

ARTICLE 74:11
MINERAL EXPLORATION

Chapter

- 74:11:01 General provisions, Void.
- 74:11:02 Required plans, Void.
- 74:11:03 Permits, Void.
- 74:11:04 Surface mining standards, Void.
- 74:11:05 Violations, Void.
- 74:11:06 Contested cases, Void.
- 74:11:07 Exploration reclamation plans, Void.
- 74:11:08 ~~Exploration operation standards~~ Capping, sealing, and plugging exploration test holes.
- 74:11:09 Exploration permits, Void.

CHAPTER 74:11:08

CAPPING, SEALING, AND PLUGGING EXPLORATION OPERATION

STANDARDS TEST HOLES

Section

- 74:11:08:01 to 74:11:08:03 Void.
- 74:11:08:03.01 Definitions.
- 74:11:08:04 Minimum acceptable plugging method.
- 74:11:08:05 Plugging and sealing confined aquifers or more than one aquifer.
- 74:11:08:05.01 Plugging and sealing single unconfined aquifers.

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74:11:08:07.01 Alternate plugging plans.
74:11:08:07.02 Plugging with bentonite chips.
74:11:08:08 Temporary plugging and capping.
74:11:08:09 to 74:11:08:15 Void.

74:11:08:01 to 74:11:08:03. Void

74:11:08:03.01. Definitions. Terms defined by SDCL chapters 45-6C and 45-6D have the same meanings when used in this chapter. In addition, terms used in this chapter mean:

(1) "Bedrock," any geologic formation or sediment of Pliocene age or older of solid unweathered rock, including solid limestone, dolomite, sandstone, shale, and igneous and metamorphic rocks;

(2) "Bentonite," a highly plastic when wet, colloidal clay composed primarily of sodium montmorillonite;

(3) "Bentonite chips," angular fragments of bentonite that have been commercially processed and graded according to size for use in plugging test holes. The fragments range in size from 1/4 to 3/4-inch;

(4) "Bentonite grout," a mixture consisting of water and a high solids, bentonite material, that has been commercially manufactured and specially formulated for use to plug a test hole. The bentonite grout must contain a minimum of 20 percent solids by weight and have a minimum slurry density of 9.4 pounds per gallon when mixed according to the manufacturer's recommendations. Bentonite manufactured for use as a drilling fluid does not meet the requirements for bentonite grout;

(5) "Cement grout," a mixture consisting of a high-sulfate-resistant type Portland cement and no more than six gallons of water for each 94-pound sack of cement, and which may have up to 75 pounds of drilling-grade bentonite per 10 sacks of cement to reduce shrinkage;

(6) "Confined aquifer," an aquifer in which the groundwater is isolated from the atmosphere by geologic formations of low permeability and that produces water levels above the top of the aquifer in test holes penetrating it;

(7) "Flowing artesian test hole," a test hole that has penetrated a confined aquifer whose potentiometric surface is above the land surface resulting in water flow at the surface;

(8) "Formation pressure," the fluid pressure within an aquifer or formation; and

(9) " Top of the aquifer," the uppermost point at which saturated conditions are found.

Source:

General Authority: SDCL 45-6C-29, 45-6D-34.

Law Implemented: SDCL 45-6C-29, 45-6D-34.

74:11:08:04. Minimum acceptable plugging method. Test holes that encounter no water or only low-permeability formations such as clays, shales, and till must be backfilled to restore natural conditions as nearly as possible. Except as provided in §§ 74:11:08:05 to 74:11:08:07 74:11:08:07.02, inclusive, the minimum acceptable ~~mineral well~~ test hole plugging method is the return of the excess drill cuttings to the drill hole to a point not less than 8 eight feet below the ground surface. Backfill material must be free of contamination and have a permeability equal to or less than the permeability of the formations encountered in the borehole. A nondegradational, nonslip plug shall be placed at a point not less than 8 eight feet below the ground surface, and a ~~5-foot~~ five-foot column of ~~low shrink, sulfate-resistant Portland~~ cement grout shall be placed above the plug. ~~The water to cement ratio for mixing the grout may not exceed 9 gallons of water per 94 pound bag of cement, and a minimum of 6 pounds of drilling grade bentonite per 94 pound bag of cement may be added to the grout mixture.~~ Topsoil or material representative of the undisturbed surface material shall be tamped into the upper 3 three feet of the drill hole.

Bentonite chips may be used as an alternative to cement grout in the top eight feet of the test hole if bentonite grout or bentonite chips are used to plug the test hole.

Source: 5 SDR 69, effective February 20, 1979; transferred from § 12:04:08:04, effective July 1, 1981; citations replaced effective July 1, 1982; 13 SDR 129, 13 SDR 141, effective July 1, 1987.

General Authority: SDCL 45-6C-29, 45-6D-34.

Law Implemented: SDCL 45-6C-29, 45-6D-34.

