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

APPLICATION OF THE NEW MEXICO OIL AND GAS ASSOCIATION FOR AMENDMENT OF CERTAIN PROVISIONS OF TITLE 19, CHAPTER 15 OF THE NEW MEXICO ADMINISTRATIVE CODE CONCERNING PITS, CLOSED-LOOP SYSTEMS, BELOW GRADE TANKS AND SUMPS, AND OTHER ALTERNATIVE METHODS RELATED TO THE FOREGOING MATTERS, STATEWIDE.

and

APPLICATION OF THE INDEPENDENT PETROLEUM ASSOCIATION OF NEW MEXICO FOR THE AMENDMENT OF CERTAIN PROVISIONS OF TITLE 19, CHAPTER 15 OF THE NEW MEXICO ADMINISTRATIVE CODE CONCERNING PITS, CLOSED-LOOP SYSTEMS, BELOW GRADE TANKS AND SUMPS, AND AMENDING OTHER SPECIAL RULES RELATED TO THE FOREGOING MATTERS, STATEWIDE.

CASE NO. 14784
and
CASE NO. 14785
(consolidated)
Order No. R-13506-D

ORDER OF THE COMMISSION AND STATEMENT OF REASONS FOR AMENDING NMAC TITLE 19, CHAPTER 15, PART 17

THIS MATTER comes before the Oil Conservation Commission ("Commission") on the Application ("NMOGA Application") of the New Mexico Oil And Gas Association ("NMOGA") for Amendment of Certain Provisions of Title 19, Chapter 15 of the New Mexico Administrative Code Concerning Pits, Closed-Loop Systems, Below Grade Tanks and Sumps, and Other Alternative Methods Related to the Foregoing Matters, Statewide, assigned Case No. 14784, and on the Application ("Application Filed By IPANM") of the Independent Petroleum Association of New Mexico ("IPANM") for the Amendment of Certain Provisions of Title 19, Chapter 15 of the New Mexico Administrative Code Concerning Pits, Closed-Loop Systems, Below Grade Tanks and Sumps, and Amending Other Special Rules Related to the Foregoing Matters, Statewide, assigned Case No. 14785. Together, the NMOGA Application and the Application Filed By IPANM may be referred to herein as the "Filed Applications." The Filed Applications seek to amend NMAC Title 19, Chapter 15, Part 17, as promulgated in June, 2008 and amended in July, 2009 (the 2008 regulation, as amended in 2009, may

sometimes be referred to herein as the "2009 Pit Rule"). The Commission, after hearing testimony, argument and public comment and deliberating, and having carefully considered the evidence, pleadings, comments and other materials submitted related to the Filed Applications now enters this Order.

The amendments to NMAC Title 19, Chapter 15, Part 17 (commonly known and referred to herein as the "Pit Rule") that are effected by this Order and attached hereto as Attachment A change, most notably and among other things, the portions of the Pit Rule that address permitting, siting requirements, design and construction, operations and closure. New definitions are added, some to clarify the 2009 Pit Rule and some to serve substantive changes made by the other amendments. Rules also are added to govern a type of pit that previously was unrecognized by the Pit Rule, the multi-well fluid management pit. The amendments also result in a reorganization of parts of the Pit Rule, in an effort to make it easier to follow. Some amendments were made in order to give more clarity and consistency to the Pit Rule, and to better enable compliance and enforcement, as suggested by either the Applicants or the New Mexico Oil Conservation Division ("OCD").

The Pit Rule is a regulatory system that addresses permitting, siting, closure methods, operation, design and construction, reclamation, revegetation, and constituent level standards. No one element of the system, in isolation from the others, can or is intended to accomplish the protective goal of the regulation as a whole. Were it not so, the other elements of the system would be rendered unnecessary. To the extent that the 2009 Pit Rule is otherwise premised, the Commission finds that the findings and conclusions in this Order, and the evidence taken and arguments made in the hearing of this matter justify the view that the Pit Rule is a system that is designed, as a whole, to provide reasonable protection of fresh water and protection of public health and the environment. As a result, some of the changes effected by this Order, and the reasons for them, are not easily segregated from one another. Nonetheless, in service of explaining these amendments, this Order is organized such that findings related to the more fundamental areas of consideration will be grouped together and under headings that describe, at least roughly, the issues to which the findings relate.

PROCEDURAL HISTORY

1. On September 30, 2011, NMOGA, an association made up of oil and gas producers, submitted the NMOGA Application.

2. On November 29, 2011, IPANM, an association made up of independent oil and gas producers, submitted the Application Filed By IPANM.

3. On December 16, 2011, the Commission caused notice to be given, as required by 19.15.3.9 NMAC, that a public hearing on the Filed Applications would be held at 9 a.m. on January 23, 2012 through January 27, 2012.

4. On January 6, 2012, OCD filed proposed modifications to the amendments to the Pit Rule that were proposed in the Filed Applications.

5. On January 13, 2012, the New Mexico Wilderness Alliance entered an appearance on behalf of the New Mexico Wilderness Alliance, the Wilderness Society, the Sierra Club, the New Mexico Wildlife Federation, the National Wildlife Federation, and the New Mexico Chapter of Backcountry Hunters and Anglers (collectively, the "NMWA").

6. On January 13, 2012 the Oil and Gas Accountability Project ("OGAP") entered an appearance.

7. On January 13, 2012 The New Mexico Citizens for Clean Air & Water ("NMCAW") entered an appearance by the filing of a Pre-Hearing Statement.

8. The amendments to NMAC Title 19, Chapter 15, Part 17, commonly referred to as the "pit rule," ("Pit Rule") that were sought by IPANM in Case No. 14785 and the amendments to the Pit Rule that were sought by NMOGA in Case No. 14784 were virtually identical. The Application Filed By IPANM, however, also sought to amend a section of NMAC Title 19, Chapter 15, Part 39 ("Rule 39")

9. On January 19, 2012, the Commission severed from the hearing on the amendments to the Pit Rule that were sought in Case Nos. 14784 and 14785 the portion of the Application Filed By IPANM that sought to modify Rule 39. In the same Order, the Commission determined that the hearing on the amendments to Rule 39 that were sought by IPANM would be scheduled after completion of the hearing and deliberation on the proposed Pit Rule amendments. The Application Filed By IPANM, excluding the portion that sought amendments to Rule 39, is referred to herein as the "IPANM Application." Together, the IPANM Application and the NMOGA Application may be referred to herein as the "Applications."

10. Also on January 19, 2012, pursuant to (i) a joint motion filed by NMOGA, IPANM and OGAP and (ii) a letter from NMWA, the Commission continued the hearing on the Applications to April 16 through 20, 2012.

11. On February 13, 2012 Nearburg Producing Company entered its appearance.

12. On February 14, 2012, before notice of the April 16 through 20, 2012 hearing had been given, the First Judicial District Court State of New Mexico ("First Judicial Court"), in Case No. D-101-CV-2012-00106, entered a Writ of Prohibition ordering the Commission to immediately cease all proceedings related to the amendment of the Pit Rule.

13. On March 30, 2012, the First Judicial Court entered an order quashing the Writ of Prohibition and dismissing Case No. D-101-CV-2012-00106.

14. On March 30, 2012, the Commission caused notice to be given that a public hearing on the Applications would be held at 9 a.m. on May 14 through May 18, 2012.

15. On April 16, 2012, NMOGA filed proposed amendments to the Pit Rule, which replaced the amendments that were proposed by the NMOGA Application. The replacement amendments addressed matters of grammar and formatting, included certain of the modifications suggested by OCD, and "t[ook] into account" certain of the comments on the NMOGA Application that had been received by the Commission.

16. On April 27, 2012, OCD filed amendments to the Pit Rule that were proposed in the Applications ("OCD Modifications").

17. On April 27, 2012, IPANM filed modifications to its Application.

18. On May 4, 2012, and again on May 30, 2012, the New Mexico State Land Office entered its appearance.

19. On May 4, 2012, Jalapeno Corporation entered an appearance by the filing of a Pre-Hearing Statement.

20. On May 10, 2012, NMOGA filed a second set of proposed modifications to the Pit Rule.

21. During the May 14 - 18, 2012 hearing IPANM orally requested that all evidence taken during the hearing of Case No.14784 be made a part of the record for Case No. 14785, as well. There was no objection to IPANM's request.

22. The Commission took evidence, heard argument and sat for public comment on May 14, 15, 16, 17 and 18. At the May 17, 2012 hearing OGAP took the position that the hearings were informal rulemakings. Tr. 986-987.[1] Not having completed the hearing, on May 16, 2012, the Commission caused notice to be given that the hearing on the Applications would resume at 9 a.m. on June 20, 2012 and would continue until the Commission reached a decision.

23. On June 20, 2012, the Commission consolidated Case Nos. 14784 and 14785, effective January 19, 2012. The consolidation did not include the portions of Case No. 14785 that sought amendment to Rule 39, which portions had been severed on January 19, 2012.

24. The Commission took evidence, heard argument and sat for public comment on the Applications on June 20, 21, 22 and 27, 2012 and on August 28 and 29, 2012.

[1] References in this Order to the transcript of the hearing will be designated by "Tr." followed by the page number(s) and a parenthetical with the witness name. References to exhibits tendered and accepted by the Commission will be designated by the initials of the tendering party, followed by "Ex." and the number or letter of the exhibit.

25. At the August 29, 2012 hearing, the participants agreed to supply the Commission with a stipulation as to the exhibits that each had submitted. At the same hearing, the Commission closed the record, required the participants in the hearing to submit written closing statements and proposed findings and conclusions on or before September 17, 2012, and continued the hearing until September 24, 2012, when the Commission would take up deliberations on the Applications.

26. On September 12, 2012, the parties filed with the Commission a Stipulated Exhibit List, which listed all exhibits that were tendered by the parties and accepted into evidence by the Commission during the hearing.

27. The Commission met for deliberation on the Application on September 24, 25, 26 and 27, 2012; and on October 1, 4 and 5, 2012.

28. During the October 2012 deliberations it was discovered that the Applications, which contained attachments of the proposed changes to the Pit Rule purportedly black-lined against the current Pit Rule ("2009 Version"), were inaccurate, to the extent that the version of the Pit Rule against which the proposed changes were black-lined was not the 2009 Version of the Pit Rule, but an earlier version ("2008 Version"). The Commission also voiced concern that constituent levels in tables that were part of the amendments proposed by the Applications were not expressed in uniform units of measurement. At the October 5, 2012, meeting, The Commission continued the deliberations to November 15, 2012 to take up the issue of how the Commission should proceed, given the error in the Applications.

29. At the November 15, 2012 hearing, the Commission determined that the use of the incorrect version for the black-lining in the Applications would not cause the need for rehearing any portion of the proposed changes because the differences between the 2008 and 2009 Versions were in portions of the Pit Rule that the Applications were proposing to repeal or replace. The Commission ordered NMOGA and IPANM to submit (i) revised attachments to the Applications that black-lined the proposed changes against the 2009 Version and (ii) revised tables, using uniform units of measurement. The Commission also reopened the record to take evidence on expressing the constituent levels in the tables in uniform units of measurement. The hearing was scheduled to resume on January 9, 2013.

30. On November 29, 2012, NMOGA filed corrections to its proposed amendments to the Pit Rule.

31. On November 29, 2012, IPANM filed corrections to its proposed amendments to the Pit Rule.

32. On December 20, 2012, on a previously made, unopposed oral motion made by IPANM, the Commission dismissed without prejudice the portions of the Application Filed By IPANM that sought amendment of Rule 39.

33. The Commission heard evidence, argument and sat for public comment on January 9, 2013, as well as the morning of January 10, 2013. The Commission ordered the participants to submit supplemental findings of fact and conclusions of law, limited to the evidence taken on January 9, 2013 and January 10, 2013, and closed the record, but for the receipt of the supplemental findings and conclusions.

34. The Commission continued deliberations on the Applications on the afternoon of January 10, 2013; on January 11, 17, and 18, 2013; and on February 13 and 15, 2013.

