in the discharge or emission of wastes into the air, waters, or land of the state or would otherwise cause an alteration of the physical, chemical, or biological properties of any air, waters, or land of the state in a manner that is not lawfully authorized; or

(e) Construct or use any new outlet for the discharge or emission of any wastes into the air, waters, or land of the state without the necessary permit.

(3) It shall be unlawful for any person to:

(a) Construct or operate a solid waste management facility without first obtaining a permit required under the Environmental Protection Act or under the Integrated Solid Waste Management Act and the rules and regulations adopted and promulgated by the council pursuant to the acts;

(b) Violate any term or condition of a solid waste management facility permit;

(c) Violate any rule or regulation adopted and promulgated by the council pursuant to the Environmental Protection Act or the Integrated Solid Waste Management Act; or

(d) After October 1, 1993, dispose of any solid waste at any location other than a solid waste management facility holding a current permit issued by the department pursuant to the Integrated Solid Waste Management Act.

(4) It shall be unlawful to:

(a) Construct or operate an air pollution source without first obtaining a permit required under the Environmental Protection Act and the rules and regulations adopted and promulgated by the council pursuant to subsection (12) of section 81-1505;

(b) Violate any term or condition of an air pollution permit or any emission limit set in the permit; or

(c) Violate any emission limit or air quality standard established by the council.

(5) It shall be unlawful for any person to:

(a) Construct or operate a livestock waste control facility without first obtaining a permit if required under the Livestock Waste Management Act or under the Environmental Protection Act and the rules and regulations adopted and promulgated by the council pursuant to such acts;

(b) Violate any provision of the Livestock Waste Management Act;

(c) Violate any term or condition of a livestock waste control facility permit; or

(d) Violate any rule or regulation adopted and promulgated by the council pursuant to the Environmental Protection Act or the Livestock Waste Management Act.

(6) Nothing in this section shall be construed to authorize the department to specify the type, design, method of installation, or type of construction of any equipment of manufacturing processes.

**Source:**

Laws 1971, LB 939, § 6; Laws 1972, LB 1435, § 5; Laws 1974, LB 1029, § 4; Laws 1977, LB 132, § 1; Laws 1980, LB 915, § 1; Laws 1983, LB 356, § 6; Laws 1992, LB 1257, § 83; Laws 1993, LB 623, § 4; Laws 1994, LB 570, § 8; Laws 1998, LB 1209, § 22.

**81-1507**
**Director; violations; hearings; orders.**

(1) Whenever the director has reason to believe that a violation of any provision of the Environmental Protection Act, the Integrated Solid Waste Management Act, the Livestock Waste Management Act, a rule or regulation pursuant to such acts, or any order of the department has occurred, he or she may cause a written complaint to be served upon the alleged violator or violators or he or she may bring a criminal or civil action under section 81-1508.01 or 81-1508.02. The complaint shall specify the provision of the act, rule or regulation, or order alleged to be violated and the facts alleged to constitute a violation thereof and shall order that necessary corrective action be taken within a reasonable time to be prescribed in such order. Any such order shall become final unless each person named therein requests in writing a hearing before the director no later than thirty days after the date such order is served. In lieu of such order, the director may require that the alleged violator appear before the director at a time and place specified in the notice and answer the charges complained of. The notice shall be delivered to the alleged violator or violators in accordance with the provisions of subsection (5) of this section not less than thirty days before the time set for the hearing.

Whenever, on the basis of any information, the director determines that there is or has been a release of hazardous waste or hazardous constituents into the environment from a facility authorized to operate under the Environmental Protection Act or from a facility subject to hazardous waste management regulations adopted and promulgated under the act, the director may issue an order requiring the owner or operator to monitor, investigate, and undertake corrective action or such other response at the facility or beyond the facility boundary where necessary to protect human health and the environment. In the case of any facility or site not in operation at the time a determination is made to require corrective action, if the director finds that the owner could not reasonably be expected to have actual knowledge of the presence of hazardous waste at the site, the director may issue an order requiring any previous owner or operator who could reasonably be expected to have actual knowledge to carry out the necessary monitoring, investigation, and corrective action.

