STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION COMMISSION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION FOR THE PURPOSE OF CONSIDERING:

APPLICATION OF THE NEW MEXICO OIL CONSERVATION DIVISION, THROUGH THE ENVIRONMENTAL BUREAU CHIEF, FOR ADOPTION OF AN AMENDMENT TO 19.15.1 NMAC ADDING NEW MATERIAL TO BE CODIFIED AT 19.15.1.21 NMAC.

CASE NO. 13269
ORDER NO. R-12172

ORDER OF THE OIL CONSERVATION COMMISSION

BY THE COMMISSION:

THIS MATTER came before the Oil Conservation Commission (hereinafter referred to as "the Commission") on June 17 and 18, 2004, at Santa Fe, New Mexico, on application of the New Mexico Oil Conservation Division (hereinafter referred to as "the Division") through the Chief of the Environmental Bureau, and the Commission, having carefully considered the evidence, the pleadings, comments and other materials submitted in support and in opposition of the proposal, now, on this 15th day of July, 2004,

FINDS:

1. Proper notices have been given of this proceeding and of the public hearing hereof, and the Commission has jurisdiction of the subject matter.

The Division's Proposal

2. This is a rulemaking proceeding in which the Division has proposed adoption of special rules for protection of fresh water and the environment in selected areas of Otero and Sierra Counties.

3. The Division staff has submitted a proposed new Rule 21, which would prohibit the construction of most oil and gas industry related pits, and adopt additional restrictions upon produced water injection wells, in the selected areas. The proposed new Rule 21 would be codified as 19.15.1.21 NMAC.

4. The Commission held a public hearing on the Division's proposal on June 17 and 18, 2004. In addition, the Commission accepted written comments concerning the proposed rulemaking prior to and during the hearing. The Commission deliberated on the application in open session during its meetings on June 18, 2004, and July 15, 2004.

Background

5. The Commission has been concerned about disposal or storage of hydrocarbons, produced water and other materials in open pits and the potential of such pits to contaminate fresh water resources of the State for a long time. Beginning in 1958 with the adoption of Order No. R-1224-A, the Commission has undertaken selective regulation of pits in particular areas of the State and in particular circumstances.

6. On December 11, 2003, by Order No. R-12011-B, the Commission adopted Rule 50 [19.15.2.50 NMAC] to comprehensively regulate pits and below-grade tanks used in the oil and gas industry. Although Rule 50 was adopted to promulgate rules that the Commission determined to be generally appropriate throughout the State, the Commission expressly recognized, by its adoption of the provision in Rule 50C(2), providing that the Division may require additional protective measures for pits located in groundwater sensitive areas, that absolute uniformity of pit regulation was neither possible nor desirable.

7. Since the adoption of Rule 50, the Division has continued to study the regulation of pits and the requirements that may be or become necessary for protection of the fresh waters of the State and the environment

8. On January 31, 2004, the Governor of New Mexico issued Executive Order 2004-005, entitled, "State Agencies Act to Conserve and Protect Resources of Otero Mesa." The Executive Order directed the Division to "propose rules to prohibit pits associated with any oil and gas drilling at Otero Mesa," and "to propose regulations to implement produced water re-injection standards and controls to assure full protection of the groundwater resources of Otero Mesa." The Executive Order further directed the Division "to work with any applicable state boards and commissions to implement this directive in accordance with law."

9. Pursuant to this directive, the professional and legal staff of the Division developed proposed Rule 21. The selected areas which the proposed rule will cover include the area known as "Otero Mesa," together with surrounding areas.

10. At the hearing, the Division submitted an amended proposal revising its recommendations regarding produced water transportation lines in response to written comments the Division had received.

11. Although the Division, in order to secure adoption of final rules as expeditiously as possible, did not seek extensive public input in the process of formulating this proposal, the Commission, in this proceeding, has carefully considered the 550 pages of testimony adduced at the hearing, together with voluminous written comments, and has fully evaluated the justifications for the proposed rule advanced by the Division and members of the public, as well as objections and qualifications raised in the testimony and comments.

12. A majority of the Commission has concluded that the proposed rule should be adopted with certain clarifications and modifications fully discussed below.

Technical Evidence

13. The Division presented the testimony of William C. Olson, Senior Hydrologist with the Environmental Bureau of the Division and a member of the Water Quality Control Commission; Robert C. Sivinski, botanist with the Forestry Division of the Energy, Minerals and Natural Resources Department; Roger C. Anderson, chemical and environmental engineer and Chief of the Environmental Bureau of the Division; Andrew B. Core, hydrologist with the Office of the State Engineer, Rachel Jankowitz, wildlife management biologist with the Department of Game and Fish; Chris Williams, District Supervisor of the Hobbs District office of the Division; and William V. Jones, petroleum engineer, hearing examiner and Underground Injection Control (UIC) Program Manager with the Division.

14. The Division's witness, Mr. Olson, testified that water produced in connection with drilling for and production of oil and gas typically contains dissolved salts that have the potential to contaminate fresh water with which they may come in contact, and may also contain hydrocarbon substances that are hazardous to human health.