35. On March 8, 2013, the parties filed an Amended Stipulated Exhibit List, which contained the list of the exhibits in the Stipulated Exhibit List, and also the exhibits tendered by the parties and accepted into evidence by the Commission during the January 9 and 10, 2013 portions of the hearing.

36. On June 6, 2013, the Commission reopened the record for the sole purpose of accepting the Amended Stipulated Exhibit List, and then closed the record.

37. The Commission heard evidence, argument and sat for public comment regarding the Applications for a total of thirteen days, and deliberated on the Applications an additional thirteen days.

PIT WASTE CONSTITUENTS

38. Dr. Forest Benjamin Thomas was tendered and accepted, without objection, as an expert witness in the fields of petroleum waste characterization, toxicology and risk assessment. Tr. 446. NMOGA Ex. 10.

39. Dr. Thomas was asked by NMOGA to review the NMOGA Application and evaluate whether it provided an adequate margin of safety for the public health, the environment and natural resources. Tr. 447 (Thomas).

40. Dr. Thomas recommended to NMOGA that chemical analyses be performed on solids in pits to determine which chemicals are present in high enough concentrations to warrant regulatory attention. Tr. 449 (Thomas).

41. In a study designed by Dr. Thomas, samples were taken from three pits in northwest New Mexico (the San Juan Basin) and three pits in southeast New Mexico. Tr. 499 (Thomas); NMOGA Ex. 11-4; NMOGA Ex. 12. Wells in northwestern New Mexico are primarily natural gas wells, and drilled to depths of about 1,000 feet. Tr. 452-53 (Thomas); NMOGA Ex. 12. Wells in southeastern New Mexico are primarily oil wells, and often at depths of 7,500 feet. Tr. 453 (Thomas); NMOGA Ex. 12. The purpose of sampling in both northwest and southeast New Mexico was to obtain a broad overview of the chemicals likely to be found in pits. Tr. 453 (Thomas). The samples were taken at the surface and at depth. The individual samples were examined using standard Environmental Protection Agency ("EPA") methods for the presence of metals, volatile and semivolatile organic compounds, anions, cations, TPH, PCBs, radium isotopes, and

other analytes, and to determine whether those present exceeded regulatory criteria. This sampling program would commonly be relied upon by an expert in the area of waste assessment, toxicology or risk assessment. Tr. 450-51, 499-500 (Thomas); NMOGA Ex. 12.

42. Dr. Thomas also examined data from samples taken by OCD in 2007. Those samples were taken from the surface at each of the four corners of a pit. Those samples were combined, and the composite sample was analyzed. Tr. 450 (Thomas). The OCD study involved 21 drilling pits, 2 production pits and 2 closed-loop tanks. NMOGA Ex. 12 at 6. Not all of the pits in the OCD study had been dewatered, so those samples and Dr. Thomas' evaluation also included fluids. Tr. 458-59 (Thomas).

43. Data from the samples analyzed by Dr. Thomas were consistent with data from the OCD study. Tr. 458-59, 500-501 (Thomas); NMOGA Ex. 11-4 & 12.

44. Some samples indicated levels of total petroleum hydrocarbons ("TPH"), comprised partially of gasoline-range organics ("GRO") and diesel-range organics ("DRO"), in excess of the current Pit Rule's TPH limit in waste, which is 2,500 milligrams per kilogram ("mg/kg"). 19.15.17.13(F); Tr. 453-54 (Thomas); NMOGA Exs. 11-5 & 12. TPH also is made up of oil range organics and asphaltenes, whose molecules are large and not sufficiently mobile to pose a concern for human health or fresh water. Tr. 455-56 (Thomas).

45. The samples also showed a substantial amount of chloride anion from pits in southeastern New Mexico. Tr. 455 (Thomas); NMOGA Exs. 11-6 & 12.

46. Benzene, a human carcinogen, also was found at levels higher than human health standards set forth in 20.6.2.3103(A), in one sample. Tr. 457-58 (Thomas); NMOGA Exs. 11-9 & 12.

47. Some levels of arsenic and barium were found in the samples but an analysis using the toxicity characteristic leaching procedure showed that the form of arsenic and barium taken from the pits is not soluble and does not mobilize in the environment. Nor was the form of arsenic found absorbable into the body. Tr. 455-57, 501-02, 506 (Thomas); NMOGA Exs. 11-7, 11-8 & 12.

48. Dr. Thomas' opinion is that, of the chemicals that are found in pit contents, three occurred with magnitude sufficient to be of concern to public health, the environment and natural resources: TPH (GRO and DRO), chloride anion and benzene. Tr. 460 (Thomas); NMOGA Exs. 11-11, 11-12 & 12. Dr. Thomas hypothesizes that the high level of benzene in the one sample may have been an artifact of the analytical procedure and problems with the sample. Because of benzene's carcinogenic nature, however, he included it in the constituents of concern. Tr. 457-58, 463 (Thomas); NMOGA Ex. 12 at 4-5.

49. Based on the data of the samples analyzed by Dr. Thomas and the data of the tests performed by OCD, pits should be monitored on a routine basis for TPH (GRO and DRO), chloride anion and benzene, and it is not necessary to monitor for the other constituents of pit waste. Tr. 463-64; 473 (Thomas); NMOGA Ex. 12.

50. James Arthur was tendered and accepted, without objection, as an expert witness in the fields of petroleum and environmental engineering, hydrogeology and contaminant transport. Tr. 514-15 (Arthur). His opinions are based upon his experience, which includes scientific testing, analysis, research and studies with federal and state agencies, and extensive pit modeling, as well as experience in the field. Tr. 511-15, 671-73, 757-58 (Arthur); NMOGA Ex. 13.

51. The standards set forth in 20.6.2.3103(A) are drinking water standards and are not appropriately applied to pit waste. Tr. 477 (Thomas), 597 (Arthur).

52. Using the four constituents set forth in Tables I and II of 19.15.17.13 NMAC is protective of public health, fresh water and the environment. Tr. 598 (Arthur).

VADOSE ZONE MODELING

53. Mr. Thomas E. Mullins was tendered as an expert in the area of the movement of fluids and gases through rock formations as a petroleum engineer, Tr. 1325, and accepted as such, over objection. Tr. 1329, IPANM Ex. 5.

54. Dr. Donald Neeper was tendered and accepted, without objection, as an expert in the field of soil physics, and qualified to evaluate the measurement and characterization of contaminates in soils. Tr. 1127, 4017; NMCAW Ex. 4.

55. Mr. Mullins modeled the movement of chloride in the vadose zone, the zone between the surface and an underlying aquifer, in order to determine the length of time that it would take chloride to move from the bottom of a pit to a receptor point that is 100 feet, vertically, and 100 feet, horizontally, from the bottom of a pit ("100'V/100'H"). IPANM Ex. 6 at. 8. He also did a similar model where the receptor point was 25 feet, vertically, and 100 feet, horizontally, from the bottom of the pit ("25'V/100'H"). IPANM Ex. 16 at 3. The models also predicted the concentrations of the chloride at the receptor points.

56. For the 100'V/100'H model, Mr. Mullins used data from the southeastern parts of New Mexico because it is an area of concentration for oil and gas development, and the drilling mud used there is a higher chloride content than in the northwestern part of New Mexico. Tr. 1366-67, 1402-04. For the 25'V/100'H model, Mr. Mullins included data from the northwestern part of New Mexico, as well. He does not believe that the changes proposed in the Applications are such that it is necessary to model other areas. Tr. 1517-18 (Mullins).

57. Chloride anion is not, itself, toxic, but it is extremely water soluble, and acts as a marker for the outer boundary of potential impact of other chemicals. Tr. 462, 483-85 (Thomas), 1132-33 (Neeper), 3919 (Robinson). Other chemicals, like benzene and BTEX, are less mobile and migrate slower than chloride. Tr. 1460 (Mullins).

58. Mr. Mullins sited the receptor 100 feet horizontally from the pit because that is the closest siting point in the Pit Rule proposed in the Applications. Tr. 1335, 1348 (Mullins).

59. In his modeling, Mr. Mullins used the Hydrologic Evaluation of Landfill Performance ("HELP") code and the Multimed code. Tr. 1351-52 (Mullins).

60. The HELP and Multimed codes were developed to allow regulators and landfill designers to model contaminate concentration levels at which a particular landfill design would provide groundwater protection. Tr. 1520 (Mullins).

61. The HELP code allows the modeler to input data regarding surface conditions, runoff, evapotranspiration, evaporation, growth of vegetation, as well as daily values for rainfall, wind speed, temperature, humidity, solar radiation indexes, and a variety of soil data. The HELP code produces an infiltration rate, which is unsaturated vertical drainage. Tr. 1351-52, 1359-61 (Mullins); IPANM Ex. 6 at 3 & 5; IPANM Ex. 10.

62. The Multimed code models the horizontal and vertical movement and concentrations of contaminates through the vadose zone. Tr. 1352-53 (Mullins); IPANM Ex. 6 at 3, 5 & 6; IPANM Ex. 9. The infiltration rates derived from the HELP model are some of the data that are input into the Multimed code. Tr. 1352 (Mullins). Mr. Mullins compared the results of the HELP models that he ran to published literature on infiltration rates, and believes the HELP results to be reasonable. Tr. 1516 (Mullins).

63. Mr. Mullins' models are not simulations and are not intended to give exact figures, but to give a good representation of what would occur under his input scenarios. Tr. 1449, 1513 (Mullins).

64. In determining input for his models, Mr. Mullins used neither a best case nor a worst case scenario, but attempted to use data that were representative of the areas that he was modeling. Tr. 1602-1603 (Mullins).

65. To obtain precipitation and other climatic values for his models, Mr. Mullins used 50 years of data from Hobbs, Maljamar, Carlsbad and Artesia, New Mexico, and a 50-year synthetic model for the temperature and solar profile of Roswell, New Mexico. Tr. 1367-68 (Mullins); IPANM Ex. 12.

66. For a conceptual model, it is reasonable to posit the bottom of the pit to be 16 ½ feet from the surface, which is the depth assumed by the models. Tr. 1624 (Mullins).

67. The models assumed that the pit contents were solid drill cuttings, receiving fluids intermittently, as opposed to storing fluids long-term. Tr. 2276-77 (Mullins).

68. The models assumed a pit with a liner underneath, no geomembrane cover, and 4 feet of soil cover. Tr. 1371 (Mullins); IPANM Ex. 6 at 8. The pit liner was assumed to be .02 inches thick, and of good quality, which is to say a deficiency of one pin hole per acre and an installation deficiency of four holes per acre. Tr. 1450-51 (Mullins).

69. The models assumed that that the pit contents were stabilized at a 3 to 1 ratio. Tr. 2038 (Mullins).

70. Leachate from the pit contents in the 100'V/100'H was assumed to have a chloride concentration of 100,000 milligrams per liter ("mg/l"). Tr. 1366 ("Mullins").

71. The evaporative zone is the depth at which evapotranspiration and evaporation move water up and out of the soil system. Tr. 1446, 1519 (Mullins).

72. Mr. Mullins used a 48 inch evaporative zone in his models because roots of shrubs can extend up to 6 feet, and new cover material over a pit is required to be 48 inches and is more recently disturbed and porous, thereby encouraging evaporation. Tr. 1445-46 (Mullins).

73. The porosity, soil texture, wilting point, hydraulic conductivity and other soil variables that were used in the models were the same as those used in modeling that had been done by OCD in 2007. Tr. 1447 (Mullins).

74. The results of Mr. Mullins' models were that it would take between 3,100 years and 9,200 years for the first measurable amount of chloride (1 mg/l) to reach a 100'V/100'H receptor. Tr. 1373-74 (Mullins); IPANM Ex. 6 at 9; IPANM Exs. 7 & 8.

75. The results of Mr. Mullins' models were that it would take from 4,500 years to 12,800 years for the maximum levels of chloride to reach a 100'V/100'H receptor. Tr. 1374 (Mullins); IPANM Ex. 6 at 9. The model indicated that the maximum chloride level at a 100'V/100'H receptor would range from 8 mg/l to 68 mg/l. Tr. 1374-75 (Mullins); IPANM Ex. 6 at 9; IPANM Exs. 7 & 8.