(2) The director shall afford an opportunity for a fair hearing, in accordance with the provisions of the Environmental Protection Act, the Integrated Solid Waste Management Act, or the Livestock Waste Management Act, to the alleged violator or violators at the time and place specified in the notice or any modification thereof. On the basis of the evidence produced at the hearing, the director or hearing officer shall make findings

of fact and conclusions of law and enter such order as in his or her opinion will best further the purposes of the acts and shall give written notice of such order to the alleged violator and to such other persons who appear at the hearing and make written request for notice of the order. If the hearing is held before any person other than the director, such person shall transmit a record of the hearing together with findings of fact and conclusions of law to the director. The director, prior to entering his or her order on the basis of such record, shall provide opportunity to the parties to submit for his or her consideration exceptions to the findings or conclusions and supporting reasons for such exceptions. The order of the director shall become final and binding on all parties unless appealed to the courts as provided in section 81-1509 within thirty days after notice has been sent to the parties.

(3) Any person who is denied a permit by the director or who has such permit revoked or modified shall be afforded an opportunity for a fair hearing as provided in subsection (2) of this section in connection therewith upon written application to the director within thirty days after receipt of notice from the director of such denial, revocation, or modification. On the basis of such hearing the director shall affirm, modify, or revoke his or her previous determination.

(4) Whenever the director finds that an emergency exists requiring immediate action to protect the public health and welfare, the director may, without notice or hearing, issue an order reciting the existence of such an emergency and requiring that such action be taken as the director deems necessary to meet the emergency. Notwithstanding the provisions of subsection (2) of this section, such order shall be effective immediately. Any person to whom such order is directed shall comply therewith immediately but on application to the director shall be afforded a hearing as soon as possible and not later than ten days after such application by such affected person. On the basis of such hearing, the director shall continue such order in effect, revoke it, or modify it.

(5) Except as otherwise expressly provided, any notice, order, or other instrument issued by or under authority of the director shall be served on any person affected thereby in a manner provided for service of a summons in a civil action. Proof of service shall be filed in the office of the department.

Every certificate or affidavit of service made and filed as provided in this section shall be prima facie evidence of the facts therein stated, and a certified copy thereof shall have like force and effect.

(6) The hearings provided for in this section may be conducted by the director or by any member of the department acting in his or her behalf, or the director may designate hearing officers who shall have the power and authority to conduct such hearings in the name of the director at any time and place. A verbatim record of the proceedings of such hearings shall be taken and filed with the director, together with

findings of fact and conclusions of law made by the director or hearing officer. Witnesses who are subpoenaed shall receive the same fees as in civil actions in the district court and mileage as provided in section 81-1176. In case of contumacy or refusal to obey a notice of hearing or subpoena issued under the provisions of this section, the district court shall have jurisdiction, upon application of the director, to issue an order requiring such person to appear and testify or produce evidence as the case may require and any failure to obey such order of the court may be punished by such court as contempt thereof.

If requested to do so by any party concerned with such hearing, the full stenographic notes, or tapes of an electronic transcribing device, of the testimony presented at such hearing shall be taken and filed. The stenographer shall, upon the payment of the stenographer's fee allowed by the court therefor, furnish a certified transcript of the whole or any part of the stenographer's notes to any party to the action requiring and requesting the same.

**Source:**
Laws 1971, LB 939, § 7; Laws 1972, LB 1435, § 6; Laws 1974, LB 1029,
Laws 1981, LB 204, § 197; Laws 1983, LB 447, § 99;
Laws 1987, LB 152, § 2; Laws 1992, LB 1257, § 84;
Laws 1998, LB 1209, § 23; Laws 1999, LB 784, § 2;
Laws 1999, LB 789, § 1.
Effective date August 28, 1999.
Note: The Revisor of Statutes has pursuant to section 49-769 correlated LB 784, section 2, with LB 789, section 1, to reflect all amendments.

