

**GROUND WATER DISCHARGE PERMIT RENEWAL  
ST. CLOUD ZEOLITE MINE, DP-314  
[Effective Date]**

**I. INTRODUCTION**

The New Mexico Environment Department (NMED) issues this Discharge Permit Renewal, DP-314 to St. Cloud Mining Company (St. Cloud) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC.

NMED's purpose in issuing this Discharge Permit, and in imposing the requirements and conditions specified herein, is to control the discharge of water contaminants from the St. Cloud Mill Site into ground and surface water following cessation of operations, so as to protect ground and surface water for present and potential future use as domestic and agricultural water supply and other uses and protect public health. In issuing this Discharge Permit, NMED has determined that the requirements of 20.6.2.3109.C NMAC have been met.

DP-314 is briefly described as follows:

The Discharge Permit Renewal is for closure and post-closure monitoring of Tailing Impoundments Nos. 1, 2, 3, and 4. Current operations at the facility involve only the crushing, screening and classification of zeolite (clinoptilolite). There is no floatation mill tailings discharge associated with present operations and no tailings discharge is authorized by this Discharge Permit Renewal. The St. Cloud facility is located approximately 3 and 1/2 miles southeast of Chloride, in Section 4, T12S, R8W, Sierra County.

**Quantity, Quality and Flow Characteristics of the Discharge**

St. Cloud formerly operated a floatation mill and discharged tailings slurry to the Nos. 1, 2, 3, and 4 Tailing Impoundments. The mill ceased operating in 1993 and Tailing Impoundments Nos. 2, 3, and 4 have been closed pursuant to the approved closure plan dated October 20, 1995. The tailings within the closed impoundments contain elevated concentrations of metals and some tailings contain sulfides that have the potential to generate acid and mobilize contaminants. The bulk of the tailings within Tailing Impoundment No. 1 were excavated and sold offsite as smelter flux and the impoundment is currently being used as a storage facility for fine-grained zeolite.

**Characteristics of Ground Water**

The depth to ground water below the site is at a depth of approximately 50 feet and has a TDS concentration of 360 milligrams per liter (mg/l).

**Activities That Produce the Discharge**

St. Cloud discharged floatation tailings to four unlined tailing impoundments prior to cessation of milling operations in 1993. Tailing Impoundment No. 1 received tailings from the St. Cloud and U.S. Treasury Mines; Tailing Impoundment No. 2 received tailings from the Pinos Altos Mine; Tailing Impoundment No. 3 received tailings from the Midnight Mine and Pinos Altos Mine; and

Tailing Impoundment No. 4 received tailings from the Hanover Empire Zinc Mine. Zeolite material from St. Cloud's Zeolite Mine continues to be stockpiled in Tailing Impoundment No. 1 as zeolite production continues.

## **General**

St. Cloud's Discharge Plan consists of the materials submitted by St. Cloud to NMED dated January 29, 2013. In addition, the Discharge Plan includes information and materials submitted as part of the original discharge plan approved on February 3, 1984; renewed April 10, 1989; renewed and modified on May 11, 1998; renewed on May 16, 2008; and amended on March 27, 2009. The discharge shall be managed in accordance with the Discharge Plan as conditioned by this Discharge Permit.

Issuance of this Discharge Permit does not relieve St. Cloud of its responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

Pursuant to 20.6.2.3109.E NMAC, NMED reserves the right to modify permit requirements in the event NMED determines that the requirements of 20.6.2 NMAC are being or may be violated, or the standards of 20.6.2.3103 NMAC are being or may be violated. This may include a determination by NMED that operational practices approved under this Discharge Permit are not protective of ground and surface water quality, and that a modification is necessary to protect water quality and/or abate water pollution. Permit modification may include, but is not limited to, lining or relining impoundments, changing discharge locations, changing waste management practices, expanding monitoring requirements, and/or implementing abatement of water pollution.