15. Mr. Olson further testified concerning alternatives to the use of pits for storage of drilling fluids and disposal of produced water and wastes, the environmental safety of injection wells in the selected areas, proposed construction requirements for produced water transportation lines and proposed pad and secondary containment requirements for tank batteries.

16. The Division's witness, Mr. Sivinski, testified that the Chihuahuan Desert ecoregion, which is one of the most species-diverse regions in the world and home to several endangered plant species unique to the area, includes almost all of the selected areas.

17. Mr. Sivinski further testified that the selected areas contain the largest more or less compact areas of Chihuahuan desert grasslands in New Mexico and that preservation of compact areas of grassland is essential to provide a habitat of adequate extent to maintain populations of animal species that depend on the grassland environment.

18. Mr. Sivinski further testified concerning the difficulties of restoring disturbed areas of this ecoregion.

19. The Division's witness, Mr. Anderson, testified concerning the proposed casing and cementing requirements for injection wells in the selected areas.

20. The Division's witness, Mr. Core, testified to the boundaries and characteristics of the water basins declared by the State Engineer in Otero and Sierra Counties.

21. The Division's witness, Ms. Jankowitz, testified concerning animal species that are dependent upon the Chihuahuan desert environment and the dangers that open pits containing contaminants pose for wild animals.

22. The Division's witness, Mr. Williams, testified concerning closed-loop drilling systems.

23. The Division's witness, Mr. Jones, testified concerning the Underground Injection Control (UIC) program under which the Division regulates injection wells and the need for additional requirements for injection wells in the selected areas.

24. Mack Energy Corporation, Marbob Energy Corporation and Yates Petroleum Corporation, oil and gas operators in New Mexico, appeared through counsel and presented the testimony of Brian Collins, registered professional engineer and petroleum engineer with Marbob Energy Corporation.

25. The Otero Mesa Coalition, a group of citizen groups concerned with environmental conservation of the Otero Mesa area, appeared through counsel and presented the testimony of Steven T. Finch, Jr., hydrogeologist with John Shoemaker and Associates.

26. Dr. Donald A. Neeper, a scientist retired from the Los Alamos National Laboratory, appeared and testified on behalf of the New Mexico Citizens for Clean Air and Water.

Comments

27. In addition to the above testimony, the following persons made comments on the record at the hearing:

Carl L. Johnson;
Irvin Boyd;
B.J. Brock, representing the New Mexico Cattle Growers Association;
Dan Randolph, representing the San Juan Citizens' Alliance;
Patricia London;
John McDonald;
Steven Capra, Executive Director of the New Mexico Wilderness Alliance;
David Parsons;
Jim Steitz, representing the Southwest Environmental Center;
Ken Whiton, President of the New Mexico Chapter, Republicans for Environmental Protection;
Janice Simmons; and
Jennifer Goldman, representing the Oil and Gas Accountability Project.

28. The following persons submitted written comments, prior to or during the hearing, that were made a part of the record:

Charlene Anderson and Ed Moslimann;
BP America Production Company;
Burlington Resources Oil and Gas Company LP;
Julia Ruth Claus;
Dugan Production Corp.;
Fasken Oil and Ranch, Ltd.;
Cyndy Gimble;
Hinkle, Hensley, Shanor & Martin, L.L.P.;
Independent Petroleum Association of New Mexico (IPANM);
Suzy T. Kane;
Manzano, LLC;
Marathon Oil Company;
Marbob Energy Corporation;
Merrion Oil & Gas;
Linda Moscarella;
New Mexico Cattle Growers' Association;
Dr. Donald A. Neeper, PhD;
New Mexico Environmental Law Center;
New Mexico Oil & Gas Association (NMOGA);
Oil & Gas Accountability Project (OGAP);
OXY USA, Inc., Occidental Permian Limited Partnership and OXY USA WTP Limited Partnership;
Janet Y. and John W. Rees;
Synergy Operating, LLC;
Ross and Kristin Ulibarri;
The Williams Companies; and
Yates Petroleum Corporation.

29. Collective written comments were submitted by Chihuahuan Desert Conservation Alliance, Earthjustice, National Wildlife Federation, Natural Resources Defense Council, New Mexico Wilderness Alliance, New Mexico Wildlife Federation, Sierra Club, Rio Grande Chapter, Southwest Consolidated Sportsmen, Southwest Environmental Center and The Wilderness Society. These comments were also made part of the record.

Powers of the Commission

30. The Commission and the Division have power, pursuant to NMSA 1978, Section 70-2-12.B(15)

> "to regulate the disposition of water produced or used in connection with the drilling for or producing of oil or gas or both and to direct surface or subsurface disposal of the water in a manner that will afford reasonable protection against contamination of fresh water supplies designated by the state engineer."

31. The Commission and the Division have power, pursuant to NMSA 1978, Section 70-2-12.B(21) and (22) to regulate the disposition of nondomestic wastes resulting from oil and gas operations to protect public health and the environment.