76. In the 25'V/100'H models, Mr. Mullins assumed that the leachate from the pit had a chloride concentration of 1,000 mg/l. Tr. 1406 (Mullins); IPANM Ex. 16 at 2. Mr. Mullins used the climatic conditions of Aztec, New Mexico and Carlsbad, New Mexico. The results of Mr. Mullins' model were that, under the climatic conditions of Aztec, New Mexico, a measurable amount of chloride would not reach a 25'V/100'H receptor. Using climatic conditions of Carlsbad, New Mexico, the results of Mr. Mullins' model were that it would take 950 years for the first measurable amount of chloride (1 mg/l) to reach a 25'V/100'H receptor. Tr. 1406 (Mullins); IPANM Ex.16 at 4.

77. Using the climatic conditions at Carlsbad, Mr. Mullins' model predicted that it would take 1350 years for the maximum levels of chloride to reach a 25'V/100'H receptor. Tr. 1406 (Mullins); IPANM Ex. 16 at 4. The maximum chloride level was 2.3 mg/l. Tr. 1406 (Mullins); IPANM Ex. 16 at 4.

78. Mr. Mullins did sensitivity testing on his models with respect to the evaporative zone depth, precipitation, liner quality, soil conductivity, wind speed, humidity, solar radiation, and soil texture and hydraulic conductivity. Tr. 1584 - 1601 (Mullins).

79. Of the variables that Mr. Mullins tested, the evaporative zone depth and soil conductivity were the most sensitive. Tr. 1585, 1587 (Mullins).

80. The values used for soil conductivity in the models were appropriate, given the types of soil in New Mexico. Tr. 1587 (Mullins).

81. Mr. Mullins ran sensitivity tests for evaporative zone depths of 20, 30 and 60 inches. He found that increasing the evaporative zone depth had an exponential effect on decreasing the infiltration rate. Tr. 1601 (Mullins).

82. The principal difference between earlier models done by OCD and Mr. Mullins' models is the depth of the evaporative zone, 20 inches in the OCD models and 48 inches in Mr. Mullins' model. Tr. 1415-17 (Mullins).

83. Permeability of or the presence of a pit liner was not a sensitive variable in Mr. Mullins' models, and the presence of a pit liner produced a marginally slower transport of contaminate. Tr. 2025-27 (Mullins). This is so because in Mr. Mullins' model, the liner was not in the evaporative zone, the upper four feet of the model. Tr. 2294-96 (Mullins).

84. In modeling done by OCD in 2009, a 10 foot mixing zone was used. Mr. Mullins used a 10 foot mixing zone in his modeling. Tr. 1438-39 (Mullins).

85. Reducing the mixing zone interval increases the chloride concentration at the receptor. Tr. 1614 (Mullins).

86. Mr. Mullins' model did not take into account the impact of multiple pits, each 100 feet from the receptor, or of the effect of the receptor as a pumping water well, Tr. 1523 (Mullins), but that would occur only in very tight spacing, Tr.1619-20 (Mullins).

87. Mr. Mullins' model did not include an infiltration rate from a surface with no vegetation, Tr. 1545-46 (Mullins); however, the models that he ran were based upon poor vegetation with respect to leaf area index, Tr. 2036-37 (Mullins).

88. Together, Mr. Mullins' (i) 100'V/100'H receptor models and (ii) 25'V/100'H models may be referred to herein as the "Horizontal/Vertical Models."

89. At the request of the Commission, Mr. Mullins ran a model ("Vertical Model") to indicate the length of time that it would take for chloride to travel to a receptor that is 25 feet vertically and 3 feet horizontally from the bottom of a pit and, again, where the leachate from the pit contains 1,000 mg/l chloride. Mr. Mullins used the climatic conditions of Aztec, New Mexico and Carlsbad, New Mexico. Except for the horizontal placement of the receptor, data that were input for the Vertical Model were the same as the data used in the Horizontal/Vertical Models. The results of Mr. Mullins' Vertical Model were that, under the climatic conditions of Aztec, New Mexico, the first measurable amount of contaminates would reach a 25'V/3'H receptor in 111,367 years. For climatic conditions of Carlsbad, New Mexico, the results of Mr. Mullins' Vertical Model were that the first measurable amount of contaminates would reach a 25'V/3'H receptor in 775 years. Tr. 2016-19, 2022 (Mullins); IPANM Exs. 16 & 18.

90. The results of Mr. Mullins' Vertical Model were that, under the climatic conditions of Carlsbad, the maximum level of chloride would reach a 25'V/3'H receptor in 1120 years. Tr. 2020 (Mullins); IPANM Ex. 18. The maximum chloride level was 13.3 mg/l. Tr. 2020 (Mullins); IPANM Ex. 18. Under the climatic conditions of Aztec, after 111,367 years the chloride level at a 25'V/3'H receptor would be .0006 mg/l. Tr. 2020-21 (Mullins); IPANM Ex. 18.

91. A simulation done by Dr. Neeper demonstrates that in looser soils, chloride preferentially travels downward; in moderate soils, chloride travels less; and in tighter soils, the chloride tends to travel upward, where it concentrates above the pit. The simulation showed chloride reaching groundwater 52 feet below the pit in 40 years and 101 feet below the pit in 100 years, in loose soil. In moderate soil, chloride reached 16 feet below the pit in 40 years, and 20 feet below the pit in 100 years. In tight soil, the chloride reached a depth of 13 feet below the pit in 40 years, and 20 feet below the pit in 100 years. Tr. 1178-79 (Neeper); NMCAW Ex. 5 at 42-48. The point of the simulation, however, was not to show an actual profile of chloride movement, but to show how far and how fast salt could possibly travel. Tr. 1234, 1276-77 (Neeper), 3386-87. Dr. Neeper's simulation was one dimensional, Tr. 1191-92 (Neeper), and he did not compare the infiltration rates that he used with literature regarding New Mexico infiltration rates. Tr. 1191-92, 1242-43 (Neeper).

92. Dr. Neeper also performed calculations to demonstrate possible flow through a liner. He calculated Darcy flow, however, and Commissioner Balch doubts that a Darcy flow calculation is appropriate for low permeability liners now used in the oil and gas industry. Tr. 1281-83 (Neeper).

93. Various site conditions can make a significant difference in the speed of chloride transport. Tr. 2047-51 (Neeper). If, for instance, the infiltration rate is 25.4 millimeters, it would take approximately 46 years for chloride to travel 25 feet. Tr. 2048, 2058 (Neeper). Additionally, there may be a correlation in the HELP code between the average head on the liner of a pit and the infiltration rate. Tr. 2053-54, 2062-63 (Neeper); NMCAW Ex. R-2 at 4.

94. Places in New Mexico that might have the higher, 25.4 millimeter infiltration rate are less arid regions, like Rio Arriba County. Most New Mexico oil and gas activity takes place in the more arid regions. Tr. 2069 (Neeper).

95. To the extent that neither Mr. Mullins' model nor Dr. Neeper's simulation were three dimensional, they both were conservative. Nor did Mr. Mullins' model take account of the diminution of chlorides as they disperse in a three dimensional plume. Tr. 1362-63 (Mullins), 3484-85.

96. The salt bulge, discussed later in this Order, was not manifest in Mr. Mullins' models because the Multimed code models the speed of water flow, and will not model the existence or depth of a salt bulge. Tr. 2071 (Neeper). This is so because the model did not account for chemistry of the soil or salts, which is one cause of the bulge. Tr.1434 (Mullins), 2338, 2379 (Buchanan)

97. Kathy Martin was accepted, over objection, as an OGAP witness, with the Commission giving her testimony the value that it deserves. Tr. 2110, 2146.

98. Ms. Martin testified that Mr. Mullins' model is predicated on an artificially low infiltration rate. Tr. 2173, 2190-91, 2264-65 (K. Martin). Mr. Mullins responded that he used an initial soil moisture in his model, that he appropriately accounted for precipitation, and that the map contained in the HELP code engineering manual shows that depth that he used for the evaporative zone was appropriate. Tr. 2280 (Mullins). Additionally, Mr. Mullins testified that the infiltration rates that he used were consistent with a study performed by Dr. Daniel B. Stephens, who participated in hearings on prior iterations of the Pit Rule. Tr. 2280 (Mullins).

99. Ms. Martin also reviewed a number of pits that had purportedly contaminated ground water, but none of the wells that she looked at in detail had been constructed after the promulgation of the Pit Rule in 2008 and the "spill rule" promulgated later in 2008. Tr. 2207-49, 2257-58, 2268, 2278 (K. Martin), 2634-2652; OGAP Ex. 5. One difference between the Pit Rule, either the 2009 Pit Rule or as adopted by this Order, and prior practice is that the Pit Rule requires liners to be at least 20- mil string reinforced linear low-density polyethlene ("LLDPE") for temporary pits, and 30-mil flexible polyvinyl chloride ("PVC") or 60-mil high-density polyethylene ("HDPE") for permanent or, in the Pit Rule adopted by this order, multi-fluid management pits. Prior to 2008, plastic liners of no particular thickness were allowed. Tr. 2266-68 (K. Martin). The Pit Rule also limits the amount of time that a temporary pit may hold fluids. Tr. 2646-47, 3390.

100. Mr. Mullins testified that the pits that Ms. Martin focused on were old pits, from the 1950's or 1960's and that several of them had been used for produced water and that it could not be definitively stated that temporary, lined pits were the cause of the contamination. Tr. 2277-78 (Mullins).

SOIL TRANSPORT

101. Dr. Bruce Buchanan was tendered and accepted, without objection, as an expert in the fields of soil sciences, including soil assessment and salt migration, reclamation and revegetation. Tr. 783; NMOGA Ex. 16.

102. Movement of salts in soil is a concern for two reasons. One is the movement of salt downward, as a tracer for contaminates reaching groundwater. Another is the upward migration of salt, because of salt's effect on plants. Tr. 4475.

103. A saturated flow condition exists when the pore space between soil particles is filled with water. Tr. 785 (Buchanan); NMOGA Exs. 17-5 & 18.

104. Water moves primarily downward in saturated flow conditions because of gravity. Tr. 785 (Buchanan); NMOGA Ex. 17-6 & 17-7. As water leaves the pore spaces, the soil is said to become unsaturated. Water moves very slowly in unsaturated conditions, and more quickly in saturated conditions. Tr. 785-86 (Buchanan); NMOGA Ex.18.

105. As saturated flow moves down from the surface, there are unsaturated conditions both above and below it. As the saturated flow continues to move down, it leaves unsaturated conditions in its wake and the saturated flow dissipates. Tr. 787-89 (Buchanan); NMOGA Exs. 17-6, 17-7 & 18.

106. Saturated flow exists for very brief periods in arid and semi-arid areas, perhaps for a few hours up to a day. Tr. 790-91 (Buchanan).

107. In saturated flow conditions, salt moves principally by diffusion. In unsaturated flow, salt moves principally by convection. Tr. 893-94 (Buchanan).

108. As soil begins to get very dry, the pore spaces become filled with vapor, as opposed to liquid, and salts do not move in vapor. Tr. 1163 (Neeper), 2330 (Buchanan).

109. According to Dr. Buchanan, through the processes of convection and diffusion, salts will reach equilibrium, form a salt bulge in the vadose zone, and will not move appreciably further, either up or down. Salts that are more soluble will reach equilibrium deeper than salts that are less soluble. In a study of an unlined pit, conducted by Dr. Buchanan, the bulge occurred in the range of 7 feet from the pit contents. Tr. 814, 858, 2339-44 (Buchanan); NMOGA Exs. 17-19, 17-20 & 18.

110. Dr. Neeper describes the salt bulge as the result of a dynamic steady state that is created by pulses of moisture moving salts down and evapotranspiration taking the moisture out and leaving the salt behind. Tr. 2072 (Neeper).

111.The higher the infiltration rate, the lower the bulge will occur. Tr. 2072 (Neeper).