74:11:08:05. Plugging and sealing confined aquifers or more than one aquifer. Test holes that penetrate confined aquifers or that encounter more than one aquifer may be plugged with bentonite grout only if the weight of the bentonite grout column is sufficient to overcome formation pressure. If the weight of the bentonite grout column is not sufficient to overcome formation pressure the test hole must be plugged with cement grout. The bentonite or cement grout must be placed from the bottom of the hole to within eight feet of the ground surface. All confined aquifers shall be plugged with high quality sodium bentonite gel having a Marsh Funnel viscosity of at least 20 seconds greater than that of the returned completion drilling fluid. The use of inert, nondegenerative weighting materials to overcome formation pressures is allowable. The upper eight feet of the hole shall be plugged in accordance with the specifications set forth in § 74:11:08:04. Alternate plugging plans must be approved by the department.

Source: 5 SDR 69, effective February 20, 1979; transferred from § 12:04:08:05, effective July 1, 1981; citations replaced effective July 1, 1982; 13 SDR 129, 13 SDR 141, effective July 1, 1987.

General Authority: SDCL 45-6C-29, 45-6D-34.

Law Implemented: SDCL 45-6C-29, 45-6D-34.

74:11:08:05.01. Plugging and sealing single unconfined aquifers. Test holes that penetrate a single, unconfined aquifer may be backfilled with drill cuttings or clean sand or

gravel from the bottom of the hole to the top of the aquifer. Above the aquifer, bentonite grout or cement grout shall be used to plug the test hole from the top of the aquifer to within at least eight feet of the ground surface. The upper eight feet of the hole shall be plugged in accordance with the specifications set forth in § 74:11:08:04.

Source:

General Authority: SDCL 45-6C-29, 45-6D-34.

Law Implemented: SDCL 45-6C-29, 45-6D-34.

74:11:08:06. Plugging in unconsolidated granular material. ~~Any drill hole~~ Test holes that ~~intersects~~ penetrate water-bearing unconsolidated granular material above ~~the~~ bedrock and that continue into the bedrock shall be plugged ~~in the following manner:~~ by placing a column of ~~drilling grade sodium bentonite slurry with a minimum density of 15 pounds per gallon shall be placed~~ or cement grout from the bottom of the hole to a point not less than ~~5~~ five feet below the bedrock surface ~~and a.~~ A column of ~~Portland~~ cement grout with a density of not more than ~~14 pounds per gallon~~ shall be placed between the bentonite ~~slurry grout~~ and ~~3~~ three feet below the ground surface. ~~The dry constituents of the grout mixture must be in the proportions of 6 pounds of drilling grade bentonite per 94 pound sack of sulfate resistant cement, and the water to cement ratio may not exceed 9 gallons of water per 94 pound sack of cement. Upon initial settling of the cement grout, the remainder of the drill test hole shall be plugged with topsoil or a suitable substitute material in a manner consistent with the specifications set forth in § 74:11:08:04.~~

~~Any drill hole~~ Test holes that ~~intersects~~ penetrate nonwater-bearing unconsolidated granular material above the bedrock surface shall be plugged ~~in the following manner: the hole shall be plugged~~ by returning all excess drill cuttings to the hole to a point not less than ~~13~~ eight feet below the ground surface. The ~~remainder~~ upper eight feet of the hole shall be plugged ~~with Portland cement grout together with topsoil or other suitable material in a manner consistent in~~ accordance with the specifications set forth in § 74:11:08:04. If drill cuttings are not available in quantities sufficient to fill the hole to within ~~13~~ eight feet of the ground surface, that portion of the hole remaining to be filled may be plugged with either ~~Portland~~ cement grout or free-flowing mineral aggregate.

Source: 5 SDR 69, effective February 20, 1979; transferred from § 12:04:08:06, effective July 1, 1981; citations replaced effective July 1, 1982; 13 SDR 129, 13 SDR 141, effective July 1, 1987.

General Authority: SDCL 45-6C-29, 45-6D-34.

Law Implemented: SDCL 45-6C-29, 45-6D-34.

74:11:08:07. Plugging flowing artesian wells test holes. All flowing artesian ~~wells~~ test holes shall be plugged with ~~high sulfate-resistant~~ cement grout from the bottom of the hole to within three feet of the surface ~~or by other permanent means which may be required to seal the well. Any alternate method must be approved by the department. The upper three feet shall be filled with suitable soil materials.~~ Upon initial settling of the cement grout, the remainder of the test hole shall be plugged with topsoil or suitable material in a manner consistent with the specifications set forth in § 74:11:08:04.

Source: 5 SDR 69, effective February 20, 1979; transferred from § 12:04:08:07, effective July 1, 1981; citations replaced effective July 1, 1982; 13 SDR 129, 13 SDR 141, effective July 1, 1987.

General Authority: SDCL 45-6C-29, 45-6D-34.

Law Implemented: SDCL 45-6C-29, 45-6D-34

74:11:08:07.01. Alternate plugging plans. Alternate plugging plans may be approved by the department if they are determined to be as protective of groundwater as the methods specified in this chapter. Alternate plugging plans must be approved by the department in writing before the plans are implemented.

Source:

General Authority: SDCL 45-6C-29, 45-6D-34.

