GUIDELINES FOR THE PREPARATION OF DISCHARGE PLANS

AT BRINE EXTRACTION FACILITIES

(Revised 5-91)

OIL CONSERVATION DIVISION
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Introduction

The New Mexico Oil Conservation Division (OCD) regulates brine extraction activities and disposal of non-domestic wastes resulting from this industry pursuant to authority granted in the New Mexico Water Quality Act and the Oil and Gas Act. OCD administers, through delegation by the New Mexico Water Quality Control Commission (WQCC), all Water Quality Act regulations pertaining to surface and ground water except sewage. However, if the sewage is in a combined waste stream, the OCD will have jurisdiction.

Sections 3-104 and 3-106 of the WQCC Regulations stipulate that, unless otherwise provided for by the regulations, no person shall cause or allow effluent or leachate to discharge so that it may move directly or indirectly into the ground water unless such discharge is pursuant to a discharge plan approved by the director. Additionally, Section 5-101 requires in situ extraction wells, including those extracting brine, to have approved discharge plans prior to operation. The Oil and Gas Act (Section 70-2-12.B(22)) authorizes the OCD to regulate the disposition of non-domestic, non-hazardous wastes at oil field facilities to protect public health and the environment. The OCD has combined these requirements into one document, (a "discharge plan") that will provide protection to ground water, surface water and the environment through proper regulation of brine extraction facilities and associated transfer, storage, and disposal of materials at the facility.

A proposed discharge plan shall set forth in detail the methods or techniques the discharger proposes to use which will ensure compliance with WQCC regulations and the Oil and Gas Act. The proposed discharge plan must provide the technical staff and the director of the regulating agency (in this case, the OCD) with sufficient information about the operation to demonstrate that the discharger's activities will not cause state regulations or ground water standards (WQCC Section 3-103) to be violated.

In addition to meeting the Part 5 WQCC requirements for injection wells, the discharge plan must address surface facility operations including storage pits, tankage and loading areas. Inadvertent discharges of liquids (ie. leaks and spills, or any type of accidental discharge of contaminants) or improper disposal of waste solids still have a potential to cause ground water contamination or threaten public health and the environment.

For existing brine extraction facilities presently operating under an approved discharge plan, WQCC UIC regulation 5-101G stipulates that the expiration date of the plan shall be extended provided the following conditions are met: (1) A discharge plan renewal application should be submitted to the OCD at least 180 days prior to plan expiration, and (2) the discharger is in compliance with the existing plan on the original date of expiration. The extension of the existing plan is effective until the OCD approves or disapproves the renewal application. The renewal application should follow the attached guidelines with emphasis on the items that are not included in the original plan.
After a discharge application plan has been received, the OCD must publish a public notice pursuant to Section 3-108 of the regulations, and allow 30 days for public comment before a discharge plan may be approved or otherwise resolved. If significant public interest is indicated, a public hearing will be held which will delay a decision on plan approval.

Once a plan has been approved, discharges must be consistent with the terms and conditions of the plan. Similarly, if there is any facility expansion or process change that would result in any significant modification of the approved discharge of water contaminants, the discharger is required to notify this agency, and have the modification approved prior to implementation. Approval of a discharge plan application by OCD will not relieve the operator of the necessity to become familiar with other applicable state and federal regulations.

The review of a proposed discharge plan often requires several months depending on complexity. This includes time for requests to the discharger for additional information and clarification, in-house information gathering and analysis, and field investigations of the discharge site, and a public notice and comment period. Review time will, to a large extent, be dependent on the extent to which a facility has generally self-contained processes to prevent movement of fluids and leaching of solids from the work area into the environment.

