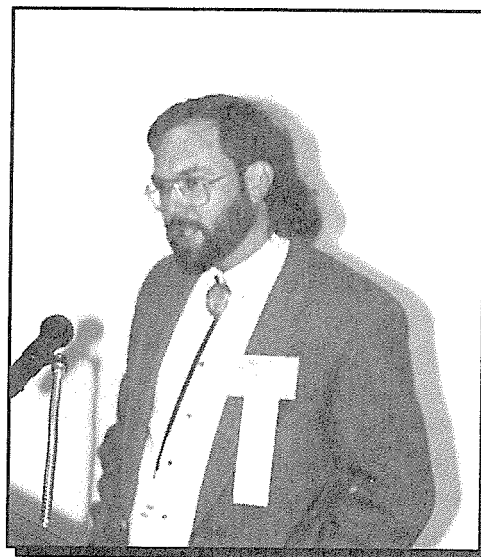


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ENVIRONMENTAL CONCERNS AND REGULATION OF THE OIL AND GAS INDUSTRY

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Introduction

The Oil Conservation Division (OCD) is unique among New Mexico state regulatory agencies in that it is the only agency other than the New Mexico Environment Department (NMED) that administers several wide-ranging water quality protection programs. Some of these programs have been developed and remain separate from the umbrella state Water Quality Act which, until the advent of various federal programs, controlled other discharges to groundwater. Among the types of discharges regulated by OCD are surface and underground disposal of water produced concurrently with oil, natural gas, and carbon dioxide; waste drilling fluids and muds; and waste fluids at crude oil recovery facilities, oilfield service companies, refineries and natural gas plants and compressor stations.

Most of these activities are regulated under the New Mexico Oil and Gas Act, which also authorizes the OCD to set requirements for proper drilling, completion, plugging and abandonment of wells. Additional authority is granted OCD under the New Mexico Geothermal Resources Act, and under administrative delegation as a constituent agency of the Water Quality Control Commission (WQCC) under the New Mexico Water Quality Act.

Oil and Gas Act

When the New Mexico Oil and Gas Act (70-2-1 through 70-2-38, NMSA 1978) created the Oil Conservation Commission in 1935, it authorized rulemaking for prevention of waste and to protect correlative rights, but did not specifically address freshwater protection. However, the original act did

require that dry or abandoned wells be plugged in a way to confine fluids to their existing zones.

Under these and other provisions of the statute, OCD adopted rules regarding drilling, casing, cementing, and abandonment of wells. These activities, by themselves, provide some freshwater protection.

In 1961, the Act was amended to allow the Division to make rules providing for freshwater protection from the disposal of drilling or production waters. Under the 1961 amendments, the state engineer designates which water is to be protected. Currently, protection is afforded to all surface water streams, all surface and groundwater having 10,000 mg/l or less total dissolved solids (TDS), and all surface water over 10,000 mg/l TDS that impacts protectable groundwater.

Under the Oil and Gas Act, statewide regulations can be adopted after notice and hearing, or rules specific to a particular practice, operator, or geographic area may be issued as Division "orders." When an order is approved for a specific operator, it serves as a permit. Using one or the other of these methods, OCD administers requirements for underground injection of produced waters and nonhazardous production fluids, for surface disposal of such fluids, and for disposal of nonrecoverable waste oils and sludges from production and oil treating plants.

Water Quality Act

The New Mexico Water Quality Act (74-6-1 through 74-6-17, NMSA 1978) provides the statutory authority for OCD environmental regulation of refineries, natural gas plants and compressor stations, and oil field service companies. Discharges to groundwater at these facilities are controlled under the WQCC Regulations. As a constituent agency of the WQCC, OCD has been delegated authority to administer the regulations at these facilities and at geothermal operations. State water quality regulations at other non-oilfield facilities are administered by the NMED.

The New Mexico Water Quality Act specifically prohibits the WQCC from exercising concurrent jurisdiction over oil and gas production activities that may cause water pollution and are regulated by the OCD through the Oil and Gas Act. The delegation to OCD of WQCC authority effectively eliminates this conflict because the same staff persons administer

both sets of regulations, and apply whichever is applicable to the regulated facility.