112. Below the salt bulge, chloride concentrations begin to decrease and approach native concentrations. Tr. 927-28 (Buchanan), 1270-71, 1286-87 (Neeper); NMOGA Ex. 17-19, NMCAW Ex. 5 at 39-40.

113. The concentration of chlorides will not affect the depth of the salt bulge. Tr. 1298 (Neeper).

114. Assuming that siting of the pit is done properly, and not in a riparian area, the salt bulge typically will occur at depths of 10 to 12 feet, depending on the texture of the soil and the climate, and poses no threat to groundwater at 50 feet. Tr. 2344-45, 2347, 2353-54, 2390-91 (Buchanan).

115. In samplings taken and analyzed by Dr. Neeper, one for an unlined pit spudded in 1979 and one in a lined pit, both top and bottom, spudded in 2001, Dr. Neeper found that the chloride in the pit contents were not retained by either the contents or the bottom liner, and the chloride progressed to 30-35 feet. Tr. 1164-66 (Neeper); NMCAW Ex. 5 at 32-41. The liner, however, was installed prior to the liner requirements found in either the 2009 Pit Rule or the Pit Rule as effected by this Order, and Dr. Neeper offered no testimony with respect to how long fluids had been in the pit before it was closed or the type or condition of the liner when it was installed.

116. Salt will diffuse toward the surface from water with higher concentration of salt to water with lower concentration of salt, but as the soils get drier toward the surface the diffusion will slow and, according to Dr. Buchanan, stop. Tr. 803-13 (Buchanan); NMOGA Exs.17-11 through 17-15 & 18.

117. Water, along with soluble salts, will capillary up from unsaturated flow soil conditions into drier soil conditions. Tr. 798 (Buchanan). This is a function of the moisture potential of the soil, or suction. As soil dries at the surface, the suction becomes higher and water begins to travel upwards. Tr. 1138-39 (Neeper). A rain event, though, will saturate the soil and the water and salts will move down through the saturated flow conditions. According to Dr. Buchanan; the net result is that soluble salts will move up through soil, but very little, and they will not migrate to the surface, unless the water table is very shallow. Tr. 798-99, 818, 935-37, 2368-69 (Buchanan); NMOGA Ex. 18.

118. Dr. Neeper testified, however, that how much the salts move down depends on the nature of the rain event. In a pulse of rainfall, not all of the salt in the soil's porosity will be flushed out, and that which remains will diffuse upward, and will not stop unless the soil conditions are very dry. Tr. 1152-53 (Neeper).

119. Studies throughout the western United States, including New Mexico, show that in very few instances will salts migrate toward the surface much more than 12 inches and, generally, will migrate between 4 and 10 inches where soil cover is at least 3 feet. Tr. 916, 2340-41, 2368 (Buchanan).

120. A study conducted by McFarland in the mid-1980s at the "Mertz Site," as well as studies done by Dr. Buchanan, Dalhoff, Sandoval and Craberhoff show that with deep cover soil, salts can migrate up about a foot, and then stop. Tr. 2309-2312 (Buchanan). The Mertz Site, for instance, involved 36 inches of cover, and the amount of salt that migrated did not render the soil unsuitable for vegetation. Tr.2312 (Buchanan).

121. Dr. Neeper testified that he did not see a great deal of difference between his analysis and Dr. Buchanan's analysis. While Dr. Neeper is not sure about Dr. Buchanan's prediction that salts will move only so far and no further, both agree that salts do move through the soil, that surface remediation is important and that low enough rainfall will slow movement through the soil at depth. Tr. 1193 (Neeper).

CONSTRUCTION AND DESIGN

122. Allowing the use of approved, standardized plans for temporary pits, multi-well fluid management pits and below grade tanks allows stringent review of the plan, while promoting consistency, compliance and ease of enforcement. It also lessens the burden on both OCD and the operator in subsequent applications. Standardized plans also are easier for OCD field inspectors to work with and allows for more effective enforcement. Tr. 217-18 (Hasely), 1831 (Powell).

123. A standardized plan would not necessarily be used district wide, and would be used absent site peculiarities. Tr. 388-89 (Fanning).

124. Thickness of a pit liner, while one feature of a pit for environmental protection, is not the only feature. Good design and operation of the pit are important, and merely having a thicker liner does not necessarily mean that one pit is more protective than another. Tr. 643-44 (Arthur).

125. The lifespan of liner materials is reduced by stress. Tr. 1196 (Neeper).

126. Constructing a pit such that it is placed on a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities will help to prevent the liner's rupture or tear. Tr. 2260 (K. Martin).

127. The angle of repose is the angle at which the addition of material will cause the material to slide. A pit wall constructed at the angle of repose is not stable. Tr. 1196-97, 1257 (Neeper).

128. Constructing pits with walls at the angle of repose will increase the likelihood of stress on a liner, and increase the possibility of a tear. Tr. 1196-98 (Neeper).

129. Slope ratios of 2:1 (horizontal:vertical) or 3:1 help keep the sides of a pit from collapsing. Tr. 310 (Lane), 2164 (K. Martin).

130. The slope ratio of 2:1 is a ratio that has been used for a long time, and Dr. Neeper has never seen sloughing or sliding at that ratio. Tr. 1258 (Neeper).

131. A liner for a burial trench does not need to be resistant to ultraviolet light because it is buried, and not exposed to sun light. Tr. 576 (Arthur).

132. With respect to a multi-well fluid management pit, a leak in a primary liner will be detected with an appropriate detection system. Tr. 2261 (K. Martin).

133. A leak detection system between two liners is a reliable way to detect a pit leak that may be an environmental threat. Tr. 755 (Arthur).

134. It is important that the design of a leak detection system be such that it facilitates the transport of leaked material to an observation port or otherwise promotes the earliest possible detection of a leak. Tr. 2158-59, 2250 (K. Martin).

135. If netting on a pit is infeasible, it is something that the operator must demonstrate in submitting the application and design of the pit. Tr. 304-05 (Lane).

136. The requirement that a steel tank be used in connection with hydrocarbon based drilling fluids de facto means that hydrocarbon based drilling fluids must be used with a closed loop system, as opposed to using a temporary pit. Use of hydrocarbon based drilling fluids is relatively limited, primarily for drilling certain formations in the southeast part of the State. The requirements of soil testing and spill clean-up and the relatively short life span of a temporary pit, along with in-place burial restrictions, mitigate environmental risks associated with hydrocarbon based drilling fluids. Additionally, operators are required to remove any visible layer of oil from a pit after operations have ceased. Given the nature of hydrocarbon based drilling fluids, this requirement is tantamount to requiring the operator to immediately drain the pit, thus removing the risk of the pit containing the fluid for a prolonged period of time. Tr. 354-355 (Fanning), 4324-35; NMOGA Slide 9-8. The Commission finds that deleting the requirement that a steel tank be used in connection with hydrocarbon based drilling fluids provides reasonable protection of fresh water, public health and the environment.

137. Mr. Ed Hasely was tendered and accepted, without objection, as an expert in the field of petroleum engineering and the siting, installation and management of below grade tanks in the oil and gas industry. Tr. 152; NMOGA Ex. 4.

138. Because a below grade tank is required to be covered with mesh or net, and the perimeter of the site is fenced, the tank does not present the same hazards as a pit and the public health and environment are protected without surrounding the tank by a chain link fence, with barbed wire across the top. Tr. 170 (Hasely); NMOGA Ex. 5-1.

139. OCD recommends the use of an automatic high level shutoff control device and manual control, as opposed to an alarm system, on a below grade tank in order to provide

assurance that an overflow would be stopped. An alarm may not be heard or seen and does not provide such assurance. Tr.1885 (E. Martin).

140. Requiring an operator to use appropriate engineering principles and practices, as well as to follow applicable liner manufacturer's requirements, is redundant and vague; it is sufficient to require that it follow the manufacturer's requirements. Tr. 2606-07.

OPERATION AND ADMINISTRATION

141. Mr. Brandon Powell was tendered and accepted, without objection, as an expert in the enforcement of OCD rules. Tr. 1824-25.

142. Mr. Ed Martin was tendered and accepted, without objection, as an expert in the enforcement of OCD rules. Tr. 1881.

143. Mr. Jerry Fanning, an employee of Yates Petroleum Company and a member of the industry committee that developed the amendments that are proposed by the Applications, testified on behalf of NMOGA. Tr.333-34; NMOGA Ex. 8.

144. Typical time for an OCD district to take action on an application to drill under the Pit Rule is between 2 and 12 days. Tr. 1948-49 (E. Martin).

145. Sixty days for OCD to determine the completeness of an application for a facility that is subject to the Pit Rule, and then to deny, approve or approve with conditions is a sufficient amount of time, particularly in light of the fact that some applications may be more complex than others. Tr. 1895-99, 1908-09 (E. Martin).

146. While it is reasonable for applicants to want a decision on an application within 60 days, deeming an application granted if not acted upon within that time frame would allow an operator to act under a permit that has not been evaluated. Deeming an application denied if not acted upon would avoid that result and at least provide a definite time at which the applicant may apply for hearing and move the process forward. Tr. 3067-70.

147. Requiring the applicant to demonstrate to the OCD district office the actual and potential effects on soil, surface water and groundwater in connection with an application for a temporary or multi-fluid management pit or a below grade tank is an unrealistic and unnecessary requirement. District offices are not staffed with hydrologists to evaluate such a demonstration, and such an evaluation would take an inordinate amount of time. The purpose of regulatory requirements like soil and waste testing and standards, and siting requirements, is to establish a framework within which an operator may work, which provides reasonable protection of fresh water, public health and the environment. If the operator is required to demonstrate and OCD evaluate the actual and potential effects of each project, the standards and requirements that are contained in the Pit Rule would not be necessary. Tr. 2575-91

148. Data generated by models, cathodic well lithology and published information are typically used by professionals in hydrogeology in order to determine the approximate depth to groundwater, provide a reasonable approximation of the location of groundwater, and are used in other states for such purpose. Tr. 541-42 (Arthur). The ability of OCD and the operator to determine the approximate depth to groundwater will be enhanced by expanding the sources of data that may be used to make such a determination. Tr. 2588-97, 4223-30, 4242-44.

149. Requiring an applicant to submit with an application an alternative closure plan, in case the initial closure plan is not approved, creates unnecessary work and paperwork, and should be eliminated. Tr. 346 (Fanning).

150. Notification of closed-loop systems and registration of below grade tanks, as opposed to permitting same, provide information that is sufficient for OCD to monitor closed-loop systems and below grade tanks. Tr. 1904-05 (E. Martin). Requiring an application for a closed-loop system, as required under the 2009 Pit Rule, creates needless paperwork. Tr. 2559.

151. The significance of using a closed-loop system is that the cuttings will not be buried on site, not the particulars of the system, itself. As a result, it is sufficient for the relevant OCD office to be notified on a Form C-101, C-103 or the applicable Bureau of Land Management ("BLM") form that a closed-loop system will be used. Tr. 1397-98 (Mullins), 1650 (Scott), 1950 (E. Martin).

152. A manufacturer of a closed loop system provides a manual for the proper manner in which to operate the system. Tr. 386 (Fanning).

153. The difference between a below grade tank, which typically is made of metal or fiberglass, and an earthen pit recommends treating a below grade tank differently from a pit with respect to permitting. Tr. 62-63 (Gantner), 168, 204 (Hasely).

154. If a below grade tank that was installed prior to promulgation of the Pit Rule in 2008 is properly constructed and maintained, capable of inspection, and demonstrates integrity, the additional costs that result from the 2009 Pit Rule's requirements with respect to such tanks are unnecessary. Tr. 2754-80. Similarly, registration of a below grade tank, where the registration demonstrates compliance with siting, construction and design requirements, is sufficient and a permitting process for below grade tanks is not necessary. Allowing an OCD approved, standardized plan for below grade tanks will also help streamline the process for documenting installation of a below grade tank. Tr. 165-68 (Hasely).

155. Waiting for permit approval of a below grade tank unnecessarily delays the operator's ability to install and use the tank. Tr. 164 (Hasely).