For example, the review process will be expedited when effluent, process or other fluids are routed to tanks, or lined pits with underdrains for leak detection, when accurate monitoring of fluid volumes and pressure and/or integrity testing is performed for leak detection in below grade or underground tanks, and when the possibility of accidental spills and leaks is addressed by adequate contingency plans (e.g. containment by curbing and drainage to properly constructed sumps). Other examples allowing faster review include recycling of waste oils, proper disposal of dried sludges to minimize potential ground water contamination, and closure of previously used ponds. A more rapid review of discharge plans for such facilities is possible because much less geologic and hydrologic study of the site is required in order to delineate impact.

Similarly, longer review times will be required for operators seeking to continue to use unlined ponds or to utilize other procedures that have a high probability of allowing infiltration and movement of effluent and leachate to the subsurface. For these instances large amounts of technical data generally will be required including: 1) detailed information on site hydrogeology, natural and current water quality, and movement of contaminants; 2) processes expected to occur in the vadose and saturated zones to attenuate constituents to meet WQCC standards at a place of present or reasonably foreseeable future use of ground water; and 3) monitoring of ground water (including post operational monitoring as necessary).
If an operator desires to change or modify effluent or solid waste disposal practices it is not necessary to have completed all such changes prior to plan approval. A commitment to make the changes together with submittal of proposed modification details and a timely completion schedule can be included in the plan. These become plan requirements after the plan is approved.

The following discharge plan application guidelines have been prepared for use by the discharger to aid in fulfilling the requirements of Sections 3-106, 3-107 and Part 5 (UIC) of the WQCC regulations and to expedite the review process by minimizing OCD requests for additional information. It sets up a logical sequence in which to present the information required in a discharge plan for this type of facility. It is suggested that you read the entire document before preparing your application. Not all information discussed in the guidelines may be applicable to your facility. However, all sections of the application form must be completed for new or renewal discharge plan applications.

If there are any questions on the preparation of a discharge plan, please contact OCD’s Environmental Bureau (1220 South St. Francis Dr., Santa Fe, New Mexico 87505 or by telephone at (505) 476-3440).
DISCHARGE PLAN GUIDELINES

I. Name of Facility

Provide complete name. Indicate whether this is a new or renewal application.

II. Name of Operator or Legally Responsible Party and Local Representative

Include address and telephone number.

III. Location of Facility

Give a legal description of the location (i.e. 1/4 1/4, Section, Township, Range) and county. Use state coordinates or latitude/longitude on unsurveyed land. Submit a large scale topographic map, facility site plan, or detailed aerial photograph for use in conjunction with the written material. It should depict the location of the injection well, storage tanks and/or ponds, process equipment, relevant objects, facility property boundaries, and other site information required in Sections V through IX below. If within an incorporated city, town or village provide a street location and map.

IV. Landowners

Attach the name and address of the landowner(s) of record of the facility site.

V. Type and Quantities of Fluids Stored or Used at the Facility

List all fluids stored or used at the facility (e.g. High TDS salt water, hydrocarbons, etc.). Include source, average daily volume produced, estimated volume stored, location, and type of containers.

VI. Transfer, Storage and Disposal of Fluids and Solids

A. Provide sufficient information to determine what water contaminants may be discharged to the surface and subsurface within the facility. Information desired includes whether tanks, piping, and pipelines are pressurized, above ground or buried. If fluids are drained to surface impoundments, skimmer pits, emergency pits, sumps, etc. for further transfer and processing, provide size and show if these units are lined or unlined. Provide fluid flow schematics with sufficient detail to show individual units.
1. Tankage and Chemical Storage Areas - Storage tanks for fluids other than fresh water must be bermed to contain a volume one-third more than the largest tank. If tanks are interconnected, the berm must be designed to contain a volume one-third more than the total volume of the interconnected tanks. Chemical and drum storage areas must be paved, curbed and drained such that spills or leaks from drums are contained on the pads or in lined sumps.

2. Surface impoundments - Date built, use, type and volume of materials stored, area, volume, depth, slope of pond sides, sub-grade description, liner type and thickness, compatibility of liner and stored materials, installation methods, leak detection methods, freeboard, runoff/ runon protection.