**81-1508**

**Violations of Environmental Protection Act, Integrated Solid Waste Management Act, or Livestock Waste Management Act; civil penalties; injunctions.**

(1) Any person who violates any of the provisions of the Environmental Protection Act, the Integrated Solid Waste Management Act, or the Livestock Waste Management Act, fails to perform any duty imposed by either act or any rule or regulation issued thereunder, or violates any order or determination of the director promulgated pursuant to either act and causes the death of fish or other wildlife shall, in addition to the penalties provided in sections 81-1508.01 and 81-1508.02, be liable to pay to the state an additional amount equal to the sum of money reasonably necessary to restock waters with fish or replenish such wildlife as determined by the director after consultation with the Game and Parks Commission. Such amount may be recovered by the director on behalf of the state in a civil action brought in the district court of the county in which such violation or failure to perform the duty imposed occurred.

(2) Except as provided for in subsection (3) of this section for the handling, storage, treatment, transportation, or disposal of solid or hazardous waste, in addition to the penalties provided by this section and sections 81-1508.01 and 81-1508.02, the director, whenever he or she has reason to believe that any person, firm, or corporation is violating or threatening to violate any provision of the acts, any rule or regulation adopted and promulgated thereunder, or any order of the director, may petition the district court for an injunction. It shall be the duty of each county attorney or the Attorney General to whom the director reports a violation to cause appropriate proceedings to be instituted without delay to assure compliance with the acts.

(3) Upon receipt of evidence that the handling, storage, treatment, transportation, or disposal of any solid waste or hazardous waste is presenting an imminent and substantial endangerment to the health of humans or animals or to the environment, the director may petition the district court for an injunction to immediately restrain any person from contributing to the alleged acts, to stop such handling, storage, treatment, transportation, or disposal, and to take such other action as may be necessary. It shall be the duty of each county attorney or the Attorney General to whom the director reports a violation to cause appropriate proceedings to be instituted without delay to assure compliance with the Environmental Protection Act, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act.

**Source:**
Laws 1971, LB 939, § 8; Laws 1972, LB 1435, § 7;
Laws 1973, LB 538, § 3; Laws 1979, LB 342, § 3;
Laws 1981, LB 216, § 4; Laws 1983, LB 356, § 7;
Laws 1984, LB 1078, § 4; Laws 1987, LB 565, § 1;
Laws 1991, LB 413, § 1; Laws 1992, LB 1257, § 85;
Laws 1994, LB 570, § 9; Laws 1998, LB 1209, § 24.

**81-1508.01**
**Violations of Environmental Protection Act, Integrated Solid Waste Management Act, or Livestock Waste Management Act; criminal penalties.**

(1) Any person who violates the Environmental Protection Act, the Integrated Solid Waste Management Act, or the Livestock Waste Management Act by knowingly and willfully committing any of the following offenses shall be guilty of a Class IV felony:

(a) Violating any water pollution control law, rule, or regulation adopted pursuant to the National Pollutant Discharge Elimination System created by the Clean Water Act, as amended, 33 U.S.C. 1251 et seq., or any permit or permit condition or limitation or failing to obtain a permit as required by the Environmental Protection Act, the Integrated Solid Waste Management Act, or the Livestock Waste Management Act;

(b) Violating any air pollution control law, rule, regulation, permit, license, or permit or license condition or limitation;

(c) Violating any hazardous waste control law, rule, regulation, permit, license, or permit or license condition or limitation;

(d) Violating any mineral production, mineral exploration, or injection control law, rule, regulation, permit, license, or permit or license condition or limitation;

(e) Making any false statement, representation, or certification in any application, label, manifest, record, report, plan, or other document required to be filed or maintained by the Environmental Protection Act, the Integrated Solid Waste Management Act, or the Livestock Waste Management Act or the rules or regulations adopted and promulgated pursuant to such acts;

(f) Falsifying, tampering with, or rendering inaccurate any monitoring device or method used or required for compliance with any permit or license or the Environmental Protection Act, the Integrated Solid Waste Management Act, or the Livestock Waste Management Act or the rules or regulations adopted and promulgated pursuant to such acts; or

(g) Transporting hazardous waste to an unpermitted facility.