Law Implemented: SDCL 45-6C-29, 45-6D-34

74:11:08:07.02. Plugging with bentonite chips. Bentonite chips may be used in place of bentonite grout to plug test holes with a diameter four inches or greater, that are not deeper than 500 feet and that have no more than 100 feet of standing water unless the chips have been coated by the manufacturer to delay hydration. Bentonite chips shall be poured slowly into the top of the test hole to prevent bridging in the casing or borehole. Fine bentonite particles or dust that accumulate in the shipping container may not be used for plugging. Upon completion of the plugging operation, water shall be placed into the casing or borehole to promote expansion of the

bentonite above the static water level. A maximum of four gallons of water shall be added for every 50 pounds of bentonite chips added above the static water level.

If bridging occurs during pouring of the bentonite chips, the point of bridging must be broken to allow the bentonite chips to fall to the bottom of the test hole. If the bridge cannot be broken, the test hole must be drilled out and replugged with bentonite or cement grout. Bentonite chips may not be used in test holes drilled into loose or broken strata if hole collapse and bridging is likely.

Source:

General Authority: SDCL 45-6C-29, 45-6D-34.

Law Implemented: SDCL 45-6C-29, 45-6D-34

74:11:08:08. Temporary plugging and capping. If a delay in plugging and capping is approved by the department, the hole shall be securely capped with a tapered concrete plug or suitable equivalent that is of sufficient diameter to prevent it from slipping below the surface. The temporarily plugged and capped hole shall be marked with a sturdy steel fence post with a minimum height of 42 inches above the ground surface. All test holes shall be capped and permanently plugged as soon as practical and may not be left unplugged for more than 30 days without approval of the department.

Source: 5 SDR 69, effective February 20, 1979; transferred from § 12:04:08:08, effective July 1, 1981; citations replaced effective July 1, 1982; 13 SDR 129, 13 SDR 141, effective July 1, 1987.

General Authority: SDCL 45-6C-29, 45-6D-34.

Law Implemented: SDCL 45-6C-29, 45-6D-34.

74:11:08:09 to 74:11:08:15. Void

CHAPTER 74:29:11
IN SITU LEACH MINING

Section

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- 74:29:11:03 Application content requirements - Mine operations plan.
- 74:29:11:04 Application content requirements - Reclamation plan.
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- 74:29:11:06 Ground water restoration table.
- 74:29:11:07 Establishment of baseline water quality in new mining areas.
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- 74:29:11:09 Designation of exempted aquifers.
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- 74:29:11:58 Ground water contamination during the postclosure period.
- 74:29:11:59 End of the postclosure period.
- 74:29:11:60 Public notice for in situ leach mines.

74:29:11:01. Application for in situ leach mine permit – Contents. All applications for an in situ leach mine permit shall include, at a minimum, the information necessary to address

SDCL 45-6B-4 to 45-6B-10, inclusive; 45-6B-14; 45-6B-15; 45-6B-32 to 45-6B-33.2, inclusive; 45-6B-37 to 45-6B-46, inclusive; 45-6B-91; and 45-6B-92; and §§ 74:29:01:04; 74:29:02:02 to 74:29:02:12 inclusive; 74:29:06:01; and 74:29:10:03;~~and:~~

~~—— (1) A. The application shall include a description of the activities to be conducted by the applicant for which permits or construction approvals are required under SDCL chapters 34A-11, 34A-2, and the Prevention of Significant Deterioration program of the Clean Air Act, 42 U.S.C. § 7401 et seq. as through November 15, 1990;~~

~~—— (2) A and a listing of all permits or construction approvals received or applied for in association with the in situ leach mine permit area under the following programs:~~

~~(a)(1) The state hazardous waste management program under SDCL chapter 34A-11;~~

~~—— (2) The state solid waste permit program under SDCL chapter 34A-6, article 74:27, and chapters 74:54:01 and 74:54:02;~~

~~(b) An (3) The federal underground injection control (UIC) program under Part C of the Safe Drinking Water Act, 42 U.S.C. § 300h et seq. (2003);~~

~~—— (4) The state UIC Class III well permit program under SDCL 34A-2 and chapter 74:54:01;~~

~~(e)~~(5) The state surface water quality program under SDCL chapter 34A-2 and article 74:52;

(6) The state underground storage tank and aboveground storage tank program under SDCL chapter 34A-2 and article 74:56;

(7) The state water rights permit program under SDCL title 46 and article 74:02;

~~(d)~~~~A~~(8) The new source review, Prevention of Significant Deterioration, or Title V permit program under the Clean Air Act 42 U.S.C. § 7401 et seq. as amended through November 15, 1990, and under SDCL chapter 34A-1 and article 74:36, or minor source construction and operating air quality permit program under SDCL chapter 34A-1 and article 74:36;

~~(e)~~~~A~~(9) The U.S. Army Corps of Engineers dredge and fill permit program under Section 404 of the Clean Water Act, as amended to January 1, 2008;

~~(f)~~~~A~~(10) The U.S. Nuclear Regulatory Commission source material license program under 10 CFR Part 40 (January 1, 2007); or

~~(g)~~(11) Other relevant permits permitting programs, including other state and local permits or approvals.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 45-6B-81.

Law Implemented: SDCL 45-6B-5 to 45-6B-7, inclusive.