Discussion of the Proposed Rule

Title

32. The proposed rule is entitled "Special Provisions for the Chihuahuan Desert Area."

33. Several persons who submitted comments objected to appropriateness of the title insofar as it described the subject areas as the "Chihuahuan desert area."

34. The Commission concludes that:

(a) According to the testimony of the Division's witness, Mr. Sivinski, there exist significant Chihuahuan desert areas in other counties of New Mexico and outside New Mexico, and some of the areas in Otero and Sierra Counties for which the rule is proposed have been so far changed that they no longer contain flora and fauna typical of the Chihauhan desert.

(b) The expression "Chihuahuan desert area" is not therefore accurately descriptive of the area to which the rule will apply.

(c) Accordingly, the rule adopted should be entitled "Special Provisions for Selected Areas of Sierra and Otero Counties," and the rule as adopted should substitute "selected areas" for "Chihuahuan Desert area," each place in the proposed rule that the latter language appears.

Subsection A - Selected Areas

35. Subsection A of the proposed rule defines the geographical areas in which the Division proposes that the new rule should apply.

36. The areas within which the Division proposes to apply the new rule are depicted as the cross-hatched area on OCD Exhibit 4, which was admitted in evidence in the hearing.

37. The areas of Sierra and Otero counties which the Division proposes to exclude from the new rule are depicted as the colored, non-cross-hatched area on OCD Exhibit 4, which was admitted in evidence in the hearing.

38. Counsel for the Commission has advised that the description set forth in Subsection A of Rule 21 in Exhibit A to this Order (Exhibit A) correctly describes the areas within which the new rule was proposed to apply, as depicted on OCD Exhibit 4.

39. The Commission concludes that Subsection A of Rule 21 as set forth on Exhibit A should be adopted in lieu of Subsection A of the proposed rule.

Subsection B - Pits

40. Subsection B of the proposed rule would prohibit the issuance of permits for pits under Rules 50 or 711 in the selected areas.

41. Present Rules 50 and 711 require a permit for the construction or use of any pit, except, as applicable to the selected areas, for pits constructed in an emergency (which generally are to be used for no more than 48 hours) and pits authorized under Water Quality Control Commission rules.

42. Thus, adoption of the proposed rule would effectively prohibit the construction and use of pits in the selected areas .

43. The Division's witness, William C. Olson, testified in detail concerning the pit lining requirements of OCD Rule 50.

44. Mr. Olson testified that:

(a) While the majority of pit-caused contamination cases have resulted from unlined pits, pits lined in accordance with the Rule 50 requirements are not leak-proof. Indeed, Mr. Olson identified specific instances of leaks that had caused actual or potential ground water contamination, and that proceeded from pits lined in accordance with the requirements now incorporated in Rule 50.

(b) Rule 50 does not require netting of all pits to protect birds, nor does it require fencing of pits sufficient to exclude wildlife.

(c) Leaks from pits are more likely to cause ground water contamination in areas where ground water is encountered at shallow depths, or where the underlying strata are fractured.

(d) Contamination proceeding from pits overlying rocky, fractured strata is particularly difficult to locate and remediate.

(e) Oil and gas operations can be conducted without the use of pits, by using "closed-loop systems" consisting of open-top tanks to contain drilling fluids at the well-site, and by disposing of produced water through re-injection or treatment and application to other uses.

(f) Closed-loop systems provide better environmental protection than lined pits because steel tanks are less likely to leak than plastic pit liners, leaks from a tank are easier to detect quickly, permitting repair before pollution results, tanks are not as easily accessible by wildlife as pits are, and tanks do not involve the potential long-term environmental hazards associated with burial of pit wastes on site enclosed only in a plastic liner that may get punctured or subsequently float to the surface.

45. The Division's witness, Mr. Sivinski, testified to the difficulty of restoring areas disturbed by pit construction and use in the selected areas.

46. Mr. Sivinski testified that:

(a) where pits that contain sodium compounds, such as sodium chloride, have been closed, the buried contents of these pits tend to migrate upward and sterilize overlying soils preventing restoration of vegetation;

(b) pit excavations in the grasslands in the selected areas would create conditions conducive to re-vegetation with scrub and noxious weeds that would tend to defeat efforts to restore native plant species; and

(c) in any event restoration of disturbed grassland areas would be difficult due to unavailability of the necessary seeds.

47. The Division's witness, Mr. Core, testified that:

(a) fresh water is found in virtually all parts of the selected areas and at a great variety of depths, ranging from 50 to 100 feet in some places down to as much as 1,500 feet in places;

(b) ground water is being used, additional wells are being drilled, and additional applications for water rights are being filed in all of the basins identified in the selected areas;

(c) there are additional and more extensive future uses of water from this area, especially from the Salt Basin, which includes the Otero Mesa area; and

(d) ground water in the selected areas is particularly sensitive to degradation by the introduction of contaminants, especially in the Salt Basin where fractures permit such contaminants to migrate rapidly.