(2) Any person who violates the Environmental Protection Act, the Integrated Solid Waste Management Act, or the Livestock Waste Management Act by knowingly and willfully committing any of the following offenses shall be guilty of a Class I misdemeanor:

(a) Violating any solid waste control law, rule, regulation, permit, license, or permit or license condition or

limitation; or

(b) Violating any livestock waste control law, rule, regulation, permit, license, or permit or license condition or limitation.

(3) Any person who knowingly and willfully violates any other provision of the Environmental Protection Act, the Integrated Solid Waste Management Act, or the Livestock Waste Management Act or any rule or regulation adopted and promulgated pursuant to such acts shall be guilty of a Class III misdemeanor.

(4) Each violation under this section shall be actionable. In case of a continuing violation, each day shall constitute a separate offense. Any person who knowingly and willfully violates this section shall be subject to personal liability under this section. In assessing the amount of any fine, the court shall consider the degree and extent of the violation, the size of the operation, and any economic benefit derived from noncompliance.

**Source:**
Laws 1994, LB 570, § 10; Laws 1998, LB 1209, § 25.

**81-1508.02**
**Unlawful acts; civil penalty.**

(1) It shall be unlawful for any person:

(a) To refuse the right of entry and inspection to any authorized representative of the department when the representative is acting under the provisions of a permit issued by the department;

(b) To violate any air, water, or land quality standards, any emission or effluent standards or limitations, any permit or license condition or limitation, any order of the director, or any monitoring, reporting, or record-keeping requirements contained in or issued or entered into pursuant to the Environmental Protection Act, the Integrated Solid Waste Management Act, or the Livestock Waste Management Act or the rules or regulations adopted and promulgated pursuant to such acts;

(c) To make any false statement, representation, or certification in any application, label, record, report, plan, or other document required to be filed or maintained by such acts, rules, or regulations;

(d) To falsify, tamper with, or render inaccurate any monitoring device or method used or required for compliance with a permit or license or such acts, rules, or regulations; or

(e) To violate any other provision of or fail to perform any other duty imposed by such acts, rules, or regulations.

(2) Each violation of this section or of section 81-1506 shall subject a person to a civil penalty of no more than ten thousand dollars per day. In case of a continuing violation, each day shall constitute a separate offense. In assessing the amount of the fine, the court shall consider the degree and extent of the violation, the size of the operation, and any economic benefit derived from noncompliance.

**Source:**
Laws 1994, LB 570, § 11; Laws 1998, LB 1209, § 26;
Laws 1999, LB 789, § 2.
Effective date August 28, 1999.

**81-1511**
**Department; inspections; search warrants.**

Any duly authorized officer, employee, or representative of the director may at any reasonable time, with the consent of the person or persons in control of an air, land, or water contaminant source, enter and inspect any property, premise, or place on or at which such a contaminant source is located or being constructed, installed, or established for the purpose of ascertaining the state of compliance with the Environmental Protection Act, the Integrated Solid Waste Management Act, and the Livestock Waste Management Act and rules and regulations in force pursuant to the acts. A suitably restricted search warrant, upon a showing of probable cause in writing and upon oath or affirmation, may be issued by the district court as provided by law to such officer, employee, or representative of the department for the purpose of enabling him or her to make such inspection. No person shall refuse entry or access to any authorized representative of the department who requests entry for purposes of inspection and who presents appropriate credentials and warrants. No person shall obstruct, hamper, or interfere with any such inspection. Nothing in this section shall be construed to prevent prompt inspection without consent or appropriate warrant in acute and compelling emergency situations when there is neither sufficient time nor opportunity to obtain a search warrant. If requested, the owner or operator of the premises shall receive a report setting forth all facts found which relate to compliance status.