Although the WQCC Ground Water Quality Standards cannot be applied directly to permitted operations regulated under the Oil and Gas Act, OCD staff use them as guidelines since they have been developed for New Mexico's groundwater quality and are both more comprehensive and realistic than some federally promulgated standards. In instances where the Oil and Gas Act is silent, such as requirements for cleanup and remedial action in the event of contamination of groundwater, WQCC Regulations are applied for the investigation and reclamation actions. Under the WQCC delegation agreement, staff are responsible for proper enforcement of the Water Quality Act in these instances.

Geothermal Resources Act

Regulations adopted under the Geothermal Resources Act (71-5-1 through 71-5-24, NMSA 1978) are structured similar to those of the Oil and Gas Act. Its provisions control drilling, casing and cementing of geothermal wells; and production volume of the geothermal fluids so that the geothermal reservoirs will not be depleted, or unfairly appropriated by a particular user. The Act and regulations adopted thereunder specify that activities be conducted in a manner such that human health and the environment are afforded maximum reasonable protection, and that disposal of produced waters be in a manner so as not to constitute a hazard to surface or underground useable waters.

Unlike the Oil and Gas Act, the Geothermal Resource Act has a clause allowing concurrent jurisdiction with other state agencies having regulatory jurisdiction. This means that WQCC Regulations also are applicable. Again, these responsibilities have been delegated to the OCD, and in practice only storage and disposal of geothermal fluids are currently being regulated via discharge plans. Other operational aspects (drilling and production) are covered through permits issued under the Geothermal Resources Act.

Implementation

Environmental activities conducted by the Division are implemented by OCD's Santa Fe office and four district offices. In addition to matters related to

oil and gas production, Santa Fe staff process, approve or set for hearing applications for surface disposal or underground injection of salt water, for water flooding used in secondary oil recovery or pressure maintenance, and surface treatment and disposal facilities. With the exception of surface disposal and waste oil recovery/treatment plant applications, which are reviewed by the OCD Environmental Bureau staff, all the above activities are performed by OCD's petroleum engineers. However, OCD Environmental Bureau staff provide valuable input and guidance in the application process, especially for possible impacts to groundwater from production and underground injection.

The OCD Environmental Bureau, formed in 1984, performs water protection activities not carried out under other OCD programs. These include permitting of oil refineries, natural gas plants and compressor stations, oil field service companies, and other regulated discharges to groundwater. Bureau staff perform inspections and sampling at these facilities, groundwater contamination investigations, sampling of groundwater at domestic wells and other locations suspected of having contamination, and supervise groundwater cleanup and remedial actions. The Bureau coordinates Division environmental programs and responds to information requests by industry, federal and state agencies, and other members of the public. Additional regulations for freshwater protection are researched, written and proposed to the Oil Conservation Commission, and guidelines to assist industry in complying with regulatory requirements are prepared and updated. Activities performed by the Environmental Bureau are carried out by a staff of five comprising a hydrogeologist, petroleum engineer, chemical/environmental engineer and two petroleum geologists.

Daily activities performed by OCD district staff provide protection for fresh water. All permits to drill, complete, work-over, and plug oil, gas and injection wells are reviewed and approved by district staff which includes a district geologist. The review ensures proper casing and cementing programs to protect fresh water. Field inspectors witness required cementing and testing of production and injection wells, and respond to complaints of possible rule violations. They also collect water samples, supervise cleanup of minor spills and leaks, and provide first

response to oil- and gas-related environmental problems.

Environmental Concerns

The state of New Mexico is heavily dependent on groundwater as a public resource. Approximately 88% of New Mexico's population depends on groundwater aquifers as a source of domestic water. Consequently, the OCD Environmental Bureau has concentrated its resources on prevention of contamination of fresh water by oil and gas production and refinery activities and remediation of those groundwaters contaminated as a result of oil-field practices.