## **II. FINDINGS**

In issuing this Discharge Permit, NMED finds:

1. St. Cloud has discharged effluent or leachate from the St. Cloud Zeolite Mine, such that such effluent or leachate may move directly or indirectly into groundwater within the meaning of 20.6.2.3104 NMAC.
2. St. Cloud has discharged effluent or leachate from the St. Cloud Zeolite Mine so that such effluent or leachate may move into ground water of the State of New Mexico which has an existing concentration of 10,000 mg/l or less of total dissolved solids within the meaning of 20.6.2.3101-A NMAC.
3. The discharge from the St. Cloud Zeolite Mine is not subject to any of the exemptions of 20.6.2.3105 NMAC.
4. The Water Quality Act requires that determination of a discharger's effect on ground water shall be measured at any place of withdrawal of water for present or reasonably foreseeable future use. NMSA 1978, 74-6-5(E)(3). NMED considers the discharge site covered by DP-

314 to be a potential place of withdrawal of water for present or reasonably foreseeable future use. In the future, as part of the permit application process, St. Cloud may present evidence to NMED supporting why some or the entire discharge site is not a place of withdrawal of water for present or reasonably foreseeable future use. If the evidence is presented to NMED, NMED will consider the evidence and any other relevant evidence, and will issue a written determination based thereon.

### **III. AUTHORIZATION TO DISCHARGE**

St. Cloud is authorized to manage discharges as follows:

- St. Cloud is authorized to store zeolite fines in Tailing Impoundment No. 1, not to exceed its design capacity. [20.6.2.3109 NMAC]
- St. Cloud is authorized to manage storm water and perform post-closure monitoring at the St. Cloud Zeolite Mine [20.6.2.3104].

### **IV. PERMIT CONDITIONS**

The following conditions shall be complied with by St. Cloud and are enforceable by NMED

#### **CLOSURE PLAN**

1. St. Cloud shall continue to implement the approved closure plan for the St. Cloud Zeolite Mine in accordance with the WOC Regulations 20.6.2.3106.C and 3107 NMAC to ensure compliance with 20 NMAC Chapter 6, Part 2. [20.6.2.3106.C NMAC] [20.6.2.3107 NMAC]

#### **Cover Placement and Surface Shaping**

2. St. Cloud has reclaimed Tailing Impoundments No. 2, 3, and 4 as described below. Run-on shall not be allowed to pass through or over the tailing impoundments. Vegetation shall be maintained on the tailing impoundments in accordance with the seed mix approved in New Mexico Mining and Minerals Division (MMD) permit number SI006RE. [20.6.2.3109 NMAC]
  - a. Tailing Impoundment No. 2: A 3-foot thick zeolite layer mixed with 20-30% topsoil was placed upon the tailings. The surface of the cap was contoured to provide positive drainage away from the top of the tailings.
  - b. Tailing Impoundment No. 3: A bottom layer 0.5 to 1 foot thick of -40 mesh zeolite material was placed on top of the tailings. An upper layer of native clay-rich colluvial material 2.5 to 3 feet thick was placed on top of the zeolite layer. The surface of the cap was contoured to provide positive drainage away from the top of the tailings.

- c. Tailing Impoundment No. 4: A 10-foot thick zeolite layer was placed on top of the tailings followed by 20 feet of topsoil. The surface of the cap was contoured to provide positive drainage away from the top of the tailings.
3. Within 180 days after St. Cloud ceases to store zeolite in Tailing Impoundment No. 1, St. Cloud shall implement construction of the cover system on the impoundment. The cover system shall be constructed and maintained as described in the October 20, 1995 St. Cloud Mill Closure Plan, which includes 6"-12" of -40 mesh zeolite overlain by 2.5'-3' of colluvial material and contouring that provides positive drainage away from the top of the tailings. Revegetation shall include an MMD approved seed mix. [20.6.2.3109 NMAC]

### **Storm Water Management**

4. St. Cloud shall manage storm water as follows. [20.6.2.3109 NMAC]
  - a. Rip-rap on the northwest corner of Tailing Impoundment No. 2 in the South Fork of Cuchillo Negro Creek shall be maintained to protect the impoundment from erosion. Maintenance and reinforcement of the rip-rap structure shall be required upon regular inspections made by St. Cloud Mining.
  - b. Storm water diversion structures shall be inspected and maintained along the western edge of Tailing Impoundments Nos. 2, 3, and 4 to route storm water away from the tailing impoundments.
  - c. Storm water diversion structures shall be inspected and maintained around the perimeter of Tailing Impoundment No. 1 to route surface flows away from the impoundment.
  - d. Grading shall be conducted on all tailing impoundments to maintain positive drainage with adequate erosion controls.