**Source:**
Laws 1971, LB 939, § 11; Laws 1972, LB 1435, § 10;
Laws 1987, LB 152, § 3; Laws 1992, LB 1257, § 87;
Laws 1998, LB 1209, § 27.

**81-1513**
**Variances from rules, regulations; conditions for granting; appeal.**

(1) Any person who owns or is in control of any plant, building structure, process, or equipment may apply to the director for a variance from rules or regulations. The director may grant such variance if he or she finds that the emissions or discharges occurring or proposed to occur do not endanger or tend to endanger human health or safety or that compliance with the rules or regulations from which variance is sought would produce serious hardship without equal or greater benefits to the public. In making such findings the director shall give due consideration to all the facts and circumstances bearing upon the reasonableness of the emissions or discharges involved including, but not limited to:

(a) The character and degree of injury to or interference with the health and physical property of the people;

(b) The social and economic value of the source of the air, water, or land pollution;

(c) The question of priority of location in the area involved; and

(d) The technical practicability and economic reasonableness of reducing or eliminating the emissions or discharges resulting from such source.

(2) No variance shall be granted until the director has considered the relative interests of the applicant, other owners of property likely to be affected by the discharges, and the general public.

(3) Any variance or renewal thereof shall be granted within the requirements of subsection (1) of this section, for time periods and under conditions consistent with the reasons therefor, and within the following limitations:

(a) If the variance is granted on the ground that there is no practicable means known or available for the adequate prevention, abatement, or control of the air, water, or land pollution involved, it shall be only until the necessary means for prevention, abatement, or control become known and available and subject to the taking of any substitute or alternate measures that the director may prescribe;

(b) If the variance is granted on the ground that compliance with the particular requirement or requirements from which variance is sought will necessitate the taking of measures which, because of their extent or cost, must be spread over a considerable period of time, it shall be for a period not to exceed such reasonable time as, in the view of the director, is requisite for the taking of the necessary measures. A variance granted on the ground specified in this section shall contain a

timetable for the taking of action in an expeditious manner and shall be conditioned on adherence to such timetable; and

(c) If the variance is granted on the ground that it is justified to relieve or prevent hardship of a kind other than that provided for in subdivision (a) or (b) of this subsection, it shall be for not more than one year.

(4) Any variance granted pursuant to this section may be renewed on terms and conditions and for periods which would be appropriate on initial granting of a variance. If complaint is made to the director on account of the variance, no renewal thereof shall be granted unless the director finds that renewal is justified. No renewal shall be granted except on application therefor. Any such application shall be made at least thirty days prior to the expiration of the variance. Immediately upon receipt of an application for renewal the director shall give public notice of such application in accordance with rules and regulations of the department.

(5) A variance or renewal shall not be a right of the applicant or holder thereof but shall be in the discretion of the director. The granting or denial of a variance or a renewal shall be by final order of the director. Any person adversely affected by such an order may appeal the decision, and the appeal shall be in accordance with the Administrative Procedure Act.

(6) Nothing in this section and no variance or renewal granted pursuant to this section shall be construed to prevent or limit the application of the emergency provisions and procedures of section 81-1507 to any person or his or her property.

(7) No variance shall be granted which will sanction any violation of state or federal statutes or regulations.

**Source:**
Laws 1971, LB 939, § 13; Laws 1972, LB 1435, § 11; Laws 1974, LB 1029, § 7; Laws 1988, LB 352, § 175.

**81-1531.01**
**Act, how construed.**

Nothing in the Environmental Protection Act shall be construed to apply to any wells or holes covered by sections 57-901 to 57-922.