48. The Division's witness, Ms. Jankowitz, testified that pits attract wildlife and cause injury or death to the wildlife due to ingestion of pit contaminants or becoming trapped in the pits.

49. The Division's witness, Mr. Williams, testified, based on his experience with closed-loop mud systems on off-shore drilling sites that:

(a) closed-loop systems are equipped with gas separators and the tanks are vented or open at the top to provide ventilation and prevent build up of explosive gasses;

(b) closed-loop systems can be operated safely; and

(c) closed-loop systems can provide an adequate mud supply for well control if the system is designed with adequate tank capacity.

50. Steven T. Finch, Jr., hydrogeologist, testified concerning the Salt Basin, which comprises a significant part of the selected areas, that:

(a) the fresh water in the Salt Basin is substantial in quantity and high in quality;

(b) the aquifer is a highly fractured limestone through which water moves rapidly; so that contaminants introduced into the fresh water will migrate and may pollute a large area;

(c) fresh water is encountered in many parts of this basin at depths of less than 100 feet;

(d) the area is also characterized by shallow, or no, topsoil; and

(e) there are no viable protective measures that can prevent pits from being a potential source of ground water contamination in this environment.

51. Dr. Neeper testified that pit contents buried on site upon closure of a pit would have a high probability to "wick up" through overlying soil and contaminate surface soils.

52. Industry witness, Mr. Brian Collins, testified concerning certain problems encountered in the use of closed-loop systems, but his testimony confirmed that such systems have been used successfully in New Mexico where the necessity to minimize surface disturbance was paramount.

53. Industry commentors indicated that closed-loop systems involve safety hazards, may provide insufficient drilling fluids for well control, and are incompatible with air drilling.

54. A majority of the Commission concludes that:

(a) Pits are used in the oil and gas industry primarily for the storage, management and disposition of nondomestic wastes resulting from oil and gas operations, including, but not limited to, produced water.

(b) The Commission and the Division have authority to regulate pits used in oil and gas operations where necessary to protect fresh water resources of the State, the public health and the environment, including protection of the State's biological resources.

(c) The selected areas are areas of unique flora and fauna, home to an unusual diversity of species, some of which are endangered or threatened, indicating a special need for protection of wildlife in these areas.

(d) Pits present particular dangers to wildlife who may ingest pit contents or residue or become trapped in pits, dangers not adequately addressed in present Rule 50.

(e) Excavations to create pits in the grasslands, which occupy a significant part of the selected areas, are likely to disturb the soil in ways that will render restoration of the pre-existing grassland habitat impracticable.

(f) There exist protectible fresh water resources generally distributed throughout the selected areas that are, in many places, encountered at very shallow depths and particularly sensitive to contamination by pollutants that may escape from leaking pits.

(g) Pits are not necessary to oil and gas operations in the selected areas because there exists a practicable alternative, *i.e.* the use of closed-loop systems.

(h) Closed-loop systems have numerous environmental advantages over pits, including a lesser propensity to leak, greater ease of removal for off-site disposition of wastes, and less danger to wildlife.

(i) Closed-loop systems can provide a source of adequate fluids for well control if a sufficient number and size of tanks are used.

(j) Closed-loop systems have been employed in New Mexico and elsewhere without safety problems.

(k) No evidence was offered that air drilling, allegedly not possible without using pits, is essential to effective oil and gas development in the selected areas.

(l) Accordingly, Subsection B of the proposed rule should be adopted without change, other than the substitution of "selected areas" in place of "Chihuahuan desert area."

Subsection C - Injection Wells

55. Subsection C of the proposed rule would provide special and more stringent rules for permitting and operation of produced water injection wells in the selected areas, including both new wells to be drilled for such purpose, and existing wells to be converted to injection.

56. The Division's witness, William C. Olson, testified that injection wells are the principal means of disposal of produced water in New Mexico, and the principal alternative to the use of evaporation pits, and that while application of produced water to other uses is a developing alternative, it is not a presently available alternative for disposal of substantial quantities of such water in southern New Mexico.

57. Mr. Olson further testified that, while there have been occasional instances of contamination of fresh water resulting from injection wells, in his opinion, injection wells can be safely operated in the selected areas so as not to present a danger to fresh water resources.

58. The Division's witness, Mr. Anderson, testified that requirements for permitting injection wells involved demonstration of the existence of a protective zone that would prevent upward migration of injected fluids from the injection zone into fresh water zones absent the existence of a conduit.

59. The Division's witness, Mr. Jones, testified to the scrutiny required to screen the zone of endangerment around a permitted injection well for the existence of any well or fracture that could serve as a conduit for migration of injected fluids into fresh water aquifers.

60. Several citizen commentors objected to allowing any injection wells in the selected areas due to perceived dangers to fresh water resources.

61. The Commission concludes that:

(a) There is a lack of practicable alternatives for disposition of produced water from oil and gas operations in the selected areas other than permitting injection wells.

(b) isposition of produced water into injection wells is, generally, an environmentally safe and effective means of managing such waters.