### **MONITORING, REPORTING AND OTHER REQUIREMENTS**

5. St. Cloud shall perform post-closure monitoring for a minimum period of 15 years following completion of final closure construction activities, including cover placement, at all tailing impoundments. St. Cloud shall conduct the monitoring, reporting, and other requirements listed below. [20.6.2.3107 NMAC]
6. Upon notification from NMED that post-closure monitoring may cease, St. Cloud shall plug and abandon monitoring wells MW-1 (Northwest), MW-2 (Middle), and MW-3 (Southeast) in accordance with *NMED Monitoring Well Construction and Abandonment Guidelines, revision 1.1, March 2011* (attached), or an alternative method approved by NMED [20.6.2.3107 NMAC]

### Sampling and Field Measurements

7. Ground Water Monitoring Wells - St. Cloud shall monitor wells MW-1 (Northwest), MW-2 (Middle), and MW-3 (Southeast) annually as follows:
  - a. St. Cloud shall record the depth to the water table in the monitoring wells to the nearest inch.
  - b. St. Cloud shall collect samples from each well and analyze for the water parameters listed in Conditions 11b and 11c below.

Analytical results and depth to ground water measurements shall be reported as required in Condition 13 below. [20.6.2.3107 NMAC]

8. Meteorological Data - St. Cloud shall measure daily precipitation at the St. Cloud Zeolite Mill. A summary of daily precipitation data shall be reported annually as required in Condition 13 below. [20.6.2.3107 NMAC]
9. Erosion - St. Cloud shall visually inspect for rills and gullies that may erode the cover of closed impoundments and expose tailings to the environment. Inspections shall be conducted on closed impoundments twice a year in mid-May and mid-September and in the event of a rain event totaling one inch or greater in any 24-hour period measured at the nearest rain gauge. St. Cloud shall verbally report evidence of a major rill, gully, or sheet erosion on any closed impoundment to NMED within 24 hours of discovery. St. Cloud shall provide a written report within 30 days of the discovery describing the nature and extent of erosion and steps taken to repair the erosion. NMED may require St. Cloud to take additional actions to repair or otherwise mitigate the erosion. [20.6.2.3107 NMAC]
10. Revegetation - To ensure that revegetation is protective of water quality, St. Cloud shall, at a minimum, perform closure and post-closure monitoring of revegetation pursuant to schedules and monitoring requirements approved by MMD. Any proposed changes to the closure or post-closure revegetation monitoring plan to meet the NMMA requirements shall be submitted to NMED to ensure monitoring is protective of water quality. St. Cloud shall provide a summary of revegetation monitoring results, including photographic documentation, in annual reports to NMED. At such time as MMD's revegetation monitoring requirements under the NMMA have been met, revegetation monitoring shall continue under the authority of NMED pursuant to this Discharge Permit. [20.6.2.3107 NMAC]

### Analysis

11. Samples of surface water shall be analyzed for total and dissolved concentrations of the analytes listed below. Samples of ground water, seeps and springs shall be analyzed for dissolved concentrations of the analytes listed below.

- a. Field parameters (analysis to be performed in the field): temperature, pH, and specific conductance.
- b. Indicator parameters: field parameters in Condition 11a plus sulfate and total dissolved solids (TDS).
- c. Comprehensive inorganic parameters: total mercury, and dissolved concentrations of aluminum, arsenic, beryllium, boron, cadmium, cobalt, copper, chromium, iron, manganese, molybdenum, nickel, lead, selenium, and zinc.

### **Methodology**

12. Unless otherwise approved in writing by NMED, St. Cloud shall conduct sampling and analysis in accordance with the most recent edition of following documents:
  - a. American Public Health Association, Standard Methods for the Examination of Water and Wastewater.
  - b. U.S. Environmental Protection Agency, Methods for Chemical Analysis of Water and Waste.
  - c. U.S. Geological Survey, Techniques for Water Resource Investigations of the U.S. Geological Survey.
  - d. American Society for Testing and Materials, Annual Book of ASTM Standards, Part 31. Water
  - e. U. S. Geological Survey, et al., National Handbook of Recommended Methods for Water Data Acquisition.
  - f. Surface water monitoring must also be conducted according to test procedures approved under Title 40 Code of Federal Regulations Part 136. [20.6.2.3107B NMAC]

### **Reporting**

13. St. Cloud shall submit to NMED an annual report by the last day of September of each year. Reports shall use the following format:
  - a. A description of any work completed during the previous annual period towards final closure of the St. Cloud Mill facility. This requirement includes, but is not limited to:
    - 1) Status of closure activities at each tailing impoundment
    - 2) Any maintenance and repair work conducted
    - 3) Monitoring results for erosion and revegetation