3. Leach fields - Type and volume of effluents, leach field area and design layout. If non-sewage or mixed flow from any process units or internal drains is, or has been, sent to the leach fields, include dates of use and disposition of septic tank sludges.

4. Solids disposal - Describe types volumes frequency and location of on-site solids dried disposal. Typical solids include sands, sludges, filters, containers, cans and drums.

B. For each of the transfer/storage/disposal methods listed above:

1. Describe the existing and proposed measures to prevent or retard seepage such that ground water at any place of present or future use will meet the WQCC Standards of Section 3-103, and not contain any toxic pollutant as defined in Section 1-101.UU.

2. Provide the location and design of site(s) and method(s) to be available for sampling, and for measurement or calculation of flow.

3. Describe the monitoring system existing or proposed in the plan to detect leakage or failure of any discharge system. If ground water monitoring exists or is proposed, provide information on the number, location, design, and installation of monitoring wells.
C. Off-Site Disposal

If wastewaters, sludges, solids etc. are pumped or shipped off-site, indicate general composition (e.g. waste oils), method of shipment (e.g. pipeline, trucked), and final disposition (e.g. recycling plant, OCD-permitted or domestic landfill, Class II disposal well). Include name, address, and location of receiving facility. If receiving facility is a sanitary or modified domestic landfill show operator approval for disposal of the shipped wastes.

D. Proposed Modifications

1. If protection of ground water cannot be demonstrated pursuant to Section B.1. above, describe what modification (including closure) is proposed to meet the requirements of the Regulations. Describe in detail the proposed changes. Provide the information requested in A. and B. above for the proposed modified facility and a proposed time schedule for construction and completion. (Note: OCD has developed specific guidelines for lined surface impoundments that are available on request.)

2. For ponds, pits, leach fields, etc. where protection of ground water cannot be demonstrated, describe the proposed closure of such units so that existing fluids are removed, and emplacement of additional fluids and runoff/runon of precipitation are prevented. Provide a proposed time schedule for closure.

E. If the facility contains underground piping, the age and specification (i.e., wall thickness, fabrication material, etc.) of said piping should be submitted. Upon evaluation of such information, mechanical integrity testing of piping may be necessary as a condition for discharge plan approval. If such testing (e.g. hydrostatic tests) has already been conducted, details of the program should be submitted.

F. Inspection, Maintenance and Reporting

1. Describe proposed routine inspection procedures for surface impoundments and other transfer, storage, or disposal units including leak detection systems. Include frequency of inspection, how records are to be maintained and OCD notification in the event of leaks.
2. If ground water monitoring is used to detect leakage or failure of the surface impoundments, leach fields, or other approved transfer/storage/disposal systems provide:
   a. The frequency of sampling, and constituents to be analyzed.
   b. The proposed periodic reporting of the results of the monitoring and sampling.
   c. The proposed actions and procedures (including OCD notification) to be undertaken by the discharger in the event of detecting leaks or failure of the discharge system.

3. Discuss general procedures for containment of precipitation and runoff such that water in contact with process areas does not leave the facility, or is released only after testing for hazardous constituents. Include information on curbings, drainage, disposition, notification, etc.

4. Describe methods used to detect leaks and ensure integrity of above and below ground tanks, and piping. Discuss frequency of inspection and procedures to be undertaken if significant leaks are detected.

5. Submit a general closure plan describing what actions are to be taken when the facility discontinues operations. These actions must include:
   1. Removal of all fluids, contaminants and equipment.
   2. Grading of facility to as close to the original contour as is practical.
   3. Proper disposal of fluids, sludges and solids pursuant to rules and regulations in effect at the time of closure.