74:29:11:01.01. Underground Injection Control – Class III Well permit required for mine permit. The board may not grant a permit for an in situ mining operation under Chapter 74:29:11 unless the applicant has obtained a permit under SDCL chapter 34A-2 and chapter 74:55:01 Underground Injection Control - Class III Wells. A permit issued under chapter 74:55:01 satisfies the permit requirements of chapter 74:29:11 for subdivisions 74:29:11:02(1)(a) and (1)(b); the background radiological data related information requirements of subdivision 74:29:11:02(2); subdivisions 74:29:11:02(4) to (8), inclusive; subdivision 74:29:11:03(1); subdivisions 74:29:11:03(2)(a) to (2)(c), inclusive; subdivisions 74:29:11:03(8)(a) to (8)(c), inclusive; subdivision 74:29:11:03(10)(a); subdivisions 74:29:11:03(10)(e) to (10)(g), inclusive; subdivisions 74:29:11:03(11) to (24), inclusive; subdivisions 74:29:11:04(1)(f) to (h), inclusive; subdivisions 74:29:11:04(2) to (4), inclusive; subdivisions 74:29:11:04(11)(c) to (g), inclusive; § 74:29:11:06; § 74:29:11:09; § 74:29:11:12; § 74:29:11:16; subdivision 74:29:11:18(1); § 74:29:11:29; and § 74:29:11:30. The applicant may submit an application for an in situ mine permit before obtaining a permit under SDCL chapter 34A-2 and chapter 74:55:01, and the department may process the application. If the department processes the application, the application may not be deemed procedurally complete pursuant to section 74:29:01:07 until the applicant has obtained a permit under SDCL 34A-2 and chapter 74:55:01.

Source:

General Authority: SDCL 45-6B-81.

Law Implemented: SDCL 45-6B-5 to 45-6B-7, inclusive.

74:29:11:03. Application content requirements -- Mine operations plan. All applications for an in situ leach mine permit shall include, at a minimum, the information and materials related to mine plans required in SDCL 45-6B-5 to 45-6B-7, inclusive, and §§ 74:29:02:04; 74:29:02:11; and 74:29:07:02 to 74:29:07:17, inclusive; and the following information:

(1) In addition to the requirements of §§ 74:29:02:04; 74:29:02:09; and 74:29:02:12, contour (topographic) maps that accurately locate and identify the permit area and show the location of any public highways, tribal reservation boundaries, dwellings, utilities, and easements within the permit area and adjacent lands in relation to all proposed affected lands and proposed activities associated with the in situ leach mine, including all processing facilities, chemical storage areas, production areas, and roads. The map shall also clearly illustrate the location of monitoring wells;

(2) Discussion and illustration of the estimated mining schedule, including:

(a) A list of the proposed wellfields;

(b) A map showing the proposed sequence for mining of the wellfields;

(c) An estimated time schedule for mining each wellfield; and

(d) The capacity of the water/wastewater treatment systems and correlation of the capacity with the mining and restoration schedules;

(3) Conceptual plans and specifications for in situ leach mine facilities in accordance with § 74:29:11:21;

(4) A leakage response plan detailing actions that will be taken in response to the detection of leakage from ponds and surface impoundments in accordance with subdivision 74:29:11:23(6)(f), and from pipeline systems in accordance with subdivision 74:29:11:24(4);

(5) A plan for the periodic inspection and maintenance of mine facilities, to include pipelines and lined impoundments. The plan shall include criteria for repair or replacement of equipment or infrastructure to keep mine facilities in good repair and order, and a quarterly report to include inspection logs, problems noted, and repair or replacement work completed;

(6) The composition of all known and anticipated wastes and procedures for their disposal;

(7) Procedures for ensuring that all radioactive, toxic, acid-forming, or other materials constituting a fire, health, safety, or environmental hazard encountered during or created by the mining process are promptly treated, confined, or disposed of in a manner designed to prevent pollution of surface water or ground water, degradation of soils or vegetation, or a threat to human or animal health and safety, and according to state law and rule;

(8) A site monitoring plan to include:

(a) Ground water quality for both production zones and nonproduction zones;

(b) Surface water quality and quantity, including discharge points, streams and lakes, and general direction of flow off the site;

(c) Requirements for water quality sampling and analysis to include:

(i) A description of, or reference for, the procedures and methods used for sample collection, preservation, quality control, and detection levels;

(ii) The name, address, and telephone number of the laboratory performing the analyses, and the laboratory identification number; and

(iii) Signatures of the laboratory manager or technician performing the analyses;

(d) Air quality, including process facilities and other enclosed facilities;

(e) Soils;

(f) Wildlife and aquatics;

(g) Subsidence;

(h) Vegetation; and

(i) Environmental radiological monitoring of surface water, air, soils, and vegetation;

(9) A description of the location within the permit area where underground injection is proposed;

(10) A description of the proposed method of operation, including:

(a) Injection rate, with the average and maximum daily rate and the volume of fluid to be injected;

(b) Injection pressures, with average and maximum injection pressures;

(c) A description of how a negative pressure gradient will be maintained within the production zone;

- (d) Proposed well stimulation program;
- (e) Type of mining solution to be used;
- (f) Proposed injection procedure; and
- (g) Expected changes in pressure, native ground water displacement, and direction of movement of mining solution;