- b. A summary of monitoring results from the three monitoring wells including analytical data and depth to ground water in a table format that also shows the results of the previous sampling events.
- c. Annual reports will include a potentiometric map and laboratory QA/QC.
- d. St. Cloud shall submit annually a summary of the daily precipitation data from the weather station at the St. Cloud Zeolite Mill. [20.6.2.3107 NMAC]

### CONTINGENCY PLANS

- 14. In the event that monitoring indicates ground water standards are exceeded during the term of this Discharge Permit, upon closure of the facility or during post-closure monitoring, St. Cloud shall collect a confirmatory sample from the monitoring well(s) within 15 days to confirm the initial sampling results. In accordance with 20.6.2.3109.E.1 NMAC, within 30 days of confirmation of ground water contamination, St. Cloud shall submit an abatement plan proposal to NMED which includes a site investigation to define the source, nature and extent of contamination; a proposed abatement option; and a schedule for its implementation. The site investigation and abatement option shall be consistent with the requirements and provisions of 20.6.2.4101, 4103, 4106, 4107, and 4112 NMAC. The abatement plan shall be implemented within 30 days of NMED approval. [20.6.2.3107A(10) NMAC] [20.6.2.1203A NMAC]
- 15. If NMED or St. Cloud identifies any other failure of this Discharge Permit or system not specifically noted above, NMED may require St. Cloud to develop for NMED approval contingency plans and schedules to address such a failure. [20.6.2.3107A(10) NMAC]

### FINANCIAL ASSURANCE

- 16. St. Cloud shall maintain joint financial assurance with NMED and MMD in the amount of \$157,719 to cover costs associated with post-closure monitoring, maintenance and corrective actions as required under this Discharge Permit. This amount is based on the calculations completed as part of the Financial Assurance reduction approved by NMED and MMD dated February 5, 2007 and the March 10, 2008 Reclamation Cost Estimate Update. [20.6.2.3107A(11) NMAC]
- 17. General Financial Assurance
  - a. St. Cloud shall retain a financial assurance instrument throughout the term of the Discharge Permit until released by the Secretary. The financial assurance shall remain in place during lapses in Discharge Permit coverage, including late Discharge Permit renewal.
  - b. NMED shall be named as the payee or beneficiary of the financial assurance instrument. St. Cloud may select a joint financial assurance instrument to meet the requirements of NMED and the New Mexico Energy, Minerals and Natural Resources

Department (EMNRD). If a joint instrument is selected, both NMED and EMNRD must be named as payees or beneficiaries and the joint instrument must meet the requirements of both agencies.

- c. The financial assurance instrument shall allow for adjustments due to inflation, new technologies, or NMED approved revisions to the closure plan based on continued investigations.
- d. The financial assurance shall be evaluated, compared, and if necessary, revised to comply with WQCC financial assurance regulations, if and when such regulations are promulgated and become effective and from time to time as the regulations allow.
- e. St. Cloud shall provide at least 120 days written notice to the Secretary prior to cancellation or non-renewal of the financial assurance. St. Cloud shall obtain an NMED approved alternate financial assurance mechanism within 90 days of such notice. If St. Cloud fails to obtain alternate financial assurance within 90 days, the current financial assurance shall become immediately payable to NMED.
- f. If St. Cloud refuses or is unable to conduct or complete the closure requirements of this approval, if NMED determines the terms of the permit are not met, or if NMED determines that St. Cloud defaults on the conditions under which the financial assurance was accepted, then the Secretary may proceed with forfeiture of all or part of the financial assurance. Prior to beginning a forfeiture proceeding, the Secretary shall provide a written notice to St. Cloud and shall include the reasons for the forfeiture and the amount to be forfeited. The amount shall be based on the total cost of achieving compliance with the permit, including completion of the closure. All financial assurance forfeited shall become immediately payable to NMED.
- g. St. Cloud may request a review by NMED of remaining closure measures once every twelve months. The request for closure review shall describe the closure measures completed and must contain a cost estimate for remaining closure measures.
- h. The financial assurance shall be released or modified when the NMED determines that closure measures covered by the financial assurance have been completed according to the requirements of the NMED approved discharge plan, including the closure plan and the requirements of the New Mexico Water Quality Act and the WQCC regulations.  
[20.6.2.3107A (11) NMAC]