156. Registration of a below grade tank allows the OCD to identify the owner of the tank in order to address pre- and post-closure issues, if necessary. Tr. 1832 (Powell).

157. The amendments to the Pit Rule that are proposed by OCD will require less time in the office for OCD field office staff, and allow staff more time in the field for inspections. Tr.1878-79 (Powell).

158. It is important to be able to address below grade tank problems quickly. Tr. 1886 (E. Martin).

159. Requiring the operator to inspect a below grade tank monthly enables early detection of a release. Tr. 1835-36 (Powell).

160. Integrity of a below grade tank may be demonstrated by inspection, as well as by pressure testing. Tr. 190 (Hasely).

161. Requiring daily inspections of a temporary pit until the rig is no longer on location and weekly inspections thereafter, until closure, is reasonable, particularly because the pit may be used for more than one well, and the operator has 60 days to drain the fluid from the pit once it is no longer being used. Tr. 2880-82.

162 Maintenance of an inspection log is important during the operational phase of a pit, there is no purpose served by requiring the operator to submit the log after pit closure, and removing such a requirement eliminates unnecessary paperwork for both the operator and OCD. Tr. 2883-86.

163. While addition of an inspection schedule for permanent pits was not requested in the Applications, the Pit Rule should contain such a schedule order to create consistency in the operation of the various types of pits. The importance of an inspection schedule for permanent pits may be fairly inferred from the inspection requirements for other types of pits. The Commission finds that the omission of an inspection schedule for permanent pits in the 2009 Pit Rule was inadvertent, and that, given the similarities of design and construction between a permanent pit and a multi-fluid management pit, it is appropriate for the inspection schedule for the former be similar to the latter. Tr. 3341-44.

164. The purpose of a boom not only is to absorb oil. It also may be used to block the flow of released oil from going further. Tr. 428-29 (Fanning).

165. While there was testimony that a boom is not necessary, Tr. 715 (Arthur), there also was testimony that not maintaining a boom or similar device on site cause an operator to lose a lot of response time, thereby perpetuating additional damage from a release. Tr. 415 (Fanning).

166. Mr. Fanning did not know the cost of maintaining a boom on site or transporting a boom from one site to another. Tr. 415 (Fanning).

167. Using a percentage standard for determining when a sheen on a pit is "visible" is difficult to understand and enforce, and promotes inconsistency in enforcing the rule. Tr. 1830 (Powell).

168. Requiring an operator to, within 48 hours, (i) repair a pit liner that has been compromised above the surface of the fluid or (ii) seek a variance from the OCD district office, encourages a quick response time, lessens the possibility of the liner impairment becoming worsened by wind or pit pressure, and helps protect the environment. Tr. 1834-35 (Powell).

169. Weather or equipment availability may make it difficult for an operator to remove the fluid from a temporary pit within 30 days of cessation of operations, but most operators involved in the drafting of amendments proposed by the Applications believed that the removal could be accomplished in 60 days. Tr. 358-59 (Fanning).

170. The Commission encourages reuse and recycling and temporary pits may be used more efficiently. If completions are spaced sufficiently close, there is no need to have multiple temporary pits. Allowing more than one well per temporary pit reduces surface disturbance. Tr. 4211. Allowing more than one well to use a temporary pit is preferable, so long as the life span may be controlled. Tr. 2511-12. By requiring that a temporary pit be closed within 6 months of the date that the operator releases the drilling or workover rig from the first well using the pit, the life span is so controlled. Tr. 4287-93. Requiring that a temporary pit be located at one of the associated permitted well drilling locations will, as an operational matter, control the number of wells that may use the pit. Tr. 4438-39.

171. The point of the rules addressing an "emergency pit" is not to have a standby pit, in the event of an emergency, but to allow the construction of a pit during an emergency. Tr. 1887-88 (E. Martin).

172. Allowing deviations from rule requirements in certain circumstances is useful because it allows flexibility in addressing peculiarities in specific fact situations and encourages the development of best practices and new technology. TR. 533 (Arthur), 1428 (Mullins), 1901, 1960 (E. Martin), 4130. That advantage, however, must be balanced with not allowing such latitude that a rule, adopted in a public forum and upon which the public relies, is circumvented. Tr. 1207-08 (Neeper). Having two levels and processes to address operator requests for deviations from the rule, "exceptions" for significant deviations and "variances" for relatively minor deviations, achieves that balance. Tr. 2936-46, 2950, 4764.

173. It is appropriate and expedient for requests for variances to be obtained at the district office level and for exceptions to be obtained at the division level in Santa Fe, with different processes for each and with an opportunity for public hearing in the case of exceptions. Tr. 1822 (Powell), 2950-51, 2962-3050.

174. Many requests for deviations from the rule are best handled by the local district office because that staff is more familiar with site specific conditions. Tr. 1428 (Mullins), 1960 (E. Martin).

175. District offices are adequately staffed to process applications for variances. Tr. 1905 (E. Martin).

176. Sixty days is an adequate amount of time for a district office to review and approve or deny an application for a variance. Tr. 1889 (E. Martin).

177. Providing in the rules that a variance or an exception is deemed granted if OCD has not evaluated the application for same, institutionalizes an abrogation of OCD's duty to the public to protect the public health, environment, and natural resources. Tr. 1890 (E. Martin).

178. Requiring the operator to demonstrate that a variance or exception provides "equal or greater protection" of fresh water, public health and the environment as the rule from which the variance or exception is sought is a better standard than requiring the operator to demonstrate that a variance or exception provides "reasonable" protection of fresh water, public health and the environment. Tr. 1900-01 (E. Martin). This is so because the Commission already has determined in the rulemaking context that the rule provides a "reasonable" level of protection. The Commission does not, however, make such a determination with respect to each application for variance or exception. Thus, instead of OCD determining whether each variance or exception provides "reasonable" protection, it is more appropriate for OCD to determine how the level of protection provided by the variance or exception compares to the level of protection provided by the already-determined "reasonably protective" rule requirements. Tr. 1919-20 (E. Martin).

179. It is important to define "onsite" in order to avoid vagueness when allowing onsite burial or temporary pits to be used for waste from other, onsite temporary pits. The definition must be sufficiently restrictive to prevent operators from creating large waste pits, in lieu of seeking a permit for a surface waste management facility. On the other hand, the definition must not be so restrictive as to discourage the ability to dispose of multiple well wastes at one site, which allows fewer waste sites and the ability to use best practices in locating waste sites. One commenter, a waste treatment and disposal company, proposed that "onsite" be defined as "within the boundaries of the lease and/or development plan where in exploration and production waste continues to be under the control and management of the operator/producer." The Commission finds that referencing "development plan" in the definition is too expansive, and creates the potential of waste from thousands of acres being deposited in one burial site. Defining "onsite" as "within the boundaries of a single lease where exploration and production waste is generated," however, meets the needs of allowing flexibility and best practices, while being sufficiently restrictive so as to avoid the creation of large, unpermitted waste sites. Tr. 4209-19, 4244-48, 4433-43.

CLOSURE AND REVEGETATION

180. Dr. Clay Robinson was admitted, without objection, as an expert in soil science and related testing methods for inorganic compounds. Tr. 3878.

181. As between the operational phase and the closure phase of a pit, the risks of a leak or other cause of contamination is less during the closure phase than during the operational phase. Tr. 525, 729 (Arthur). This is so, in part, because water moves very slowly in unsaturated conditions, and more quickly in saturated conditions. Tr. 785-86 (Buchanan); NMOGA Ex.18. It is during the operational phase that pits contain fluids. Tr. 3591. Before pit closure, however, free fluids are required to be removed and disposed of at an OCD approved facility.

182. Allowing the "reasonable achievement" of the removal of free fluids from a pit prior to closure avoids the use of extraordinary methods to remove "all" free fluids, where such methods could be counterproductive, for example, where such methods could result in liner damage. Tr. 3467-68.

183. Benzene, and toluene, ethylbenzene and xylene (a compound commonly referred to as BTEX), are light aromatics and are more soluble than some other compounds, but are highly volatile. Tr. 461, 508 (Thomas), 591 (Arthur).

184. Total petroleum hydrocarbons ("TPH"), which includes gasoline range organics ("GRO") and diesel range organics ("DRO") contains light aromatic compounds that are relatively water soluble and, so, could migrate to groundwater. Tr. 461 (Thomas).

185. The resident time for benzene is very low, in the range of an hour, and unconfined it will volatilize and evaporate quickly. BTEX and other light aromatics, too, will volatilize. Tr. 508 (Thomas), 577, 591, 679 (Arthur), 1461 (Mullins), 3380-82, 4059-60, 4311-12.

186. Benzene, TPH and BTEX will oxidize in the process of stabilizing waste, and will degrade quickly in soil. Based upon modeling and simulation presented to the Commission, given the amount of time that it will take for constituents to migrate, particularly in unsaturated flow, it is likely that those constituents will degrade and be eliminated before they have the opportunity to reach groundwater. Tr. 3686-91

187. Benzene levels recommended in the Applications are lower than the levels recommended by the American Petroleum Institute. Tr. 1377-79 (Mullins); IPANM Ex. 13.

188. GRO and DRO are not a concern with regard to toxicity, but will affect the odor and taste of water. Tr. 461-62 (Thomas).

189. There is a high degree of certainty that soils with constituent levels that are less than or equal to the levels in Table I, at the levels to groundwater reflected in Table I, will not threaten groundwater quality. Tr. 594-95 (Arthur).

190. The levels of constituents in the pit contents analyzed by Dr. Thomas gave him very little concern regarding exposure and, as a toxicologist and risk assessor, he believes

that the constituent tables proposed in the Applications are reasonable and protective of public health and the environment. Tr. 470-73, 476-77 (Thomas)

191. Based on the modeling presented to the Commission, and the evidence before the Commission regarding the depth and concentration levels of the salt bulge, as well as the depth below the salt bulge at which native chloride levels are reestablished, the Commission finds that the levels of concentration of chloride in Table I "Closure Criteria for Soils Beneath Below-Grade Tanks, Drying Pads Associated with Closed-Loop Systems and Pits where Contents are Removed" provide reasonable protection of fresh water, public health and the environment. Because facilities that are subject to Table I criteria were fluid bearing prior to closure, and contents and fluids must be removed, the Commission believes that a conservative standard of 600 mg/kg where groundwater depth is 50 feet or less from the bottom of the facility provides reasonable protection of fresh water, public health and the environment where there is no evidence of a leak or spill requiring further investigation. Tr. 3407, 4425-27, 4461-63, 4467-77, 4635-40.

192. Based on the modeling presented to the Commission, and the evidence before the Commission regarding the depth and concentration levels of the salt bulge, the depth below the salt bulge at which native chloride levels are reestablished, the mobility of chlorides as compared to the non-chloride constituents, migration of salts toward the surface, and the volatility, mobility and toxicity of the non-chloride constituents in Table I, the Commission finds that the levels of concentration of the non-chlorides in Table I, at which further investigation is required, provide reasonable protection of fresh water, public health and the environment. Tr. 3381-84, 3395-96, 3407, 3411-13, 3492-92, 3685-3707, 4515-40, 4641-46.

193. Based on the modeling presented to the Commission, and the evidence before the Commission regarding the depth and constituent levels of the salt bulge, the depth below the salt bulge at which native chloride levels are reestablished, migration of salts toward the surface, and operational, closure and revegetation requirements, the Commission finds that the level of concentration of chloride in stabilized waste where groundwater is between 25 and 50 feet from the bottom of the pit, at which on site burial is allowed, provides reasonable protection of fresh water, public health and the environment. There is support for having no chloride limit at depths in excess of 50 feet in Table II, as requested by IPANM. Even so, because contamination of fresh water is a severe consequence, in an abundance of caution, the Commission declines to abandon chloride limits below 50 feet, and establishes them at 40,000 mg/kg where groundwater is 51-100 feet beneath the lowest level of buried, stabilized waste and at 80,000 mg/kg where groundwater is over 100 feet beneath the lowest level of buried, stabilized waste. The modeling and evidence concerning soil transport, supports the conclusion that the further groundwater is from the waste, the less the risk of contamination. Moreover, doubling the chloride level depth increase is not inconsistent with the typical engineering safety factors of 200%. Finally, the 40,000 mg/kg level for groundwater at 51-100 feet below the bottom of the pit is more stringent than the approximately 60,000 mg/kg allowed by the 2009 Pit Rule for trench burials at 100 feet, though the testing method involved in that 2009 Pit Rule limit was an acid based leach test, which would measure

both mobile and immobile chlorides. The Commission therefore finds that the Table II levels of concentration of chloride in stabilized waste where groundwater is 51 – 100 feet and over 100 feet from the bottom of the facility, provide reasonable protection of fresh water, public health and the environment. Tr. 3407, 4426-27, 4482-83, 4485-4504, 4506-14.