(11) The following information concerning the production zone shall be determined:

(a) If the receiving strata is naturally a water-bearing formation:

- (i) Fluid pressure;
- (ii) Fracture pressure;
- (iii) Physical and chemical characteristics of the receiving strata fluids; and
- (iv) Compatibility of injected fluids with formation fluids;

(b) If the receiving strata is not a water-bearing formation, the fracture pressure in the production zone;

(12) The procedures to ensure that the installation of recovery, injection, and monitor wells will not result in hydraulic communication between the production zone and overlying or underlying stratigraphic horizons;

(13) The procedures used to verify that the injection and production wells are in communication with monitor wells completed in the receiving strata and employed for the purpose of detecting excursions;

(14) Descriptions of the completion details for all injection and production wells in accordance with §§ 74:29:11:11 to 74:29:11:13, inclusive, and for monitor wells in accordance with §§ 74:29:11:11, 74:29:11:12, and 74:29:11:14;

(15) A schedule for and description of the procedures to demonstrate and maintain mechanical integrity of all injection wells in accordance with § 74:29:11:16;

(16) A corrective action plan in accordance with § 74:29:11:19 for wells that are improperly sealed, completed, or abandoned, consisting of the steps or modifications necessary to prevent movement of fluid into unauthorized zones;

(17) A description of the proposed mining solution and the chemical reactions that may occur during mining as a result of injection of the mining solution;

(18) A subsidence analysis, using established geotechnical principles, that estimates, based upon the proposed mining operation, the effect of subsidence upon the land surface and overlying aquifers;

(19) A spill contingency plan to include reporting, response, assessment, and remedial actions;

(20) A description of measures employed to prevent an excursion, and in the event of an excursion, the plans to report or to verify the excursion, and plans for remedial action in accordance with §§ 74:29:11:35 to 74:29:11:40, inclusive;

(21) An assessment of impacts that may reasonably be expected as a result of the mining operation to water resources and water rights inside the permit area and on adjacent lands, and the steps that will be taken to mitigate these impacts;

(22) A well maintenance plan to ensure:

(a) Wells are sufficiently covered to protect against entrance of undesirable material into the well;

(b) The wells are marked and can be clearly seen;

(c) The area surrounding each well is kept clear of brush or debris; and

(d) Monitoring equipment is appropriately serviced and maintained so monitoring requirements can be met;

(23) To the extent that existing information or data is available, a determination of whether existing water wells, former producing wells, former injection wells, former monitor wells, abandoned wells, and exploration holes in the proposed production area have been appropriately plugged, and if not, a plan for replugging these wells; and

(24) Contingency plans to cope with all shut-ins or well failures so as to prevent the migration of mining solutions into underground sources of drinking water.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 34-21-15, 45-6B-81.

Law Implemented: SDCL 34-21-13, 45-6B-5 to 45-6B-7, inclusive.

74:29:11:06. Ground water restoration table. Based upon the information submitted in accordance with subdivision 74:29:11:04(1) and the determination in accordance with § 74:29:11:05, the department shall develop a ground water restoration table with assigned ground water quality restoration values that are the compliance requirements for restoration of the production and nonproduction zones.

The restoration values shall be based on premining baseline conditions. If the ground water restoration demonstration in accordance with subdivision 74:29:11:04(1) indicates that the operation will be unable to achieve the standard of returning affected ground water to baseline conditions with the application of best practicable technology, the department ~~may~~ shall set the restoration values as follows:

(1) To not exceed the applicable maximum contaminant levels in South Dakota ground water quality standards listed in § 74:54:01:04;

(2) To not exceed the health advisory levels or secondary drinking water regulations set by the U.S. Environmental Protection Agency for other parameters not listed in Table 1 and Table 2 of § 74:54:01:04; and

(3) To not exceed values based on an appropriate statistical method for any parameters not listed in South Dakota ground water quality standards, or in U.S. Environmental Protection Agency health advisory lists or secondary drinking water regulations.

Modification of the restoration table shall be done in accordance with § 74:29:11:50.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 45-6B-81.

Law Implemented: SDCL 45-6B-41.

74:29:11:07. Establishment of baseline water quality in new mining areas. In addition to the requirements of SDCL 45-6B-7(9), before mining a new area or section in a production zone, the operator shall submit a baseline ground water quality sampling plan to include an adequate number of wells and samples to adequately characterize baseline water quality in production and nonproduction zones in and adjacent to the new mining area. Water samples may not be taken until the specific conductivity, temperature, and pH have stabilized. ~~These parameters are considered to be stabilized when there is less than 0.2 pH unit change and 10% change in conductivity and temperature for at least three consecutive well volumes.~~ These samples shall be analyzed for the parameters designated by the department. All baseline wells shall be sampled at least once every month for a minimum of six months before any mining activities. If a well shows results indicating a statistically significant variance for a control parameter, whether due to laboratory error or natural fluctuation, the department may require additional samples be taken. The sample results for each well shall be submitted to the department.

The department shall consider the baseline water quality to determine the upper limit value of a control parameter which, if exceeded, indicates that an injected fluid may be present.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 45-6B-81.