(c) Existing permitting rules require an applicant for an injection permit to demonstrate that the injected fluids will be adequately isolated in the injection zone.

(d) Hazards to underground fresh water from produced water injection wells can be effectively minimized by existing requirements and the additional safeguards in the proposed rule.

(e) Produced water injection wells should be permitted in the selected areas subject to rigorous safeguards similar to those recommended, as discussed below.

62. Paragraph C(1) of the proposed rule would provide that permits for use of wells in the selected areas for injection of produced water could be issued only after hearing.

63. Present Rule 701 [19.15.9.701 NMAC] provides that the Division may approve applications for use of existing or new wells for injection of produced water administratively, without hearing, if no objection is received within fifteen (15) days after notice of the application to the surface owner and to all offset operators within one-half mile of the proposed injection wells and publication of such notice in a newspaper of general circulation in the county where the well is located.

64. The Division witness, Mr. Jones, testified that, based on his experience as a hearing examiner, it is his opinion that in a wildcat area such as the selected areas, where the nature and location of fresh water resources are not well known, a hearing would be necessary to provide an examiner the information he or she would need to determine if an application provided adequate security for protection of fresh water.

65. The Commission concludes that:

(a) In view of uncertainty regarding the location of fresh water aquifers in substantial parts of the selected areas as well as uncertainty regarding the nature and location of fractures in the strata that could form conduits to conduct injected fluids into fresh water aquifers, the Division needs the most complete information possible before granting an injection permit in the selected areas.

(b) In view of the sensitivity of the ground water resources in the selected areas, the Division needs the maximum possible public input regarding any such permit.

(c) Utilizing the hearing process for each application will maximize the technical information available to the hearing examiner and public input.

(d) Accordingly, paragraph C(1) of the proposed rule should be adopted with change.

66. Paragraph C(2) of the proposed rule would require an expanded "area of review" for proposed produced water injection wells in the selected areas.

67. The area of review is the area around a proposed injection well which must be screened for conduits (wells or fractures) through which the injected fluids could migrate upward and invade fresh water aquifers.

68. The Division's witness, Mr. Jones, testified that:

(a) New Mexico has typically required an area of review with a radius of one-half mile in injection permits;

(b) the United States Environmental Protection Agency (EPA) has developed a formula for determining the radius of zone of endangerment (the area within which a conduit such as a well or fracture would likely lift injected fluids into a freshwater formation, based on injection pressure, vertical distance from the injection formation, characteristics of the injection formation to ground water, and other factors);

(c) in an area such as the selected areas where ground water may be encountered at unusual depths, such that the vertical distance from the injection formation to ground water may be unusually small, the formula is likely to be a better predictor of the distance at which a conduit might raise injected fluid into a fresh water formation than would the usual one-half mile rule;

(d) the EPA formula is based on certain assumptions that are not always correct, and accordingly, to provide adequate ground water protection in an imperfectly known geologic area, the radius of the area of review should ordinarily be greater than (such as one and one-third times) the computed radius of the zone of endangerment;

(e) the EPA formula, however, in some instances indicates an unnecessarily large zone of endangerment, and, accordingly, use of the formula-indicated area of review should be limited by a maximum radius for the area of review;

(f) one and one-third miles is a reasonable maximum radius for the area of review even in an area of relatively unknown geology; and

(g) there are other reasonable ways to determine zone of endangerment, in addition to the EPA formula.

69. The Division's witness, Mr. Core, testified that, in substantial portions of the selected areas, the maximum depth at which fresh water may be encountered is unknown, and that in the Salt Basin, which includes a significant part of the selected areas, the geology of the water-bearing formations is not well understood.

70. Mr. Finch, hydrogeologist, testified that, in the Salt Basin, there is considerable uncertainty regarding the depth to which the fractures in the fresh water aquifers may penetrate and the nature of the strata underlying them.

71. The Commission concludes that:

(a) The selected areas include areas of relatively poorly known geology, particularly as to the depths at which fresh water may be encountered and the nature of the strata in any injection zone and in the zones lying between fresh water aquifers and an injection zone.

(b) To provide maximum protection for fresh water in such an area, an area of review no smaller than one and one-third times the zone of endangerment suggested by the EPA formula should be used in reviewing an application to inject unless the EPA formula indicates a zone of endangerment so large as to suggest an anomalous result.

(c) If the formula produces a radius for the zone of endangerment larger than one mile, the expert testimony indicates that this would be an anomalous result, and the radius of the area of review can safely be limited to one and one-third mile.

(d) In view of expert testimony that the EPA formula does not always produce an accurate indication of the zone of endangerment, other methods the efficacy of which can be demonstrated should alternatively be allowed.

(e) Accordingly Paragraph C(2) of Rule 21 as set forth on Exhibit A, incorporating the one and one-third mile maximum area of review and allowing alternative methods of demonstrating the actual zone of endangerment, should be adopted in lieu of Paragraph C(2) of the proposed rule.

72. Paragraph C(3) of the proposed rule would require an operator to log or test a well it proposes to use for produced water injection to determine the location of fresh water aquifers, and to file the results of such log or test with the Division.