## GENERAL TERMS AND CONDITIONS

### Record Keeping

18. St. Cloud shall maintain at its facility a written record of all data and information on monitoring of ground water, surface water, seepage, meteorological conditions pursuant to this Discharge Permit including the following:
  - a. The date, exact time, and exact location of each sample collection or field measurement;
  - b. The name and job title of the person who performed each sample collection or field measurement;
  - c. The date of the analysis of each sample;
  - d. The name and address of the laboratory and the name and job title of the person that performed the analysis of each sample;
  - e. The analytical technique or method used to analyze each sample or take each field measurement;
  - f. The results of each analysis or field measurement, including the raw data; and
  - g. A description of the quality assurance and quality control procedures used. [20.6.2.3107A NMAC]
19. Such data and information described in Condition 18 shall also be maintained on all split and duplicate samples, spike and blank samples, and repeat samples. [20.6.2.3107A NMAC]
20. St. Cloud shall maintain a written record of any spills, seeps, or leaks of leachate not authorized by this Discharge Permit. [20.6.2.3107A NMAC]
21. St. Cloud shall maintain a written record of the operation, maintenance and repair of all facilities/equipment used to monitor water quality or to collect other data required by this Discharge Permit. This record shall include repair, replacement or calibration of any monitoring equipment. [20.6.2.3107A NMAC]
22. Notwithstanding any company record retention policy to the contrary, until such time as NMED determines that all closure measures have been completed in accordance with the requirements of this Discharge Permit, St. Cloud shall retain copies of all data, records, reports, and other documents generated pursuant to this Discharge Permit. Such record retention period may be increased by NMED at any time upon written notice to St. Cloud. [20.6.2.3107A NMAC]
23. All such data, records, reports, and other documents generated pursuant to this Discharge Permit, shall be provided to NMED upon request. [20.6.2.3107A NMAC]

### **Inspection and Entry**

24. St. Cloud shall allow the Secretary or an authorized representative of NMED, upon the presentation of credentials to:
- a. Enter at regular business hours or at other reasonable times upon St. Cloud's premises or at any other location where records are kept under the conditions of this Discharge Permit, or under any federal or WQCC regulation.
  - b. To inspect and copy during regular business hours or at other reasonable times, any records required to be kept under the conditions of this Discharge Permit, or under any federal or WQCC regulation.
  - c. To inspect, at regular business hours or at other reasonable times, any facility, equipment (including monitoring and control equipment or treatment works), practices or operations regulated or required under this Discharge Permit, or under any federal or WQCC regulation.
  - d. Sample or monitor at reasonable times for the purpose of assuring compliance with this Discharge Permit or as otherwise authorized by the New Mexico Water Quality Act, any effluent, water contaminant, or receiving water at any location before or after discharge. [20.6.2.3107D NMAC] [74-6-9.B & E WQA]
25. Nothing in this Discharge Permit shall be construed as limiting in any way the inspection and entry authority of NMED under the WQA, the WQCC Regulations, or any other applicable law or regulation. [20.6.2.3107 NMAC]

#### **Duty to Provide Information**

26. Within a reasonable time after a request from NMED, which time may be specified by NMED, St. Cloud shall provide NMED with any relevant information to determine whether cause exists for modifying, terminating, or renewing this Discharge Permit, or to determine whether St. Cloud is in compliance with this Discharge Permit. [20.6.2.3107D NMAC][74-6-9.B & E WQA]
27. Nothing in this Discharge Permit shall be construed as limiting in any way the information gathering authority of NMED under the WQA, the WQCC Regulations, or any other applicable law or regulation. [20.6.2.3107D NMAC][74-6-9.B & E WQA]

#### **Spills, Leaks and Other Unauthorized Discharges**

28. This Discharge Permit authorizes only those discharges specified herein. Any discharge into ground water not authorized by this Discharge Permit or any other St. Cloud discharge permit is a violation of Section 20.6.2.3104 NMAC. St. Cloud must report any such discharge to NMED, and it must take corrective action to contain and remove or mitigate the damage caused by the discharge, as required by Section 20.6.2.1203 NMAC.  
[20.6.2.1203 NMAC]

### **Modifications and Amendments**

29. Pursuant to Section 20.6.2.3107.C NMAC, St. Cloud shall notify NMED and obtain NMED approval, as a modification to this Discharge Permit pursuant to Section 20.6.2.3109.E, F, or G NMAC, prior to any changes to its mining operations or processes or closure activities that would result in any significant change in the discharge of water contaminants. [20.6.2.3107C NMAC]