194. Based on the modeling presented to the Commission, and the evidence before the Commission regarding the depth and constituent levels of the salt bulge, the depth below the salt bulge at which native chloride levels are reestablished, the mobility of chlorides as compared to the non-chloride constituents, migration of salts toward the surface, operational, closure and revegetation requirements, and the mobility, toxicity, and volatility of the non-chloride constituents in Table II, the Commission finds that the Table II levels of concentration of the non-chlorides in stabilized waste, at which on site burial is allowed, provide reasonable protection of fresh water, public health and the environment. Tr. 3381-84, 3395-96, 3407, 3411-12, 3685-3707, 4515-40.

195. Where a change in a constituent level is requested in the Applications, but the testing method by which that level is proposed to be determined is a method that neither was testified to for that constituent nor is contemplated to be used for that constituent in the 2009 Pit Rule, the Commission finds that evidence is not sufficient to change the constituent level. Tr. 4515-40.

196. EPA Method 300.0 is appropriate for testing chloride concentrations in soils. A combination of EPA Method SW-846 Method 1312, for extraction, and EPA Method 300.0, for analysis, is appropriate for testing waste. Tr. 3878-79, 3914, 3952, 3966, 3987 (Robinson); NMOGA Ex. 25.

197. Mg/kg is the appropriate unit of measurement for the EPA Method 300.0, while mg/l is the appropriate unit of measurement for the combination of EPA Method SW-846 Method 1312 and EPA Method 300.0. Tr. 3914-15 (Robinson).

198. Acid used in EPA Method SW-846 Method 1312 leaches more chloride from pit waste than will water. This is because it leaches bound chloride, or immobile chloride, as well as mobile chloride. As a result, EPA Method SW-846 Method 1312 overestimates the mobility of the chloride, or the amount of chloride that is available to leach under rainfall. Focusing on mobile chlorides recommends using the EPA Method 300.0 to evaluate chlorides in waste, as opposed to the EPA Method SW-846 Method 1312. This has the advantage not only of measuring the mobile chlorides, which is the concern with regard to pit contents, but also of allowing the chloride limit to be expressed in mg/kg, the expression that is used for the other limits in the Pit Rule and that is easier understood. Tr. 3977-80, 3994, 3996-97 (Robinson), 4062-65, 4092-98 (Neeper). The Commission finds that the appropriate method for measuring chlorides in Table II is EPA Method 300.0. Tr. 4485-88.

199. There is no laboratory standard for converting mg/l to mg/kg, when beginning with EPA Method SW-846 Method 1312. Tr. 3879 (Robinson).

200. While not exact, however, one may approximate a standard stated in mg/l to a standard stated in mg/kg by multiplying the mg/l by 20. That is to say, one mg/l is roughly equivalent to 20 mg/kg. Tr. 4018-22, 4045-47 (Neeper); NMCAW Ex. 6 at 3 & 8. This conversion could be off by a relatively small amount, up to 5 percent. Tr. 4020-21, 4071-73 (Neeper). Thus, in Table II, the chloride limit requested by the Applications is approximately 50,000 mg/kg where groundwater is between 25 and 50 feet below the bottom of the pit and approximately 100,000 mg/kg where the groundwater is 51 feet or more below the bottom of the pit. Tr. 3998-99 (Robinson). The chloride level in the leachate modeled by Mr. Mullins, where the receptor is 25 feet vertically from the bottom of the pit, is approximately 20,000 mg/kg.

201. Successful reclamation requires that the site be geomorphically stable, to reduce erosion. Tr. 831-32 (Buchanan). If the original contour of a site has features that are geomorphically unstable, the final contouring may have to differ from the original in order to avoid erosion. Tr. 833-834 (Buchanan). Final contouring must be accomplished in such a way as to avoid erosion and ponding and achieve long-term stability. Tr. 3620-33. Allowing a recontouring plan that is different from the original to be approved by the appropriate OCD office accommodates for the possibility that final contouring may have to deviate from original contouring. Tr. 3407.

202. Successful revegetation is critical to successful reclamation. Tr. 828-30, 837-38, 846, 848, 860, 907-09 (Buchanan).

203. Revegetation of the area over a pit protects against erosion and movement of chlorides and other waste constituents toward groundwater. Tr. 763-64 (Buchanan), 1383 (Mullins); NMOGA Ex. 14-22; IPANM Ex. 14.

204. Compacted soil will not allow revegetation in final reclamation. Tr. 837-38, 847, 2395 (Buchanan). In the interim, before final reclamation, areas of the site may need to be compacted in order to drive, stage equipment or otherwise service the site. Tr. 847-48 (Buchanan).

205. While they may root deeper, shrubs generally root at 3 to 4 feet. Tr. 949 (Buchanan).

206. For the most part the root systems for grasses will confine themselves to the upper 24 inches of the soil, even if water may be found deeper than that. Tr. 822-23 (Buchanan).

207. Most water taken up by plants is taken up in unsaturated flow conditions. Vegetation in New Mexico will take water from the top four feet of soil, sometimes deeper, and as it does so, it further dries the unsaturated flow. Tr. 790-91, 793-94 (Buchanan); NMOGA Ex. 18.

208. Chlorides cause stress in vegetation. This was demonstrated by soil sampling at the surface over two pits in the Caprock area, conducted by Dr. Neeper. Tr. 1149-57, 1209 (Neeper); NMCAW Ex. 5 at 24-31. The purpose of the sampling was to demonstrate the effect of salts on vegetation. The pits that were the subject of that study were constructed and closed before a pit rule was in place in New Mexico. Dr. Neeper did not know the details of the pit closure or whether the chlorides evident at the surface were the result of a very shallow burial or a release during the operational phase. Tr. 1219-20 (Neeper).

209. Electrical conductivity provides a measure of soluble salts. Tr. 795 (Buchanan); NMOGA Ex. 17-10.

210. Vegetation's tolerance for salts varies. Some will not thrive at an electrical conductivity of 2 millimhos, while others may thrive at up to 20 millimhos. The threshold of 4 millimhos is primarily for agricultural plants. Many native plants used in reclamation, however, have electrical conductivity thresholds above 4 millimhos. Tr. 2314-15 (Buchanan).

211. Very few native plants have low tolerances to salt, and most reclamation species have tolerances that are higher than 4 millimhos. Tr. 2358 (Buchanan).

212. An electrical conductivity measure of 4 millimhos is roughly equivalent to 600 to 700 mg/kg of chloride. Tr. 1148, 1295 (Neeper).

213. Salt in soil is a concern not only because of salt tolerance in plants. Salt also affects the permeability of soil and, so, the ability of water to move through the soil. Tr. 2316 (Buchanan).

214. Sodium adsorption ratio ("SAR") is a representation of the relationship among sodium, calcium and magnesium. Tr. 2315-16 (Buchanan). SAR is related to the ability of soils to aggregate. Water moves more easily through well aggregated, permeable soil. Tr. 2316 (Buchanan).

215. Whether a high SAR is damaging to the ability of soil to aggregate depends on the electrical conductivity of the water coming into the system. The higher the electrical conductivity of the water, the higher the SAR may be without damaging the permeability of the soil. TR. 2316-19; NMOGA Ex.17-49. SAR, then, is not a measure, of itself, of the toxicity of sodium to vegetation. Tr. 2321 (Buchanan). Rainwater, however, has very low electrical conductivity, and if treated irrigation water is not used, in order to increase electrical conductivity, soil may be amended with gypsum. Tr. 2372-74 (Buchanan).

216. Pressure measured in megapascals indicates the availability of water in the soil. The lower the megapascals, the greater the availability. The same percentage of water may result in a higher or lower level of pressure, depending on the soil type (for instance clay, loam or sandy). Tr. 2326 (Buchanan). NMOGA Ex. 17-52. While some plants, particularly agricultural plants, have a wilting point of 1.5 megapascals pressure, many

native plants used in reclamation can exist at up to 3 megapascals pressure. Tr. 2324-25 (Buchanan).

217. Native plants in New Mexico, including the primary oil and gas producing areas like the northwest and southeast, have adapted such that even as soil moves to the wilting point, they still survive. Tr. 2329-31 (Buchanan).

218. Given the critical role of revegetation in successful reclamation and protection of both groundwater and the surface, it is appropriate to use the relatively conservative standard of 600 mg/kg for the chloride concentration in soil cover (Tr. 1142-44, 1295 (Neeper), 3670-77), and the Commission finds that the use of such a standard provides reasonable protection of fresh water, public health and the environment.

219. Given the movement of salts through convection and diffusion, covering pit contents with 36 inches of soil and 12 inches of topsoil is sufficient for the reclamation and salt management of a pit site, in both northern and southern New Mexico. Tr. 826; 938-39 (Buchanan).

220. While the evidence regarding salt migration upward, salt tolerance in vegetation, the evaporative zone and root systems, indicates that 4 feet of soil cover will support revegetation, if the soil under a drying pad or below grade tank that has not evidenced leaks either is or has been remediated to meet the standard of 600 mg/kg of chloride, the shallow depths involved in such pads or tanks warrant one foot of cover. Tr. 3605-20, 3673-77.

221. Direct contact with waste constituents presents minimal environmental risk because of the substantial soil cover that is required to be placed over the waste. Tr. 592 (Arthur).

222. Seeding in order to establish categories of vegetation, as opposed to specific species, allows flexibility and encourages successful revegetation. Tr. 844-46, 848-50 (Buchanan).

223. Seeding in the first favorable growing season allows the reclamation effort to take advantage of variations in weather patterns and encourages best practices. Tr. 846-47 (Buchanan), 4754-63.

224. For the purposes of revegetation, strictly limiting seed type to a specific location limits the seed source and eliminates other native species that could do well in that location. As a result, it is best to reclaim with regional native life-forms. Tr. 951-53 (Buchanan).

225. In his experience as an environmental engineer working in areas that get more rain than New Mexico, Mr. Arthur has never seen precipitation accumulate at the bottom of a lined, buried pit as a result of the pit not having been capped with a geomembrane. Tr. 578 (Arthur). This is so, at least in part, because of the amount of soil cover over the

pit; revegetation, which will use water in the cover soil; recontouring; and reclamation. Tr. 652, 654 (Arthur). It is Mr. Arthur's opinion that removal of the geomembrane cover requirement will not affect the migration of pit chlorides toward groundwater. Tr. 578 (Arthur).

226. Not requiring a geomembrane cover for a burial trench may allow certain pit contents to dissipate to the surface and not accumulate in the pit. Tr. 577, 652, 696 (Arthur), 1460-61 (Mullins).

227. Requiring a cover, however, will retard unsaturated flow from the pit, Tr. 1290-92 (Neeper), and from a risk perspective a cover barrier is recommended, 509-10 (Thomas), 4316, 4321, 4341-44. The Commission finds that requiring a geomembrane cover for a burial trench and in-place burial provides reasonable protection of fresh water, public health and the environment.

228. Generally, an operator is able to accomplish closure of a temporary pit within 6 months after the drilling rig is released. Tr. 75-76, 136 (Gantner).

229. Filing a form with OCD that shows the location of a buried pit allows the agency to locate the pit, if necessary, in the future. Marking the place where a pit is buried facilitates locating the pit and notifies anyone on or using the land of the pit location. A deed notice notifies future landowners of the presence of the pit, notice which they might not otherwise have, and currently are being accepted by county clerks for filing. Tr. 1837-39, 1847 (Powell).