Law Implemented: SDCL 45-6B-7, 45-6B-41.

74:29:11:12. Well construction requirements. The method for well construction shall be stated in the permit application. Construction requirements listed in this section apply to all wells installed for activities related to in situ leach mines. The department may grant a deviation from the requirements through a technical revision, if the operator supplies documentation of reliability, mechanical integrity, design, and construction to protect ground waters of the state. Injection and production wells shall be generally constructed as follows:

(1) Annular seals shall be installed to protect the casing against corrosion, ensure structural integrity of the casing, stabilize the upper formations, protect against contamination or pollution of the well from the surface, and prevent migration of ground water from one aquifer or water-bearing strata to another in accordance with the following requirements:

(a) The drill hole shall be of sufficient diameter for adequate sealing and, at any given depth, at least three inches greater in nominal diameter than the outside diameter of the outer casing at that depth. The department may approve an alternative casing design if it provides an equivalent degree of ground water protection;

(b) Before placing the annular seal, the wellbore shall be under static conditions and all loose drill cuttings, rock chips, or other obstructions shall be removed from the annular space by circulating the borehole with water or drilling mud slurry;

(c) The annular sealing material shall be pressure-grouted as required in § 74:02:04:28;

(d) Sealing material shall consist of neat cement grout or bentonite grout mixtures meeting the following requirements:

(i) Cement grout shall be composed of high sulfate resistant Portland cement and ~~no more than six gallons of clean water for each 94 pound sack of cement to yield a slurry weight of approximately 13 pounds per gallon.~~ Cement grout shall conform to the requirements of § 74:02:04:53;

(ii) Bentonite grout shall conform to the requirements of § 74:02:04:53.01. The bentonite grout shall be a sodium bentonite material that has been commercially manufactured and specially formulated for use as a well casing seal;

(iii) The sealing material shall be thoroughly mixed before placement so there are no balls, clods, or other features that could reduce the effectiveness of the seal;

(iv) Special quick-setting cement, cement accelerators, retarders, fluid-loss additives, dispersants, extenders, loss-of-circulation materials, and other additives, including hydrated lime to make the mix more fluid or bentonite to make the mix more fluid and reduce shrinkage, may be used, if approved by the department; and

(v) Used drilling mud or drill cuttings from the borehole may not be used as sealing material;

(2) Well casing shall conform to the requirements of §§ 74:02:04:42 to 74:02:04:45, inclusive, and 74:02:04:48. The casing shall be of sufficient strength and diameter to prevent casing collapse during installation, convey liquid at a specified injection/recovery rate and pressure, and allow for sampling. Casing shall be placed with sufficient care to avoid damage to

casing sections and joints. All joints in the casing above the perforations or screens shall be watertight. Casing shall be equipped with centralizers placed at a maximum spacing of one per forty feet to ensure even thickness of annular seal and gravel pack; and

(3) Well development shall be done by methods that will not cause damage to the well or cause adverse subsurface conditions that may destroy barriers to the vertical movement of water between water bearing strata.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 45-6B-81.

Law Implemented: SDCL 45-6B-41.

74:29:11:13. Well construction requirements -- Injection wells. The following construction requirements apply to injection wells and are in addition to the requirements listed in § 74:29:11:12:

(1) Appropriate logs and other tests shall be maintained and conducted during the drilling and construction of new injection wells. A descriptive report prepared by a knowledgeable log analyst interpreting the results of such logs and tests shall be submitted to the department. The logs and tests appropriate to each type of injection well shall be determined based on the intended function, depth, construction, and other characteristics of the well, availability of similar data in the area of the drilling site, and the need for additional information that may arise from time to time as the construction of the well progresses. Logs and tests shall include

deviation checks on all holes to ensure that vertical avenues for fluid migration in the form of diverging holes are not created during drilling;

(2) All injection wells shall be constructed to prevent the migration of fluids to unauthorized zones. The casing and annular sealing material used in the construction of each newly drilled well shall be designed for the life expectancy of the well. In determining and specifying casing and annular sealing requirements, the following factors shall be considered:

(a) Depth to the deepest injection zone;

(b) Injection pressure, external pressure, internal pressure, axial loading, and related information;

(c) Hole size;

(d) Size and grade of all casing strings including well thickness, diameter, nominal weight, length, joint specification, and construction material;

(e) Corrosiveness of injected fluids and formation fluids;

(f) Lithology of injection zone and confining zone; and

(g) Type and grade of cement used to seal the annular space between the outer casing and the borehole.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 45-6B-81.

Law Implemented: SDCL 45-6B-41.