### **Enforcement**

30. Any violation of the requirements and conditions of this Discharge Permit, including any failure or refusal to allow NMED to enter and inspect records or facilities, or any refusal or failure to provide NMED with records or information, may subject St. Cloud to an enforcement action. Pursuant to WQA § 74-6-10.A and B, such action may include a compliance order requiring compliance immediately or in a specified time, assessing a civil penalty, suspending or terminating the Discharge Permit, or any combination of the foregoing; or an action in district court seeking injunctive relief, civil penalties, or both. Pursuant to the WQA §§ 74-6-10.C and 74-6-10.1, civil penalties of up to \$15,000 per day of noncompliance may be assessed for each violation of the WQA § 74-6-5, the WQCC regulations, or this Discharge Permit, and civil penalties of up to \$10,000 per day of non-compliance may be assessed for each violation of any other provision of the WQA, or any regulation standard, or order adopted pursuant to such other provision. For certain violations specified in the WQA § 74-6-10.2, criminal penalties may also apply. In any action to enforce this Discharge Permit, St. Cloud waives any objection to the admissibility as evidence of any data generated pursuant to this Discharge Permit. [74-6 WQA]

### **Compliance with Other Law**

31. Nothing in this Discharge Permit shall be construed in any way as relieving St. Cloud of its obligation to comply with all applicable federal, State, and local laws, regulations, permits, or orders. [20.6.2 NMAC]

### **Other Requirements**

32. The approval of this Discharge Permit does not relieve St. Cloud of liability should operation result in actual pollution of surface or ground water which may be actionable under other laws and/or regulations. [20.6.2.3109 NMAC]

### **Right to Appeal**

33. St. Cloud may file a petition for a hearing before the WQCC on this Discharge Permit. Such petition must be made in writing to the WQCC within thirty (30) days after St. Cloud receives this Discharge Permit. Unless a timely petition for a hearing is made, the decision of NMED shall be final. [74-6-5.N WQA]

### **Transfer**

34. Pursuant to 20.6.2.3111 NMAC, prior to any transfer of ownership, control, or possession of the permitted facility or any portion thereof, St. Cloud shall notify the proposed transferee in writing of the existence of this Discharge Permit and include a copy of this Permit with the notice. St. Cloud shall deliver or send by certified mail to NMED a copy of the notification and proof that such notification has been received by the proposed transferee. [20.6.2.3111 NMAC]