**Source:**
Laws 1983, LB 356, § 10.

**81-1531.02**
**Uranium mining; department; regulatory duties; prohibited methods; enforcement.**

(1) The department shall recommend an appropriate regulatory policy for controlling uranium mining to be presented to the council and the Legislature by January 1, 1986. The department shall evaluate all reasonable regulatory options for addressing the impacts on air, land, and water quality of uranium mining by methods other than mineral production and injection wells which are presently regulated. The department shall examine and consider regulatory programs created by other states and the federal government, their applicability to Nebraska, and their success in the states or areas where they are used and shall consider, but not be limited to, the following policy options:

(a) The development of uranium surface and shaft mining regulations;

(b) The development of regulations addressing appropriate development, mitigation, or reclamation standards for uranium mining or uranium mining-related activities;

(c) The appropriateness of developing regulations addressing ground or surface water use standards for uranium mining or uranium mining-related activities as a means of limiting the impact of uranium mining on land and water resources; and

(d) The use of any other existing state regulatory programs to control or regulate the impacts of uranium mining on land and water resources.

(2) The department shall perform the evaluation in cooperation with other state agencies which have or could have a role in regulating the impacts of uranium mining on Nebraska's people and resources or in controlling other uranium mining activities. The department shall also create a citizen advisory panel, of interested or affected parties, which shall be consulted for its input and opinion on the results of the evaluation of regulatory options.

(3) Uranium mining by any method other than mineral production and injection wells shall be prohibited until legislation is passed authorizing the department to regulate such mining activities. It is the intent of the Legislature that uranium mining shall be regulated by the department. Upon receipt of evidence that uranium mining by any method other than by mineral production and injection wells or related activities are presenting or are likely to present an imminent and substantial threat to the environment, the director shall petition the district court for an injunction to immediately restrain any person from contributing to the alleged acts or to

require any person to stop such acts or to take such other action as may be necessary. It shall be the duty of each county attorney or the Attorney General to whom the director reports a violation to cause appropriate proceedings to be instituted without delay to assure compliance with this section.

**Source:**
Laws 1983, LB 356, § 11; Laws 1984, LB 742, § 2;
Laws 1986, LB 1008, § 3.

**81-1532**
**Act, how cited.**

Sections 81-1501 to 81-1532 shall be known and may be cited as the Environmental Protection Act.

**Source:**
Laws 1971, LB 939, § 32; Laws 1983, LB 356, § 12;
Laws 1987, LB 114, § 18; Laws 1991, LB 528, § 2;
Laws 1992, LB 1257, § 92; Laws 1994, LB 570, § 12;
Laws 1998, LB 1209, § 30; Laws 2000, LB 1234, § 13.
Operative date July 13, 2000.

# Appendix B
## Comparison of U.S. Environmental Protection Agency UIC Program Requirements and Provisions of Title 122 – Rules and Regulations for Underground Injection and Mineral Production Wells

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**Title 122 Provisions Directly Related to Title 40 CFR Part 144**

Title 122 meets the minimum requirements for programs in 40 CFR §145.11, and by reference, the requirements of §144. The following program areas are required for a State program to receive EPA approval. The appropriate cross-reference between the information required in Title 40 CFR Part 144 and the Title 122 Chapter containing that information is noted in parenthesis. Where Title 122 includes minor requirements in addition to the basic EPA program, these additional requirements are noted. If the additional NDEQ requirements are significant, they are discussed in Section 4.

*Confidential information (§144.5(b)) – Title 122, Chapter 25*

Title 122 Chapter 25 contains similar confidentiality provisions to those contained in 40 CFR §144.5.

*Classification of injection wells (§144.6) – Title 122, Chapter 2*

Title 122 Chapter 2 classifies injection wells in general accordance with the EPA classifications. The Class III well classification is expanded to include in-situ combustion of fossil fuel and recovery of geothermal energy to produce electrical power. This addition is based upon the statutory requirements in the Nebraska Environmental Protection Act.

*Noncompliance reporting (§144.8) – Title 122 Chapter 30*

Title 122 Chapter 30 contains similar noncompliance reporting provisions to those contained in Title 40 CFR Part 144 provisions.