74:29:11:15. Disposal of drill cuttings. The operator may dispose and bury drill cuttings in a pit at the well site, such as the mud pit used to circulate drilling fluids once the drilling operation has been completed, if the following requirements are met:

- (1) The drill cuttings are generated from the well at the well site;
- (2) The drill cuttings are not contaminated with brines, oil, production fluids, or drilling fluids other than topsoil water or fresh water;
- (3) The pit is backfilled with topsoil replaced, and the site is graded to promote runoff with no depression that would accumulate or pond water on the surface. The stability of the backfilled pit shall be compatible with the adjacent land;
- (4) The surface of the backfilled pit area is revegetated in accordance with the approved reclamation plan to stabilize the soil surface; and
- (5) For wells into uranium ore deposits, the surface of the backfilled drill cutting pit will not exceed the following limits:
 - (a) The concentration of radium-226 or radium-228 in soil may not exceed the background level by more than 5 picocuries per gram (pCi/g) or 0.185 becquerels per gram (Bq/g), averaged over the first 15 centimeters (cm) of soil below the surface; and
 - (b) The concentration of natural uranium in soil, with no radioactive decay products present may not exceed the background level by more than 30 pCi/g or 1.11 Bq/g, averaged over the top 15 cm of soil below the surface; and 150 pCi/g or 5.55 Bq/g, average concentration at

depths greater than 15 cm below the surface, so that no individual member of the public will receive an effective dose equivalent in excess of ~~100~~ 0.1 rem per year or 1 millisievert (mSv) per year.

The department may allow the operator to use alternative drill cutting disposal methods. For wells into uranium deposits, alternative disposal methods may include the segregation and separate disposal of cuttings from the ore zone.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 34-21-15, 45-6B-81.

Law Implemented: SDCL 45-6B-41, 45-6B-43.

74:29:11:16. Mechanical integrity testing of injection wells. Before putting a new injection well into service, it must be subjected to mechanical integrity testing. A schedule and methods for mechanical integrity testing shall be included in the permit, and constitute conditions of the permit. The schedule and methods shall meet the following requirements:

(1) One of the following methods must be used to evaluate the absence of significant leaks in the casing, tubing or packer:

(a) Following an initial pressure test, monitoring of the tubing-casing annulus pressure with sufficient frequency to be representative, as determined by the department, while maintaining an annulus pressure different from atmospheric pressure measured at the surface;

(b) Pressure test with liquid or gas; or

(c) An alternative test to demonstrate mechanical integrity other than those listed in this ~~subsection~~ subdivision if it is specified in the permit or is approved by the department through a technical revision;

(2) One of the following methods must be used to determine the absence of significant fluid movement into any authorized zone, underground source of drinking water, or water-bearing strata through vertical channels adjacent to the injection bore:

(a) The results of a temperature, neutron, or noise log (e.g., cement bond log);

(b) If the nature of the casing precludes the use of the logging techniques prescribed above, sealing records demonstrating the presence of adequate sealing material to prevent such migration shall be provided; or

(c) If the department elects to rely on sealing records to demonstrate the absence of significant fluid movement, the monitoring program shall be designed to verify the absence of significant fluid movement;

(3) Maintenance of the mechanical integrity of each injection well that has not been plugged or converted shall be demonstrated at least once every five years or on a schedule determined by the department;

(4) Before resuming injection into any injection well that has been damaged by surface or subsurface activity or that has undergone an activity that may jeopardize the mechanical integrity of the well, such as the use of downhole cutting and underreaming tools, the operator must demonstrate the mechanical integrity of that well;

(5) If the department determines that an injection well lacks mechanical integrity, ~~it~~ the department shall give written notice of this determination to the operator of the well. Unless the department requires immediate cessation, the operator shall cease injection into the well within 48 hours of receipt of the department's determination. The department may allow plugging of the well or require the operator to perform such additional construction, operation, monitoring, reporting, and corrective action as is necessary to prevent the movement of fluid into unauthorized zones or onto the surface caused by the lack of mechanical integrity. Repair or plugging of the well must be completed within 120 days of the testing that indicates the well lacks mechanical integrity. If the well is repaired rather than plugged, retesting of the well must be completed within 120 days after the repair is completed. The operator may resume injection upon written notification from the department that the operator has demonstrated mechanical integrity; and

(6) Results of mechanical integrity testing shall be reported in accordance with the requirements of § 74:29:11:42.

Injection and production wells shall maintain mechanical integrity until the wells are properly plugged in accordance with the approved plugging and abandonment plan.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 45-6B-81.

Law Implemented: SDCL 45-6B-41.

74:29:11:18. Requirements for plugging drill holes and repair, conversion, and plugging wells. The requirements for plugging drill holes and repair, conversion, and plugging of wells are as follows:

(1) A plan for drill hole plugging and well repair, plugging, and conversion shall be included in the permit application and constitutes a condition of the permit;

(2) All drill holes shall be plugged in accordance with § 74:02:04:67, 74:02:04:69, or §74:02:04:70, as applicable, in a manner that will not allow the movement of fluids either into or between water-bearing strata, including underground sources of drinking water;

(3) The operator shall notify the department 45 days before ~~plugging~~ a well within a production area ~~or converting a well~~ is converted to other uses than injection well uses;

(4) The operator shall notify the department 10 days before plugging a well so the department can witness the plugging;

~~(4)~~(5) All abandoned wells shall be plugged or converted, in accordance with the plugging/conversion plan in the permit, to ensure that ground water is protected and preserved for future use and to eliminate any potential physical hazard. A well is considered abandoned if it has not been used for a period of two years, unless the operator submits to the department and receives approval for a technical revision demonstrating the operator's intention to use the well again and the actions and specifying procedures that will be taken to ensure that mechanical integrity of the well is maintained and the well will not endanger any unauthorized zone, underground source of drinking water, or water-bearing strata;