**Term**

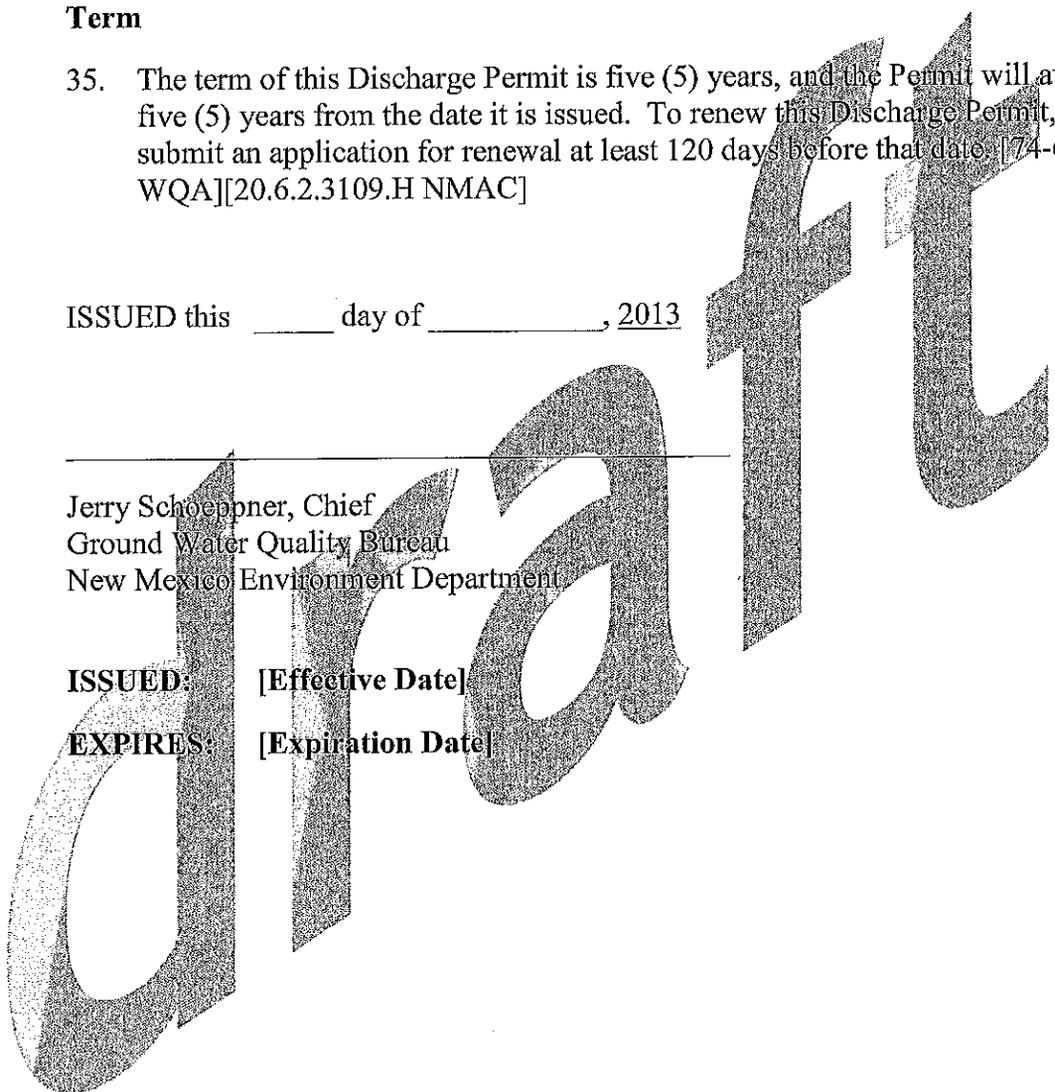
35. The term of this Discharge Permit is five (5) years, and the Permit will automatically expire five (5) years from the date it is issued. To renew this Discharge Permit, St. Cloud must submit an application for renewal at least 120 days before that date. [74-6-5.H WQA][20.6.2.3109.H NMAC]

ISSUED this \_\_\_\_\_ day of \_\_\_\_\_, 2013

Jerry Schoeppner, Chief  
Ground Water Quality Bureau  
New Mexico Environment Department

**ISSUED:** [Effective Date]

**EXPIRES:** [Expiration Date]



## **Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions**

These conditions identify construction and abandonment requirements for installation of water table monitoring wells under ground water Discharge Permits issued by the NMED's Ground Water Quality Bureau (GWQB). Proposed locations of monitoring wells required under Discharge Permits and requests to use alternate installation and/or construction methods for water table monitoring wells shall be submitted to the GWQB for approval prior to drilling and construction.

### **General Drilling Specifications:**

1. All well drilling activities shall be performed by an individual with a current and valid well driller license issued by the State of New Mexico in accordance with 19.27.4 NMAC.
2. Drilling methods that allow for accurate determinations of water table locations shall be employed. All drill bits, drill rods, and down-hole tools shall be thoroughly cleaned immediately prior to the start of drilling. The borehole diameter shall be drilled a minimum of 4 inches larger than the casing diameter to allow for the emplacement of sand and sealant.
3. After completion, the well shall be allowed to stabilize for a minimum of 12 hours before development is initiated.
4. The well shall be developed so that formation water flows freely through the screen and is not turbid, and all sediment and drilling disturbances are removed from the well.