*Prohibition of unauthorized injection (§144.11) – Title 122 Chapter 3*

Title 122 Chapter 3 meets the EPA prohibitions against unauthorized injection and includes an additional prohibition against injection of hazardous waste *into or above an aquifer that has been exempted pursuant to Chapter 5.*

*Prohibition of movement of fluids into underground sources of drinking water (§144.12) – Title 122 Chapter 4*

Title 122 Chapter 4 meets 40 CFR §144.12 and specifically adds mineral *production* wells to the activities that are covered by the prohibition of movement of fluids to a USDW. Mineral *production* wells are also added by NDEQ to the closure provision if contaminants are found in a USDW. The EPA UIC regulations only cover *injection* wells. This inclusion of mineral production wells is a statutory requirement under the Nebraska Environmental Protection Act.

Chapter 4 also requires that the NDEQ Director *will* take emergency action in case of imminent and substantial endangerment of a USDW. The EPA regulations state that the Director *may* take action.

*Elimination of Class IV wells (§144.13) – Title 122 Chapter 6*

The EPA regulation of Class IV (i.e., hazardous waste injection) wells, for isolated circumstances, allows injection in exempted aquifers and more than ¼ mile from a USDW. Title 122 Chapter 6 and Chapter 3 (noted above) do not allow this exception. In addition, Chapter 6 requires that any Class IV wells be prohibited within 90 days following the effective date of the regulation. EPA does not include this requirement for existing wells.

*Requirements for wells managing hazardous waste (§144.14)*

Title 122 does not have a Chapter including the provisions for hazardous waste injection wells because hazardous waste wells are specifically prohibited in the State of Nebraska under Chapters 3 and 6.

*Authorization by rule (§144.21-144.26) – Title 122 Chapter 7*

Title 122 Chapter 7 only allows injection by rule in Class V wells. There are no provisions for injection by rule for Class I, II, and III wells as allowed in 40 CFR Subpart C.

*Application for a permit (§144.31) – Title 122 Chapter 11*

Title 122 Chapter 11 includes the information requirements for permit applications from §144.31 and 40 CFR 146 Subparts B (Class I wells) and D (Class III wells). Chapter 11 requires that additional information concerning the identity of the owner be provided. This information must include the operators technological expertise to construct and operate the facility and a description of all related underground injection projects that the operator is or has been involved with including any citations, notices of violation, or lawsuits associated with these projects. EPA does not have similar applicant qualification requirements.

*Signatories (§144.32) – Title 122 Chapter 24*

Title 122 Chapter 24 contains similar signatory provisions to 40 CFR Part 144.

*Area Permits (§144.33) – Title 122 Chapter 21*

The provisions for area permits in Title 122 Chapter 21 are more restrictive that in 40 CFR §144.33. Area permits are only allowed for wells of the same classification. Area permits for Class III operations must also contain requirements for aquifer restoration.

*Emergency permits (§144.34) – Title 122 Chapter 22*

Title 122 Chapter 22 does not allow the issuance of emergency permits for a "substantial and irretrievable loss of oil or gas resources" or a "substantial delay in production of oil or gas resources" for Class II wells as allowed in 40 CFR §144.34.

*Duration (§144.36) – Title 122 Chapter 23*

Title 122 Chapter 23 contains similar permit duration provisions to Title 40 CFR Part 144 provisions.

*Permit transfer (§144.38) – Title 122 Chapter 26*

Title 122 Chapter 26 does not contain automatic permit transfer provisions as provided by 40 CFR §144.38, although similar informational requirements are allowed for injection wells other than Class I or Class III. For permit transfer for Class I and III

injection and mineral production wells, additional information must be submitted as discussed in Section 4.

*Permit modification (§144.39) – Title 122 Chapter 27*

Title 122 Chapter 27 allows that *any interested person* may request modification or revocation and reissuance of a UIC permit. EPA does not provide for such requests by interested parties in 40 CFR Part 144.

*Permit termination (§144.40) - Title 122 Chapter 28*

Title 122 Chapter 28 contains similar permit termination provisions to 40 CFR Part 144.