73. The Division witness, Mr. Jones, testified to the methods by which an operator could log or test an injection well to ascertain the location of fresh water aquifers.

74. Mr. Jones further testified that adequate testing to determine the location of fresh water might require perforating the casing to test the water, and that perforation might damage the integrity of the casing, necessitating insertion and cementing of a smaller diameter casing within the original casing to insure integrity.

75. The Commission concludes that:

(a) In view of the limited knowledge now available about the depths at which fresh water may be encountered in the selected areas, the Division should have adequate evidence of the location of fresh water aquifers in an injection well bore before it authorizes injection.

(b) Ascertaining the location of fresh water by logging and testing in the proposed injection well is costly and may require perforation of the casing which will undermine casing integrity and require expensive setting of additional casing.

(c) The location of fresh water zones can be determined by reference to existing wells where there are such wells, or by drilling test wells in the vicinity.

(d) Accordingly, Paragraph C(3) of Rule 21 as set forth on Exhibit A, which allows for alternative means of demonstrating the location of fresh water, should be adopted in lieu of Paragraph C(3) of the proposed rule.

76. Paragraphs C(4) and C(5) of the proposed rule would impose specific casing and cementing requirements for new produced water injection wells and for existing wells to be converted to produced water injection in the selected areas.

77. The Division's witness, Mr. Anderson, explained the proposed casing and cementing requirements.

78. Mr. Anderson testified that:

(a) rigorous cementing requirements are needed for injection wells in the selected areas because of "lost circulation" zones that could prevent effective cementing in some cases;

(b) the requirement of proposed paragraph C(4) for two cemented casing strings behind any fresh water aquifer represents a conservative approach to protection of underground sources of drinking water, and even unusually deep aquifers can be protected from contamination by injection wells constructed in this manner;

(c) the requirements of proposed paragraphs C(4) and C(5) are the same as those presently in force for Class I injection wells, that is, wells used for injection of industrial, non-hazardous industrial waste;

(d) cement bond logs required by proposed paragraph C(5) would be helpful in determining whether the cement will be sufficient to prevent upward migration of fluids behind the casing where it might invade fresh water zones; and

(e) circulation of cement to surface in the smallest diameter casing, as proposed, is necessary where an existing well is converted to injection, because of possible uncertainty about the condition of cement behind original casings.

79. The Commission concludes that:

(a) In view of the sensitivity of the fresh water resources in the selected areas, the Division should adopt conservative casing and cementing requirements that will provide the best possible assurance that injected fluids will not invade fresh water aquifers.

(b) The proposed requirements of two casing strings behind identified fresh water aquifers and cementing these strings to surface are practicable requirements, already in force for Class I injection wells, and will conservatively protect fresh water resources.

(c) The proposed requirement for cementing the smallest diameter casing string to surface in existing wells converted to injection is justified by the possibly uncertain condition of older casings and cementings.

(d) The use of the word "raised" in the phrase, "shall have cement raised to at least 100 feet above the casing shoe" in Subparagraph C(4)(b) of the proposed rule is confusing and should be deleted.

(e) In all other respects Paragraph C(4) of the proposed rule should be adopted as proposed.

(f) Cement bond logs, while not a perfect tool, provide useful information that can assist division examiners in determining whether a proposed injection well has sufficient integrity to permit for injection.

(g) Since cementing requirements for injection wells are already otherwise governed by Rule 702 [15.9.19.702 NMAC], there is not a need for a new rule requiring demonstration of adequacy of cementing in existing wells as proposed.

(h) Accordingly, Paragraph C(5) of Rule 21 as set forth on Exhibit A, which incorporates provisions of Rule 702 by reference, should be adopted in lieu of Paragraph C(5) of the proposed rule.

80. Paragraph C(6) of the rule as originally proposed would have required produced water transportation lines to be constructed of double-walled pipe or located along roads.

81. In response to industry comments pointing to availability and safety problems connected with double-walled pipe, the Division modified its proposal to require such lines to be constructed of internally plastic-lined steel pipe, and to eliminate the reference to location along roads. The proposal also would require such lines to be tested to one-and-one-half times working pressure.

82. The Division's witness, Mr. Olson, testified that salts in produced water can corrode steel pipe, causing leaks. Double walled pipe would not adequately address this problem since the salt water could successively corrode each wall. However, the danger of corrosion could be significantly reduced by using pipe with internal plastic lining.

83. Mr. Olson also testified, however, that solid plastic pipe could provide an adequate substitute for internally lined steel pipe if it met the same pressure-test requirements.

84. The Commission concludes that:

(a) In order to prevent leaks of contaminated water that would endanger the sensitive fresh water resources in the selected areas, produced water transportation lines should be constructed of corrosion-resistant materials.

(b) Other materials may serve that purpose as well as, or better than, plastic-lined steel pipe.

(c) The phrase "working pressure" in the proposed rule requiring that such lines be tested to one and one-half times working pressure is vague.