### **Well Specifications (see attached monitoring well schematic):**

5. Schedule 40 (or heavier) polyvinyl chloride (PVC) pipe, stainless steel pipe, carbon steel pipe, or pipe of an alternate appropriate material that has been approved for use by NMED shall be used as casing. The casing shall have an inside diameter not less than 2 inches. The casing material selected for use shall be compatible with the anticipated chemistry of the ground water and appropriate for the contaminants of interest at the facility. The casing material and thickness selected for use shall have sufficient collapse strength to withstand the pressure exerted by grouts used as annular seals and thermal properties sufficient to withstand the heat generated by the hydration of cement-based grouts. Casing sections shall be joined using welded, threaded, or mechanically locking joints; the method selected shall provide sufficient joint strength for the specific well installation. The casing shall extend from the top of the screen to at least one foot above ground surface. The top of the casing shall be fitted with a removable cap, and the exposed casing shall be protected by a locking steel well shroud. The shroud shall be large enough in diameter to allow easy access for removal of the cap. Alternatively, monitoring wells may be completed below grade. In this case, the casing shall extend from the top of the screen to 6 to 12 inches below the ground surface; the monitoring wells shall be sealed with locking, expandable well plugs; a flush-mount, watertight well vault that is rated to withstand traffic loads shall be emplaced around the wellhead; and the cover shall be secured with at least one bolt. The vault cover shall indicate that the wellhead of a monitoring well is contained within the vault.
6. A 20-foot section (maximum) of continuous-slot, machine slotted, or other manufactured PVC or stainless steel well screen or well screen of an alternate appropriate material that has been approved for use by NMED shall be installed across the water table. Screens created by cutting slots into solid casing with saws or other tools shall not be used. The screen material selected for use shall be compatible with the anticipated chemistry of the ground water and appropriate for the contaminants of interest at the facility. Screen sections shall be joined using welded, threaded, or mechanically locking joints; the method selected shall provide sufficient joint strength for the specific well installation and shall not introduce constituents that may reasonably be considered contaminants of interest at the facility. A cap shall be attached to the bottom of the well screen; sumps (i.e., casing attached to the bottom of a well screen) shall not be installed. The bottom of the screen shall be installed no more than 15 feet below the water table; the top of the well screen shall be positioned not

- less than 5 feet above the water table. The well screen slots shall be appropriately sized for the formation materials and shall be selected to retain 90 percent of the filter pack.
7. Casing and well screen shall be centered in the borehole by placing centralizers near the top and bottom of the well screen.
  8. A filter pack shall be installed around the screen by filling the annular space from the bottom of the screen to 2 feet above the top of the screen with clean silica sand. The filter pack shall be properly sized to prevent fine particles in the formation from entering the well. For wells deeper than 30 feet, the sand shall be emplaced by a tremmie pipe. The well shall be surged or bailed to settle the filter pack and additional sand added, if necessary, before the bentonite seal is emplaced.
  9. A bentonite seal shall be constructed immediately above the filter pack by emplacing bentonite chips or pellets (3/8-inch in size or smaller) in a manner that prevents bridging of the chips/pellets in the annular space. The bentonite seal shall be 3 feet in thickness and hydrated with clean water. Adequate time shall be allowed for expansion of the bentonite seal before installation of the annular space seal.
  10. The annular space above the bentonite seal shall be sealed with cement grout or a bentonite-based sealing material acceptable to the State Engineer pursuant to 19.27.4 NMAC. A tremmie pipe shall be used when placing sealing materials at depths greater than 20 feet below the ground surface. Annular space seals shall extend from the top of the bentonite seal to the ground surface (for wells completed above grade) or to a level 3 to 6 inches below the top of casing (for wells completed below grade).
  11. A concrete pad (2-foot minimum radius, 4-inch minimum thickness) shall be poured around the shroud or well vault and wellhead. The concrete and surrounding soil shall be sloped to direct rainfall and runoff away from the wellhead.

**Abandonment:**

12. Approval for abandonment of monitoring wells used for ground water monitoring in accordance with Discharge Permit requirements shall be obtained from NMED prior to abandonment.
13. Well abandonment shall be accomplished by removing the well casing and placing neat cement grout, bentonite-based plugging material, or other sealing material approved by the State Engineer for wells that encounter water pursuant to 19.27.4 NMAC from the bottom of the borehole to the ground surface using a tremmie pipe. If the casing cannot be removed, neat cement grout, bentonite-based plugging material, or other sealing material approved by the State Engineer shall be placed in the well using a tremmie pipe from the bottom of the well to the ground surface.
14. After abandonment, written notification describing the well abandonment shall be submitted to the NMED. Written notification of well abandonment shall consist of a copy of the well plugging record submitted to the State Engineer in accordance with 19.27.4 NMAC, or alternate documentation containing the information to be provided in a well plugging record required by the State Engineer as specified in 19.27.4 NMAC.

**Deviation from Monitoring Well Construction and Abandonment Requirements:** Requests to construct water table monitoring wells or other types of monitoring wells for ground water monitoring under ground water Discharge Permits in a manner that deviates from these requirements shall be submitted in writing to the GWQB. Each request shall state the rationale for the proposed deviation from these requirements and provide detailed evidence supporting the request. The GWQB will approve or deny requests to deviate from these requirements in writing.

**MONITORING WELL SCHEMATIC**

(Not to Scale)