New Mexico's reliance on groundwater makes the enforcement of OCD and WQCC rules and regulations to investigate and remediate oil-field contaminated soils and groundwater an important activity. The OCD currently has more than 400 cases of groundwater contamination related to oil-field activities. Approximately 10% of these cases are attributed to leaks and spills during oil and gas production operations. Over 90% of these cases are the result of disposal practices, which are not allowed under current rules and regulations, most notably the prior use of unlined pits for waste disposal. The costs to the public for loss of freshwater resources and to industry for remediation of contaminated groundwater are large. While the costs to industry of preventative measures are not negligible, preventative costs are a fraction of those incurred in the remediation of contaminated groundwater.

Due to the cost effectiveness of contamination prevention and the need to protect groundwater for future uses, the majority of OCD's efforts are in the area of preventing groundwater contamination. Preventative measures are implemented through the enforcement of regulations and rules requiring discharge plans and permits for oil-field production activities, gas plants, compressor stations, refineries and other major potential contaminant sources. The goal of the permitting system is to work cooperatively with industry to keep all groundwater contaminants contained and to provide for early detection and prompt remediation of leaks and spills to prevent groundwater contamination.

All injection wells, refineries, oil-field disposal facilities, gas plants and most mainline compressor

stations have approved discharge plans or permits. The OCD also is in the process of bringing smaller scale potential contamination sources at field gas compressor stations and oil-field service companies under the discharge plan system. Refinery and gas plant permitting has been difficult due to the age of several facilities, and pre-existing documented contamination at most operating and abandoned sites. Permitting has been facilitated by separating issues of past contamination and remedial action from the discharge plan, unless continued discharges will cause changes in contaminant migration and concentration.

Groundwater protection measures also are implemented by review and revision, as necessary, of OCD rules related to disposal of produced water and other oil-field wastes. The first groundwater protection rules were issued in the early 1960s when the New Mexico Oil Conservation Commission banned, with some exceptions, the disposal of produced water in unlined pits in areas of southeastern New Mexico with protectable fresh waters. Prior to 1986, no restrictions on direct discharge of oil-field produced water, or related wastes existed in the San Juan Basin, due to the lack of known cases of groundwater contamination and the quality of the produced water in the basin. Current OCD rules prohibit discharges to unlined pits in areas vulnerable to groundwater contamination.

Summary

OCD has an ongoing freshwater protection program staffed by persons knowledgeable in several engineering and scientific specialties needed for proper implementation of the program. The Division is cognizant of potential contamination due to oil and gas activities, and enforces and revises state rules as necessary to protect this resource. The OCD expects to continue to review existing disposal practices and regulations over time and propose regulatory modifications to protect the state's groundwater resources. Current and upcoming issues that the OCD are working on include changes in the reclamation bonding limits for surface waste facilities; revision of OCD rules on reporting and remediation of leaks and spills; review of unlined pit usage in remaining areas of the state; and review of standards and rules for general waste disposal.

Proper staffing is always crucial for successful programs; and OCD, like other agencies, has found that the demands for services by industry and the public is in conflict with budgetary constraints due to the general economic situation of the oil and gas industry and the state. Since OCD administers mostly state regulatory programs, it is able to tailor and implement these in a manner to provide maximum effectiveness with available staff, and with a minimum of bureaucratic requirements.

**NEW MEXICO
OIL CONSERVATION DIVISION
PROGRAM SUMMARY OVERVIEW**

ENVIRONMENTAL REGULATORY PROGRAMS

Underground Injection Control Program

Description: Federally-mandated EPA program for regulation of wells which inject fluids to the subsurface. The program classifies wells by function and by location with respect to protectable drinking water. Parts of the New Mexico program predate the federal programs by 15-20 years. OCD is the lead state agency for administration of this program, with NMED administering some well classifications. Federal delegation of the program is to OCD (Class II) and Water Quality Control Commission (WQCC) (Class I, III, IV and V). Some of the WQCC regulated wells also are under OCD jurisdiction pursuant to a signed delegation of responsibility. Classification of wells:

Class I: Industrial disposal wells: OCD has 4 permitted under WQCC Regulations.