(d) Accordingly, Paragraph C(6) of Rule 21 as set forth on Exhibit A, which allows for corrosion-resistant material acceptable to the Division and requires testing to one and one-half times "maximum operating pressure," should be adopted in lieu of Paragraph C(6) of the proposed rule.

85. Paragraph C(7) of the proposed rule would require tanks in the selected areas to be placed on impermeable pads and to have structures for secondary containment of spills or leaks.

86. The Division's witness, William C. Olson, testified that:

(a) leaks from produced water tanks have been a cause of documented instances of soil contamination;

(b) placement of tanks on impermeable pads would facilitate prompt detection of such leaks by causing leaking fluids to squeeze out below the sides of the tank rather than descending directly into underlying soil, and

(c) prompt detection of tank leaks would facilitate remediation before significant environmental harm could occur.

87. The Division's witness, Mr. Olson, testified that the word "impermeable" as used by the Division in permits, has an established meaning, namely a barrier having a hydraulic conductivity of less than 1 X 10 to the -7th power centimeters per second.

88. Mr. Olson further testified that the Division would consider that to have "adequate capacity" as provided in the proposed rule, the secondary containment area around a tank battery should have a capacity at least equal to one and one-third times the capacity of the largest tank, or of all interconnected tanks if the tanks are interconnected.

89. The Commission concludes that:

(a) Requirements for pads under, and berms around, storage tanks will reduce leaks of contaminants from such tanks and, by enabling earlier detection of leaks, reduce environmental damage from leaks that may occur;

(b) In view of the sensitivity of the fresh water and soil resources of the selected areas, these leak prevention requirements are warranted to protect these unique resources.

(c) In order to provide certainty for purposes of compliance and enforcement, the rule should define the capacity of "adequate" secondary containment around tanks in accordance with the testimony of the Division's witnesses regarding the intent of the proposal.

(d) Accordingly, Paragraph C(7) of Rule 21 as set forth on Exhibit A, which specifies the minimum required capacity of secondary containment around tanks, should be adopted in lieu of Paragraph C(7) of the proposed rule.

90. Paragraph C(8) of the proposed rule would require daily recording of injection volumes and pressures for all produced water injection wells in the selected areas.

91. Present Rule 704.B [19.15.9.704.B NMAC] requires monthly recording of injection volumes and pressures.

92. The Division's witness, Mr. Jones, testified that:

(a) injection pressure and volume limitations are imposed in Division injection permits to prevent fracturing of the strata which could result in migration of injected fluids outside the intended injection formation, including into fresh water aquifers;

(b) daily recording would facilitate enforcement by allowing the Division to ascertain the nature and duration of any violation of injection volume and pressure limitations;

(c) daily or continuous recording of injection volumes and pressures is not difficult with currently available technology and is already required for Class I (industrial waste) injection wells.

93. The Commission concludes that:

(a) In an area of little known and sensitive ground water resources, injection pressure and volume limitations should be rigorously enforced to prevent fracturing which could endanger fresh water aquifers;

(b) Daily or continuous recording will facilitate effective enforcement;

(c) Daily recording can be accomplished in a number of reasonable and practicable ways including, but not limited to, use of continuous recording equipment; and

(d) Accordingly, Paragraph C(8) of Rule 21 as set forth on Exhibit A, which requires daily recording but allows alternative methods, should be adopted in lieu of Paragraph C(8) of the proposed rule.

94. Paragraph C(9) of the proposed rule would require annual mechanical integrity testing for all produced water injection wells in the selected areas.

95. Present Rule 704 requires mechanical integrity testing of all injection wells at least once every five (5) years, and provides that the Division may order more frequent testing in particular cases.

96. The Division's witness, Mr. Jones, testified that:

(a) testing of casing integrity of injection wells is necessary to insure that injected fluids do not migrate up the annulus of the injection well due to casing leaks or microannuli in the cement;

(b) annual testing is superior to testing every five years because problems can be more quickly tested and corrected before harm to fresh water results; and

(c) annual mechanical integrity testing is currently required for Class I injection wells.

97. The Commission concludes that:

(a) Annual testing of injection wells is a reasonable and practicable procedure that provides greater security for fresh water aquifers than does testing every five years, because any problems can be more expeditiously corrected.

(b) In view of the sensitivity of the fresh water resources in the selected areas, the highest reasonable level of protection should be required.

(c) The requirement for notification to the Division twenty-four hours before a test does not, as a practical matter, give the Division adequate opportunity to supervise these tests.

(d) Accordingly, Paragraph C(9) of Rule 21 as set forth on Exhibit A, incorporating more flexible provisions for notification to the Division of tests, should be adopted in lieu of Paragraph C(9) of the proposed rule.

Final Conclusions

98. A majority of the Commission concludes that a new rule, to be codified as 19.15.1.21 NMAC, or otherwise if necessary to meet requirements of the Commission of Public Records, should be adopted in the form attached hereto as Exhibit A.