VII. Brine Extraction Well(s)

Insitu brine extraction wells must meet the requirements of Part 5 of the Water Quality Control Commission Regulations in addition to other applicable requirements of WQCC and Oil Conservation Division Rules and Regulations.
A. Drilling, Deepening, or Plug Back Operations

Before drilling, deepening, or plug back operations, the operator of the well must file the following plans, specifications, and pertinent documents with the Oil Conservation Division 90 days prior to start-up of the planned operation.

1. Form C-101 "Application for Permit to Drill, Deepen, or Plug Back" (OCD Rule 1101).

2. A "Notice of Intent to Discharge" in accordance with WQCC regulation 1-201 (New facilities only).

3. A map showing the number, name, and location of all producing oil and gas wells, injection wells, abandoned holes, surface bodies of water, watercourses, springs, mines, quarries, water wells, and other pertinent surface features within 1/4 mile from the wellbore(s).

4. Maps and cross-sections indicating the general vertical and lateral limits of all ground water having 10,000 mg/l or less TDS within one mile of the site. Show the position of such ground water within this area relative to the injection formation. Indicate the direction of water movement, where known, for each zone of ground water.

5. List all abandoned wells/shafts or other conduits in the area of review which penetrate the injection zone. Identify those which may provide a pathway for migration of contaminant through being improperly sealed, completed or abandoned. Detail what corrective action will be taken prior to start up of operations to prevent any movement of contaminants into ground water of less than/equal to 10,000 mg/l TDS through such conduits due to the proposed injection activity (e.g. plugging open holes). Include completion and plugging records.

If information becomes available after operations have begun, which indicates the presence of a conduit that will require plugging then the injection pressure will be limited to avoid movement of contaminants through such a conduit into protected groundwater.

6. Maps and cross-sections detailing the geology and geologic structure of the local area.

7. A proposed formation testing program to obtain an analysis or description of fluids in the receiving formation.
8. Schematic drawings of the surface and subsurface construction details.

9. The proposed drilling, evaluation, and testing, programs. Include logging procedures, coring program, and deviation checks.

10. The proposed stimulation, injection, and operation procedures (Note WQCC 5-206 limitations).

11. A plan for plugging and abandonment of the well that meets the requirements of WQCC regulations section 5-209. A **plugging bond pursuant to OCD Rule 101 is required prior to commencement of any new well drilling operations.**

B. Workover Operations

Before performing remedial work, altering or pulling casing, plugging or abandonment, or any other workover, approval of OCD must be obtained. Approval should be requested on OCD Form C-103 "Sundry Notices and Reports on Wells" (OCD Rule 1103-A).

C. Additional Information Required with Discharge Plan

In addition to all of the information required above in Part VII.A. (Drilling, Deepening, or Plug Back Operations), include the following with your discharge plan application.

1. Provide evaluation, completion and well workover information. Include all logs, test results, completion reports and workover descriptions.

2. Provide the proposed maximum and average injection pressures and injection volume. If one well is to be used for injection and extraction, fresh water must be injected down the annulus and brine must be recovered up the tubing. Reverse flow will be allowed for up to once a month for 24 hours for clean out. If an alternative operating method is desired then a written request must be submitted to the OCD which describes the proposed operating procedures and how the mechanical integrity of the casing will be guaranteed.
3. Submit a proposed mechanical integrity testing program. OCD requires a casing pressure test isolating the casing from the formation using either a bridge plug or packer prior to start of operation, and repeated at least once every five years or during well work over. In addition, OCD requires an open hole pressure test to 500 PSI for 4 hours on an annual basis.

4. Provide an analysis of the injection fluid and brine. Include location and design of site(s) and method(s) of sampling. Analysis will be for concentrations of Total Dissolved Solids, Sodium, Calcium, Potassium, Magnesium, Bromide, Carbonate/Bicarbonate, Chloride and Sulfate.

5. Compare volumes of fresh water injected to volume of brine to detect underground losses and specify method by which volumes are determined. After approval, submittal of a quarterly report listing, by month, the volume of fluids injected and produced will be required.