Class II: Oil and natural gas injection wells: Used for saltwater disposal, reservoir pressure maintenance, secondary recovery and natural gas storage. OCD regulates approximately 5300 of these wells.

Class III: Mineral extraction wells: OCD administers WQCC Regulations for 23 facilities injecting water to produce salt brine used in oil and gas operations.

Class IV: Shallow hazardous waste injection wells: Not authorized in New Mexico and closed when discovered either by NMED or OCD.

Class V: Other categories of wells: Examples are commercial septic tank systems, dry wells, geothermal wells. OCD administers WQCC rules for these wells at geothermal sites, and the oil-field service industry. Because of the potential for serious groundwater contamination by oil-field chemicals and wastes, OCD is requiring service companies to close these wells when located by OCD staff. EPA has praised OCD's efforts in this area.

The state requires permits for these wells, and specifies design and performance standards for construction and operation.

Statutory Authority: Federal - Safe Drinking Water Act and regulations codified at 40 CFR, Parts 144 to 148. State - Oil and Gas Act, 70-2-12.B and Rules 701-708; Water Quality Act and Water Quality Control Commission Regulations.

Production Operations

Description: Environmental considerations begin with review of permit application to drill an oil or gas well. Prior to approving well construction, cement and casing appropriate to the well location will be specified; operation will be pursuant to division rules for protection of health safety and environment; and, upon completion of operations, plugging to prevent movement of fluids to zones of fresh groundwater.

Statutory Authority: State Oil and Gas Act, 70-2-12.B.

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Surface Waste Disposal

Description: Underground injection to below fresh water is the preferred method for disposal of oil and gas waste fluids. However, surface disposal is necessary for solids and in locations where injection is not practical due to subsurface geology. OCD requires both commercial- and company-operated centralized surface disposal facilities to receive OCD approval. Commercial and centralized facilities are required to meet stringent siting, design, and operation standards since fluids (and solids) will come from various locations and likely will differ in composition. Public notice is required both by legal advertisement in a newspaper and certified-mail notification of property owners within ½ mile of the facility. Construction and operation plans are required to be submitted for Division review and approval.

Statutory Authority: State Oil and Gas Act 70-2-12.B and OCD Rule 711.

Refineries, Natural Gas Processing Plants, Gas Compressor Stations, and Oil-field Service Companies

Description: These facilities are regulated by OCD for prevention of groundwater contamination through control of fluids that are or may be potentially discharged as a result of facility operation. OCD requires safe handling and storage of chemicals used in processing, and proper disposal of waste solids generated at the location. OCD currently regulates 5 refineries, 48 natural gas processing plants, 147 compressor stations, 58 service facilities and 4 geothermal facilities. A number of refineries and gas plants (plus several inactive operations) are performing groundwater remediation due to contamination from past practices prior to implementation of current regulations.

Statutory Authority: These facilities are regulated for freshwater protection under the state Water Quality Act. Authority to regulate these facilities has been delegated to OCD by the state WQCC. OCD administers WQCC Regulations at these types of facilities but is prohibited by the Water Quality Act from regulating exploration and production wastes. The latter wastes are regulated, as discussed above, under the Oil and Gas Act.

In addition to the Water Quality Act for groundwater protection, OCD also imposes additional environmental requirements pursuant to our authority under Section 70-2-12.B (22) of the Oil and Gas Act. In practice, the statutory division of authority (Oil and Gas Act vs. Water Quality Act) does not interfere with OCD's environmental efforts because both statutes are administered by personnel who use the available regulatory tools for maximum environmental effectiveness.

ENVIRONMENTAL INFORMATION AND EDUCATION PROGRAMS

To date, OCD has not developed a specific public information or education program. However, OCD Environmental Bureau staff have developed written guidelines to assist industry and consultants in preparing various types of permit applications. In addition to guidelines, staff have presented papers and spoken before several trade, public and industry groups. The audience for these talks has included the public, oil and gas operators, petroleum engineers, consultants, and the oil-field service industry.