IT IS THEREFORE ORDERED:

1. A new rule of the Oil Conservation Division, to be codified at 19.15.1.21 NMAC (or elsewhere if necessary to meet requirements of the Commission of Public Records), copy attached as Exhibit A, is hereby adopted, effective as of the date of its publication in the New Mexico Register.

2. Staff of the Oil Conservation Division is instructed to secure prompt publication of the referenced rule in the New Mexico Register.

3. Jurisdiction of this matter is retained for entry of such further orders as may be necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

MARK E. FESMIRE, P.E., CHAIR

JAMI BAILEY, CPG, MEMBER

FRANK A. CHAVEZ, MEMBER

S E A L

19.15.1.21 SPECIAL PROVISIONS FOR SELECTED AREAS OF SIERRA AND OTERO COUNTIES.

A. The selected areas comprise:

(1) all of Sierra county except the area west of Range 8West NMPM and north of Township 18 South, NMPM; and

(2) all of Otero county except the area included in the following townships and ranges:

Township 11 South, Range 9 1/2 East and Range 10 East NMPM;
Township 12 South, Range 10 East and Ranges 13 East through 16 East, NMPM;
Township 13 South, Ranges 11 East through 16 East, NMPM;
Township 14 South, Ranges 11 East through 16 East, NMPM;
Township 15 South, Ranges 11 East through 16 East, NMPM;
Township 16 South, Ranges 11 East through 15 East, NMPM;
Township 17 South, Range 11 East (surveyed) and Ranges 12 East through 15 East, NMPM;
Township 18 South, Ranges 11 East through 15 East, NMPM;
Township 20 1/2 South, Range 20 East, NMPM;
Township 21 South, Range 19 East and Range 20 East, NMPM; and
Township 22 South, Range 20 East, NMPM; and also excepting also the unsurveyed area bounded as follows:
Beginning at the most northerly northeast corner of Otero county, said point lying in the west line of Range 13 East (surveyed);
Thence west along the north boundary line of Otero county to the point of intersection of such line with the east line of Range 10 East NMPM (surveyed);
Thence south along the east line of Range 10 East NMPM (surveyed) to the southeast corner of Township 11 South, Range 10 East NMPM (surveyed);
Thence west along the south line of Township 11 South, Range 10 East NMPM (surveyed) to the more southerly northeast corner of Township 12 South, Range 10 East NMPM (surveyed);
Thence south along the east line of Range 10 East NMPM (surveyed) to the inward corner of Township 13 South, Range 10 East NMPM (surveyed) (said inward corner formed by the east line running south from the more northerly northeast corner and the north line running west from the more southerly northeast corner of said township and range);
Thence east along the north line of Township 13 South NMPM (surveyed) to the southwest corner of Township 12 South, Range 13 East, NMPM (surveyed);
Thence north along the west line of Range 13 East, NMPM (surveyed) to the point of beginning.

B. The division shall not issue permits under 19.15.2.50 NMAC or 19.15.9.711 NMAC for pits located in the selected areas.

C. Produced water injection wells located in the selected areas are subject to the following requirements in addition to those set out in 19.15.9.701 NMAC through 19.15.9.710 NMAC:

(1) Permits shall be issued under 19.15.9.701 NMAC only after notice and hearing.

(2) The radius of the area of review shall be the greater of:

(a) one-half mile; or

(b) one and one-third times the radius of the zone of endangering influence, as calculated under Environmental Protection Agency regulation 40 CFR Part 146.6(a) or by any other method acceptable to the division; but in no case shall the radius of the area of review exceed one and one-third miles.

(3) Operators shall demonstrate the vertical extent of any fresh water aquifer(s) prior to using a new or existing well for injection.

(4) All fresh water aquifers shall be isolated throughout their vertical extent with at least two cemented casing strings. In addition,

(a) existing wells converted to injection shall have continuous, adequate cement from casing shoe to surface on the smallest diameter casing, and

(b) wells drilled for the purpose of injection shall have cement circulated continuously to surface on all casing strings, except the smallest diameter casing shall have cement to at least 100 feet above the casing shoe of the next larger diameter casing.

(5) Operators shall run cement bond logs acceptable to the division after each casing string is cemented, and file the logs with the appropriate district office of the division. For existing wells the casing and cementing program shall comply with 19.15.9.702 NMAC.

(6) Produced water transportation lines shall be constructed of corrosion-resistant materials acceptable to the division, and shall be pressure tested to one and one-half times the maximum operating pressure prior to operation, and annually thereafter.

(7) All tanks shall be placed on impermeable pads and surrounded by lined berms or other impermeable secondary containment device having a capacity at least equal to one and one-third times the capacity of the largest tank, or, if the tanks are interconnected, of all interconnected tanks.

(8) Operators shall record injection pressures and volumes daily in a manner acceptable to the division, and make the record available to the division upon request.

(9) Operators shall perform a mechanical integrity tests as described in Paragraph 2 of Subsection A of 19.15.9.704 NMAC annually, shall advise the appropriate district office of the division of the date and time each such test is to be commenced in order that the test may be witnessed, and shall file the pressure chart with the appropriate district office of the division.