6. For renewal application for facilities in operation in excess of 15 years, provide information on the size and extent of the solution cavern and geologic/engineering data demonstrating that continued brine extraction will not cause surface subsidence of catastrophic collapse.

VIII. Spill/Leak Prevention and Reporting Procedures (Contingency Plans)

It is necessary to include in the discharge plan submittal a contingency plan that anticipates where any leaks or spills might occur. It must describe how the discharger proposes to guard against such accidents and detect them when they have occurred. The contingency plan also must describe the steps proposed to contain and remove the spilled substance or mitigate the damage caused by the discharge such that ground water is protected, or movement into surface waters is prevented. The discharger will be required to notify the OCD Director in the event of significant leaks and spills. This commitment and proposed notification threshold levels must be included in the contingency plan.

A. Prevention

Describe how spills and leaks will be prevented at the facility. Include specifically how spillage/leakage will be prevented during truck loading and at major transfer points within the facility. Discuss general "housekeeping" procedures for areas not directly associated with the above major processes.
B. Containment and Cleanup

Describe procedures for containment and cleanup of major and minor spills at the facility. Include information as to whether areas are curbed, paved, and drained to sumps; final disposition of spill materials; etc.

C. Notification

Propose a schedule for OCD notification of spills. The OCD requires the discharger to notify the director within 48 hours of the detection or suspected detection of a spill, and provide subsequent reports as required.

IX. Site Characteristics

A. The following hydrologic/geologic information is required to be submitted with all discharge plan applications. Some information already may be included in this application or may be on file with OCD and can be provided to the applicant on request.

1. Provide the name, description, and location of any bodies of water, streams (indicate perennial or intermittent), or other watercourses (arroyos, canals, drains, etc.); and ground water discharges sites (seeps, springs, marshes, swamps) within one mile of the outside perimeter of the facility. For water wells, locate wells within one-quarter mile and specify use of water (e.g. public supply, domestic, stock, etc.).

2. Provide the depth to and total dissolved solids (TDS) concentration (in mg/l) of the ground water most likely to be affected by any discharge (planned or unplanned). Include the source of the information and how it was determined. Provide a recent water quality analysis of the ground water, if available, including name of analyzing laboratory and sample date.

3. Provide the following information and attach or reference source information as available (e.g. driller’s logs):
   a. Soil type(s) (sand, clay, loam, caliche);
   b. Name of aquifer(s);
   c. Composition of aquifer material (e.g. alluvium, sandstone, basalt, etc.); and
d. Depth to rock at base of alluvium (if available).

4. Provide information on:
   a. The flooding potential at the discharge site with respect to major precipitation and/ or run-off events; and
   b. Flood protection measures (berms, channels, etc.), if applicable.

B. Additional Information

Provide any additional information necessary to demonstrate that approval of the discharge plan will not result in concentrations in excess of the standards of WQCC Section 3-103 or the presence of any toxic pollutant (Section 1-101.UU.) at any place of withdrawal of water for present or reasonably foreseeable future use. Depending on the method and location of discharge, detailed technical information on site hydrologic and geologic conditions may be required to be submitted for discharge plan evaluation. This material is most likely to be required for unlined surface impoundments and pits, and leach fields. **Check with OCD before providing this information.** However, if required it could include but not be limited to:

1. Stratigraphic information including formation and member names, thickness, lithologies, lateral extent, etc.

2. Generalized maps and cross-sections;

3. Potentiometric maps for aquifers potentially affected;

4. Porosity, hydraulic conductivity, storativity and other hydrologic parameters of the aquifer;

5. Specific information on the water quality of the receiving aquifer; and

6. Information on expected alteration of contaminants due to sorption, precipitation or chemical reaction in the unsaturated zone, and expected reactions and/ or dilution in the aquifer.
X. Other Compliance Information

Attach such other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders. Examples include previous Division orders or letters authorizing operation of the facility or any surface impoundments at the location.