230. A deed notice may not be filed on public land. Tr. 1847 (Powell), 3743-46.

SITING

231. A confined aquifer, breached over time, could transition into an unconfined aquifer. Tr. 758-59 (Arthur), 1205-06 (Neeper). Determining what is and is not a confined aquifer is very complex, and infeasible in terms of enforcement. Tr. 1204-06 (Neeper), 1416 (Mullins), 1832-33 (Powell). The Commission declines, therefore, to make the distinction between unconfined and confined aquifers, as requested by the Applicants.

232. The goal of siting requirements is to ensure environmental protection and, simultaneously, avoid the unnecessary restriction of access to oil and gas resources. Tr. 735 (Arthur).

233. Siting requirements that are related to continuously flowing watercourses provide better protection of surface water. Tr. 1834 (Powell). A setback for the location of a pit in the vicinity of a continuously flowing watercourse is principally to guard against contamination from overland flow. Tr. 551 (Arthur).

234. Referring to a USGS quadrangle map to aid in defining a "continuously flowing watercourse" provides an advantage of clarity and consistency. Tr. 538-39 (Arthur

235. Excluding ephemeral washes and other depressions that do not have water during the majority of the days of the year from the definition of "continuously flowing watercourse" provides more regulatory certainty for operators when locating a drilling site. Tr. 1408-09 (Mullins).

236. Referring to a broken blue line on a USGS quadrangle map to aid in defining a "significant watercourse," and adding "a defined bed and bank" to the tributary that is included in the definition provides an advantage of clarity and consistency. It also protects channels that may carry a large amount of water in flash flood events. Tr. 1827-29 (Powell).

237. A significant watercourse may not flow year round. Tr. 1946 (E. Martin).

238. Defining "floodplain" by referencing US army corps of engineers or FEMA documentation provides more clarity and consistency in identifying a floodplain. Tr. 78-79 (Gantner).

239. The requirement that pits be designed to prevent run on of surface water prevents pits from being placed in an arroyo or ephemeral stream. Tr. 638-39 (Arthur).

240. Construction and design requirements may affect siting of a pit. Tr. 639-640 (Arthur).

241. It is appropriate to have different siting requirements for low chloride and non-low chloride fluids because low chloride fluids pose less risk to the environment. Tr. 540-41, 549-550 (Arthur), 1412-13 (Mullins); 3101-02.

242. Weekly inspections of temporary pits after the rig is no longer on location, as required by the Pit Rule effected by this Order, reduces the risk of contaminate transport, shortens response time to a release, and, among other factors, supports allowing reduced siting requirements for low chloride fluids, which present less risk to the environment. Tr. 3138-40.

243. In Colorado, a permit is not required for a pit with contents that have less than a 15,000mg/l chloride level. Tr. 56-57 (Gantner).

244. 12,000 to 13,000 mg/l of chloride in drilling fluid is approximately a 2% solution, and is the chloride level in a commonly used water based drilling mud. Tr. 57 (Gantner), 4419.

245. Given that sea water is approximately 19,000 mg/l, Tr. 1252 (Neeper), and water that is protected by State law is 10,000 mg/l total dissolved solids (Tr. 86-87 (Gantner),

541 (Arthur), 3122-33, 4185-91, 4418-31; 20.6.2.3101(A) NMAC), setting the low chloride fluid standard at 15,000 mg/l is reasonable.

246. It is appropriate to use EPA Method 300.0 to determine whether pit fluid is low chloride, Tr. 4002 (Robinson), though field testing may be used, as well, Tr. 4069-70 (Neeper). Field testing for chlorides is simple, easy and not high cost. Tr. 146 (Gantner).

247. Prohibiting placement of the bottom of a temporary low chloride fluid pit within 25 feet of groundwater allows sufficient response time, in case of a release. Tr. 550-51 (Arthur).

248. Prohibiting placement of a temporary low chloride fluid pit within 100 feet of a continuously flowing watercourse or any other significant watercourse allows sufficient response time, in case of a release. Tr. 551-52 (Arthur).

249. Prohibiting placement of a temporary low chloride fluid pit within 100 feet of a wetland allows sufficient response time, in case of a release. Tr. 553-54 (Arthur).

250. Prohibiting placement of a temporary low chloride fluid pit within 200 feet of (i) a spring or private domestic fresh water well used by less than five households for domestic or stock watering purposes or (ii) a lakebed, sinkhole or playa lake (measured from the ordinary high-water mark), or within 300 feet of any other fresh water well or spring or an occupied permanent residence, school, hospital, institution or church in existence at the time of initial application allows sufficient response time, in case of a release. Tr. 552-53 (Arthur).

251. Because low chloride setbacks allow closer siting to water sources, it is appropriate to require an operator to seek an exception, as opposed to a variance, if that operator wants to place a temporary pit (low chloride or otherwise), permanent pit, multi-well fluid management pit or burial trench within the low chloride setbacks. Tr. 3171-73, 3303.

252. Prohibiting placement of a temporary pit that contains fluids that are not low chloride within 300 feet of a wetland allows sufficient response time, in case of a release and is more consistent with the siting requirement for a continuously flowing watercourse. If the risk of contamination is other than from surface transport, it is likely that the water table is sufficiently close to the surface that vertical siting requirements will prevent placement of the pit at that location. Tr. 553-54 (Arthur), 934 (Buchanan), 3208-13, 4196, 4450-52.

253. Providing siting requirement for a below grade tank provides protection of human health and the environment. Tr. 1834 (Powell).

254. The difference between a tank, which typically is made of metal or fiberglass, and an earthen pit recommends treating a below grade tank differently from a pit with respect to siting. Tr. 62-63 (Gantner), 168, 204 (Hasely). Even so, while the

Commission believes that a reduction in setback restrictions for a below grade tank is justified, because of the possibility of a breach and the contents of a below grade tank the Commission finds that a 10 foot setback from the bottom of a tank to groundwater is not sufficiently protective and that a below grade tank should be sited, in this respect, similarly to a low chloride pit. Tr. 3265-67.

255. Prohibiting placement of a below grade tank (i) within 100 feet of a continuously flowing watercourse, significant watercourse, lakebed, sinkhole, wetland or playa lake, (ii) within 200 feet of a spring or fresh water well used for public or livestock consumption or (iii) where the bottom of the tank is within 25 feet of groundwater, provides adequate protection to public health, the environment and natural resources and an adequate response time in case of a release. Tr. 554-55 (Arthur), 3256-57.

256. Conditions under which on-site burial are allowed are a function of depth to groundwater and other siting requirements, soil cover, hydrology, soil transport, revegetation and other closure requirements. Tr. 3370.

257. Based on the modeling presented to the Commission, and the evidence before the Commission regarding the depth and constituent levels of the salt bulge, the depth below the salt bulge at which native chloride levels are reestablished, the mobility of chlorides as compared to the non-chloride constituents, migration of salts toward the surface, pit construction and design requirements, operational, closure and revegetation requirements, and the mobility, toxicity, and volatility of the non-chloride constituents in Table II of 19.15.17.13, reasonable protection of fresh water, public health and the environment are provided by prohibiting on-site burial, whether in-place or trench, (i) where the bottom of the pit or trench is within 25 feet of groundwater, (ii) within 100 feet of a continuously flowing watercourse, (iii) within 300 feet of a spring or private, domestic fresh water well used for domestic or stock watering purposes, or (iv) within 300 feet of a wetland.

258. Prohibiting placement of material that has been excavated from pit construction within (i) 100 feet of a continuously flowing watercourse or a significant watercourse, (ii) 200 feet of a lakebed, sinkhole or playa lake, (iii) 100 feet of a wetland or (iv) 100 feet of a 100-year floodplain provides adequate protection to public health, the environment and natural resources. Tr. 465 (Thomas), 554 (Arthur), The excavated material is not contaminated, and must be transported over the surface in order to reach the water sources from which it is set back. 3253-55.

259. Because closed loop systems are above ground and the fluids are managed with steel tanks, it is unnecessary to apply siting requirements to them. Tr. 347-48 (Fanning).

MULTI-WELL FLUID MANAGEMENT PITS

260. Michael Lane was tendered and accepted, without objection, as an expert in petroleum engineering and oil field waste management systems. Tr. 229 (Lane); NMOGA Ex.6.

261. Multi-well fluid management pits are used for water storage, predominantly produced or recycled water, with some flowback water, so that it may be reused to fracture stimulate, or frack, wells. Tr. 230 (Lane). It is not used for waste disposal. Tr. 231-32 (Lane).

262. A multi-well fluid management pit allows more efficient operation because it holds much more water, perhaps 20 to 40 acre feet, thereby eliminating the need to refill temporary tanks, as now is done in hydraulic fracturing for multi-well projects or horizontal drilling. Tr. 233, 236, 275, 284-86, 308-09, 315-16 (Lane); NMOGA Ex. 7-1 & 7-3.

263. Technology has advanced such that formations previously thought of as non-producing now are a cornerstone of production. Tr. 1674 (Scott). The ability to produce those formations is dependent on hydraulic fracturing. Tr. 1674 (Scott).

264. While hydraulic fracturing has always been used in producing New Mexico formations, the size of hydraulic fracturing jobs, and the commensurate need for water, has increased. Tr. 1674-75 (Scott). A decade ago a hydraulic fracturing job calling for 500 barrels of water would have been considered a large job. Today, a hydraulic fracturing job could require 15 to 20 times that amount of water. Tr. 1674-75 (Scott).

265. Because of the increase in the need for water in drilling and completing a well, the ability to reuse water for hydraulic fracturing is important and has a substantial impact from an economic perspective, not only arising from the cost of purchasing water, but from its disposal, as well. Tr. 319, 1676.

266. Allowing multi-well fluid management pits will encourage operators to recycle fluids that are used in hydraulic fracturing, thereby reducing the amount of fresh water that is required, as well as allowing operators to produce more efficiently and economically. Tr. 261, 287 (Lane).

267. Being able to reuse water that is used in hydraulic fracturing reduces the amount of fresh water that is used in production and reduces fuel cost and usage and truck traffic in hauling fresh water to and used water from a well site, as required under the 2009 Pit Rule. Tr. 233 (Lane), 1677-78 (Scott). It also eliminates mobilizing and demobilizing associated with temporary tanks. Tr. 317 (Lane).

268. Reducing the amount of truck traffic in a hydraulic fracturing operation is not just more cost efficient, but it has a positive impact with regard to air quality and wildlife. Tr. 317-18 (Lane).

269. Use of a multi-fluid management system reduces the individual footprint required for each hydraulic fracturing job at the wells serviced by the pit and, so, reduces surface disturbance. Tr. 239-43 (Lane); NMOGA Ex. 7-3.

270. A multi-well fluid management pit is used in the development stage of a field, as opposed to exploration. Tr. 289-90 (Lane).

271. A multi-well fluid management pit is intended to be part of an overall development plan and centrally located to service designated wells. Tr. 231, 237-39 (Lane); NMOGA Ex. 7-2.

272. The economics and practical need for placing a multi-well fluid management pit in proximity of the wells that it serves will limit the size of multi-well fluid management pits, as well as the length of time that it is useful. Tr. 719-21 (Arthur).

273. A 40-well development plan could make the life span of the associated multi-well fluid management pit up to 5 years. Tr. 246-47 (Lane). While it is conceivable, because of interruption of a development plan, that a multi-well fluid management pit may be part of a program that lasts longer than 5 years, Mr. Lane has never seen a multi-well fluid management pit used for longer than 5 years. Tr. 289-91 (Lane).

274. By requiring that a multi-well fluid management pit be identified to specific wells with approved applications for permits to drill, which are 2 year approvals with the possibility of 2 year renewal, the life span of a multi-well fluid management pit will not be permanent and the size will be limited. Tr. 2464-68, 2480-81, 2485, 4774.