~~(5)~~(6) All wells completed in confined aquifers or encountering more than one aquifer shall be plugged in accordance with § 74:02:04:67;

~~(6)~~(7) All wells completed in unconfined aquifers or with only one aquifer encountered shall be plugged in accordance with § 74:02:04:69;

~~(7)~~(8) To ensure that the locations of the abandoned wells are adequately identified:

(a) The boundaries of each wellfield and the location of the monitor well ring around each wellfield shall be recorded as a deed notice with the appropriate county; ~~and~~

(b) The top of the plugging mixture in each abandoned well shall clearly show on a steel plate placed atop the sealing mixture the permit number, well identification number, and information required by the department. All marking devices shall be installed at a minimum depth of two feet below the land surface; ~~and-~~

(c) All abandoned wells shall be surveyed using global positioning system equipment that has an accuracy of at least one meter;

~~(8)~~(9) Plugging and conversion activities shall be reported in accordance with the requirements in subdivision 74:29:11:42(3)(d).

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 45-6B-81.

Law Implemented: SDCL 45-6B-41.

74:29:11:36. Verifying analysis. If a routine sample analysis indicates the presence of a control parameter exceeding its upper ~~level~~ limit value in a monitoring well, the operator shall complete a verifying analysis of samples taken from the affected well and the monitoring wells adjacent to the affected well. The operator shall take the verifying analysis within two working days after being notified by the laboratory of monitoring results. If the results from the first and second sampling event both indicate an excursion has occurred, then an excursion is considered verified for the purpose of initiating remedial action in accordance with § 74:29:11:38.

If the results from the first and second sampling events provide conflicting information about whether or not an excursion has occurred, then a third sampling event must be conducted within 24 hours of the receipt of the results from the second sampling event. However, if the results of the confirmatory sampling are not complete within seven days of the initial sampling event that indicated an excursion might be present, the excursion will be considered verified.

All sample analyses results for excursion events shall be submitted to the department within two business days after the operator receives them from the laboratory.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 45-6B-81.

Law Implemented: SDCL 45-6B-41.

74:29:11:38. Remedial action for excursion. If the verifying analysis indicates that an excursion has occurred, the operator shall submit to the department for review and approval a remedial action plan and a ground water analysis report to include the following:

- (1) A description of the excursion and its cause;
- (2) The period of excursion, including exact dates and times;
- (3) If the excursion has not been corrected, the anticipated time it is expected to continue;
- (4) Steps taken or planned to reduce, eliminate, and prevent recurrence of the excursion;

and

(5) Sample analyses for pH, calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, silica, uranium, ammonia, nitrate, total dissolved solids (180 degrees C.), specific conductance, and any other parameter specified by the department. One or more parameters may be excluded, if the department determines that the concentration or value of a specific parameter is not likely to occur as a result of the in situ leach mine.

The operator shall report every two weeks. All reports shall be mailed to the department, postmarked within two days of the end of each report period. The first report period shall begin the day the presence of a control parameter exceeding its upper limit value in a monitor well is verified. The operator shall continue to make remedial action reports until cleanup is accomplished.

~~The following review by the department, the operator may~~ shall use any method the operator judges necessary and prudent to define the extent of the excursion and to clean up recovery fluids in an expeditious manner.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 45-6B-81.

Law Implemented: SDCL 45-6B-41.

74:29:11:54. Radiation standards for closure of surface facilities. For in situ uranium mine operations, closed surface facilities shall be considered suitable for release for unrestricted use if the following limits are not exceeded:

(1) The concentration of radium-226 or radium-228 in soil, averaged over any 100 square meters (m^2), does not exceed the background level by more than 5 picocuries per gram (pCi/g) or 0.185 becquerel per gram (Bq/g), averaged over the first 15 centimeters (cm) of soil below the surface;

(2) The contamination of vegetation does not exceed 5 picocuries per gram (pCi/g) or 0.185 becquerels per gram (Bq/g), based on dry weight, for radium-226 or radium-228; and

(3) The concentration of natural uranium in soil, with no radioactive decay products present, averaged over any 100 square meters (m^2), does not exceed the background level by more than 30 pCi/g or 1.11 Bq/g, averaged over the top 15 cm of soil below the surface, and 150 pCi/g or 5.55 Bq/g, average concentration at depths greater than 15 cm below the surface, so that no individual member of the public will receive an effective dose equivalent in excess of ~~400~~ 0.1 rem (Roentgen equivalent man) per year or 1 millisievert (mSv) per year.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 34-21-15, 45-6B-81.

Law Implemented: SDCL 45-6B-43.

74:29:11:60. Public notice for in situ leach mines. The department ~~will~~ shall provide on its website quarterly updates on the operational status, compliance status, technical revisions submitted or approved, public notices, and other pertinent information regarding an active in situ leach mine permit.

Source: 33 SDR 160, effective April 17, 2007.

General Authority: SDCL 34-21-12, 45-6B-81.

Law Implemented: SDCL 34-21-26, 45-6B-36, 45-6B-86.