*Applicable permit conditions (§144.51) – Title 122 Chapters 9, 14, 18, and 19*

The provisions of 40 CFR §144.51 are contained in Title 122 Chapter 9 (Permit Conditions; General), Chapter 14 (Right of Entry), Chapter 18 (Monitoring Requirements), and Chapter 19 (Reporting Requirements). There are minor differences, such as a Chapter 18 requirement to retain information on the composition of injected solutions for five years after completion of plugging and abandonment instead of the three years required by EPA. Chapters 18 and 19 contain significant additional monitoring and reporting requirements that are discussed in Section 4.

*Establishing permit conditions (§144.52) – Title 122 Chapters15, 35, 17, and 37*

40 CFR §144.52 provides for establishment of other permit conditions. In many cases, these other permit requirements are specified in Title 122. 40 CFR §144.52 discusses the following conditions:

- Construction Requirements. Title 122 Chapter 15 provides specific construction requirements for Class I and Class III wells. In addition, the UIC permit may also provide additional construction requirements.
- Corrective Action Requirements. Title 122 Chapter 35 provides specific corrective action requirements for Class I and Class III wells. In addition, the UIC permit may also provide corrective action requirements.
- Operation Requirements. Title 122 Chapter 17 provides specific operating requirements for Class I and Class III wells. In addition, the UIC permit may also provide operating requirements.

- Financial Responsibility. Title 122 Chapter 37 provides specific requirements to provide financial assurance for the costs of site restoration. These significant additional requirements are discussed in Section 4.

*Schedule of compliance (§144.53(a)) – Title 12 Chapter 29*

Title 122 Chapter 29 provides more stringent compliance and reporting schedules than 40 CFR §144.53.

*Monitoring requirements (§144.54) – Title 122 Chapter 18 and Chapter 20*

EPA requires that monitoring and reporting requirements be contained in permits. In addition to meeting the general provisions for monitoring, Title 122 Chapter 18 contains specific monitoring requirements for all Class I and Class III wells. These additional requirements are discussed further in Section 4.

*Corrective Action (§144.55) – Title 122 Chapter 35*

The provisions in Title 122 Chapter 35 for location and correction of any wells that penetrate the injection and/or production zone within the area of review are similar to those contained in 40 CFR §144.55. Chapter 35 provides criteria to determine the adequacy of corrective action including analysis of the toxicity and volumes of injected fluid, affected population, geology, hydrology, history, abandonment, and hydraulic connections with USDWs, if any exist. The Director may also require limitation of injection pressure by permit condition.

*Application for a permit (§124.3(a)) – Title 122*

For State programs, this section of the EPA regulations refers to the requirements for permitting from 40 CFR §144.31, which are the specific permitting requirements discussed above.

*Modification of permits (§124.5 (a), (c), (d), and (f)) – Title 122 Chapter 27*

Title 122 Chapter 27 contains similar modification provisions to 40 CFR 124.

*Draft Permit (§124.6 (a), (c), (d), and (e)) – Title 122 Chapter 12*

Title 122 Chapter 12 contains similar draft permit provisions to 40 CFR 124.

*Fact sheets (§124.8) – Title 122 Chapter 13*

Title 122 Chapter 13 contains similar fact sheet provisions to 40 CFR 124.

*Public notice (§124.10 (a)(1)(ii), (a)(1)(iii), (a)(1)(v), (b), (c), (d), and (e)) – Title 122 Chapter 31*

Title 122 Chapter 31 contains similar public notice provisions to 40 CFR 124. In addition to the federal requirements, Chapter 31 requires notice for adjacent landowners.

*Public comments and requests for hearings (§124.11) – Title 122 Chapter 32*

Title 122 Chapter 32 contains similar public comment and hearing request provisions to 40 CFR 124.

*Public hearings (§124.12(a)) – Title 122 Chapter 33*

Title 122 Chapter 33 contains similar public hearing provisions to 40 CFR 124.

*Response to comments (§124.17 (a) and (c)) – Title 122 Chapter 34*

Title 122 Chapter 34 contains similar comment response provisions to 40 CFR 124.