275. The size and life span of a multi-well fluid management pit is controlled by the number of wells that may be serviced by the pit, by requiring those wells to be identified in the permit related to the pit, by requiring that the addition of any wells to the pit permit or the extension of any of the permits to drill originally identified to the pit permit will require a hearing, and by requiring that the pit be closed within six months of the date that the operator ceases all stimulation operations on all wells identified in the permit. Tr. 278, 292, 320-21, 328-30 (Lane), 2465-68, 2480-86, 2490.

276. Both from a practical perspective (Tr. 289 (Lane), 542-48 (Arthur)) and from the definition of "multi-well fluid management pit" that is approved by this order (19.15.17.7(L), a multi-well fluid management pit is useful for a limited number of wells and for a limited period of time. While Mr. Lane testified that he viewed a multi-well fluid management pit as being more akin to a temporary pit than a permanent pit, because a multi-well fluid management pit may be in place longer than a temporary pit and may be considerably larger than a temporary pit, the Commission finds that applying permanent pit siting and construction requirements to a multi-well fluid management pit, with adjustments made to accommodate the differences between the two, provides reasonable protection of fresh water, public health and the environment. . Tr. 292, 320, 328-30 (Lane), 2465-68, 2480-86, 2787-2815, 2919-20.

277. In the application process for a multi-well fluid management pit, the OCD will be able to address issues concerning size and time limits, depending on the specifics of the plan. Tr. 326-27 (Lane).

278. Chemistry of the return flow from hydraulic fracturing is consistent with the chemistry of temporary, workover and drilling pit contents. Tr. 300-01 (Lane).

279. Flowback in the hydraulic fracturing process may contain from zero to five percent, often zero percent, of the amount of an individual chemical that has been added to the fluid that is used in hydraulic fracturing. Tr. 645-46 (Arthur).

280. At least one producer in Texas uses a 30 mil HDPE liner for multi-well fluid management pits. Tr. 311-12 (Lane).

281. At closure of a multi-well fluid management pit, all unused fluids are removed, as are the liner and any other pit contents and associated equipment, so that nothing remains after closure. Tr. 247-48 (Lane).

282. The liner and design and construction specifications for multi-well fluid management pits that are contained in the Pit Rule, as amended by this Order, are safe and effective; and pits designed and constructed pursuant to those specifications will be well engineered, allowing a multiple year life span. Tr. 721-22 (Arthur).

283. The multi-well fluid management pit provisions as effected by this Order provide reasonable protection of fresh water, public health and the environment. Tr. 261 (Lane).

THE 2009 PIT RULE

284. Bruce Alan Gantner was tendered and accepted, without objection as an expert in the field of environmental engineering. Tr. 46-49; NMOGA Ex. 3.

285. Larry Scott was tendered and accepted, without objection, as an expert professional engineer and practical oil man. Tr. 1645.

286. Mary Ellen Denomy was tendered and accepted, without objection, as an expert in petroleum accounting. Tr. 962, 968; OGAP Ex. 1.

287. Dr. John Bartlit was tendered and accepted, without objection, as an engineer, qualified in industrial systems, as related to environmental protection. Tr. 1758-59; NMCAW Ex.2.

288. Protection of public health, the environment and natural resources is not achieved by only one aspect of the Pit Rule, but by the whole of the rule and the integration of its various aspects, one with another, such as siting, waste and soil standards, closure requirements, reclamation, including soil cover, recontouring and revegetation, and pit design, construction, and operation. Tr. 654-55, 704-06 (Arthur).

289. Given the findings in this Order with regard to waste constituents, it is unnecessary to require testing of waste and soil for constituents other than those reflected in Table I and Table II of 19.15.17.13 NMAC, as adopted by this Order.

290. The 2009 Pit Rule was confusing with respect to testing and constituent limits for waste and soil. Tr. 212-13 (Hasely).

291. The 2009 Pit Rule did not distinguish between low chloride and non-low chloride fluids, making some siting requirement unnecessarily restrictive. Tr. 55 (Gantner).

292. Operators have found that the 2009 Pit Rule is difficult to understand and work with, creates unnecessary paperwork, prevents them from accessing certain reserves and creates regulatory uncertainty. Tr. 1409 (Mullins).

293. Some districts in OCD have interpreted the 2009 Pit Rule as applying to fresh water pits, which is unnecessary for environmental protection. Tr. 54-55 (Gantner).

294. Some districts in OCD interpreted "continuously flowing watercourse" in the 2009 Pit Rule so as to include surface features that contained water only a few days a year. Tr. 61 (Gantner).

295. The 2009 Pit Rule provides no storage options for the storage and recycling of water that is used in hydraulic fracturing, other than using multiple tanks. Tr. 239 (Lane).

296. The 2009 Pit Rule unnecessarily requires below grade tanks to be retrofitted or replaced prior to sale or change of operator or transfer of a permit, even if side walls are visible and integrity of the tank may be demonstrated. Tr. 176-77 (Hasely).

297. The cost of replacing a below grade tank is approximately $20,000. Tr. 177 (Hasely).

298. Below grade tanks are often confused with sumps and with above ground tanks that are located next to an incline. Tr. 159 (Hasely). Changing the siting requirements for a below grade tank will give an operator more flexibility in its placement, while still providing reasonable protection of fresh water, public health and the environment. Tr. 169 (Hasely).

299. Below grade tank siting requirements in the 2009 Pit Rule increased costs by $50,000 - $70,000 per location. Tr. 62-65 (Gantner); NMOGA Ex. 3-9.

300. The 2009 Pit Rule requires that a temporary pit be closed within six months of cessation of its operation, while a below grade tank, which involves less risk to the environment, is required to be closed within 60 days. Tr. 195 (Hasely). The 60 day deadline is difficult to meet, at times. Tr. 195-96 (Hasely).

301. Changing the 2009 Pit Rule with respect to below grade tanks will allow the operator to work more efficiently and economically, and continue to provide reasonable protection of fresh water, public health and the environment. Tr. 196 (Hasely).

302. Using a closed loop system and hauling waste from a drill site, as opposed to burying them, adds direct and indirect costs to drilling. Tr. 1734-35 (Scott).

303. Siting requirements for on-site burial in the 2009 Pit Rule have resulted in increased costs due to the necessity of using a closed loop system and hauling cuttings. The average increase in costs, according to ConocoPhillips, is in excess of $100,000 per well. Tr. 65-66, 90 (Gantner), 1393-94 (Mullins); NMOGA Ex. 3-10.

304. Mike Sauck, a member of the public, gave sworn testimony that the cost of hauling cuttings in connection with closed loop systems increased the cost of drilling. He submitted two authority for expenditures ("AFE"), well budgets, for two wells of comparable depth and into the same formation, one in 2007 and one in 2010. The AFEs show an increase in expense, after the adoption of the Pit Rule in 2008, of over $76,000 for hauling drill cuttings, as opposed to disposing of them on site. While Mr. Sauck believes that the driller/hauler underestimated the additional costs in order to prevent Mr. Sauck from abandoning the project, the $76,000 nonetheless remains the cost increase. Mr. Sauck also testified that he is aware of business partners and oil service providers leaving the State because of increased costs due to the adoption of the Pit Rule in 2008. Tr. 863-67 (Sauck).

305. An operator takes a variety of factors into account in determining when and where to drill, including infrastructure and access to gas lines. If drilling costs go up, profitability of the well decreases and lengthens the time it takes a well to pay out, or recover costs. Tr. 1001-02, 1017, 1052-54 (Denomy).

306. A higher cost of drilling, per well, negatively impacts the number of wells in which an operator may invest. Tr. 65-66, 91 (Gantner). The adoption of the Pit Rule in 2008, by affecting operators' capital budgets, has reduced the number of wells drilled in New Mexico, and encouraged operators to drill in other states. Tr. 65-67 (Gantner).

307. Texas Railroad Commission Districts 7C, 8 and 8A ("Texas Districts") are contiguous with Roosevelt, Lea and Eddy Counties in New Mexico ("New Mexico Permian Basin Counties"). Tr. 1747 (Scott). The Texas Districts and the New Mexico Permian Basin Counties offer the same formations in which to drill. Tr. 1747 (Scott). The Permian Basin extends across the New Mexico/Texas state line. Tr. 1651-52 (Scott). The climate and geology of the Texas Districts and the New Mexico Permian Basin Counties are very similar, and in many places the drilling and completion characteristics are virtually identical. Tr. 1651-52 (Scott).

308. Rig count is commonly held by those in the oil and gas business to be a leading predictor of the economic health of the oil and gas industry. Tr. 1715-17 (Scott), 1773-75 (Bartlit).

309. For the years 2003 to 2006 the ratio of rig count in the Texas Districts ("Texas Rig Count") to the rig count in the New Mexico Permian Basin Counties ("NM Permian Rig Count") was approximately 2 to 1. Beginning in 2007 the Texas Rig Count began a relatively steady increase, largely due to increasing oil prices, while the NM Permian Rig Count stayed roughly the same. By the end of 2011 the ratio of the Texas Rig Count to the NM Permian Basin Rig Count was approximately 5 to 1. Tr. 1653-54, 1673 (Scott); IPANM Ex. 15.

310. While one Commissioner discusses whether rig count is the most reliable indicator of drilling activity, he notes that even looking at spud count, spud count in 2011 is roughly half of the spud count in 2007. New Mexico rig count is relatively flat with respect to where New Mexico was in 2007, while other states are higher. Tr. 2663.

311. While price is a major factor in an operator's decision on whether to drill a well (Tr. 972-973 (Denomy)) and New Mexico oil production increased in the years 2008, 2010 and 2011 (Tr. 972 (Denomy); OGAP Ex. 2), New Mexico has seen a declining trend in spud count since the adoption of the Pit Rule in 2008. In 2008, oil prices in New Mexico rose 85%; New Mexico spud count dropped 8%. In 2009 New Mexico oil prices dropped 54%; New Mexico spud count dropped 41%. In 2010 New Mexico oil prices rose 19%; New Mexico spud count rose 21%. In 2011 New Mexico oil prices rose 29%; New Mexico spud count dropped 16%. The New Mexico spud count in 2008 was 1,646; in 2011 it was 990. OGAP Ex. 2.

312. While Ms. Denomy testified that it is not her experience that her clients find the cost of compliance with the Pit Rule to be a driving force in New Mexico, Ms. Denomy has only one client in New Mexico. That client is a working interest owner, and has no input in where to drill. Additionally, Ms. Denomy has not asked that client whether the Pit Rule has a negative impact on the decision of where to drill. Tr. 1002, 1018-1019 (Denomy).

313. Ms. Denomy's cost comparison of different types of waste disposal only accounted for the cost of hauling water for a closed-loop system because the practice in Colorado is to bury the cuttings on-site, unlike the practice under the 2009 Pit Rule, which requires hauling cuttings off-site in many circumstances. Tr. 1005, 1038-39, 1042 (Denomy); OGAP Ex. 2.

314. Ms. Denomy argued that use of pits creates waste, but did not associate the number of barrels of condensate in her argument with the amount of condensate that is not recovered, and the Commission is unable to determine whether the amount of condensate is appreciable, whether at an individual pit or statewide. Tr. 1005-06 (Denomy).

315. While Ms. Denomy asserts that jobs are lost from the use of pits, she has not conducted a study regarding that assertion, and has not examined whether the changes requested in the Applications will have any effect on the creation of jobs. Tr. 1007 (Denomy).

316. The process for obtaining permission to deviate from the 2009 Pit Rule is cumbersome, lengthy and resource-intensive; and has taken up to 8 months to obtain a decision on an exception. As a result, operators are reluctant to attempt to obtain an exception. Tr. 259-60, 282, 331 (Lane).

ULTIMATE FACTS AND CONCLUSIONS OF LAW

Based on the evidence presented in the multiple days of hearing and deliberations, as reflected in the pleadings, exhibits and transcript of these proceedings, and for the reasons set forth in this Order and, more fully, in the transcript of proceedings, the Commission sets forth below Ultimate Facts and Conclusions of Law:

A. Due public notice has been given and the Commission has jurisdiction over this rulemaking.

B. NMSA 1978, Sections 70-2-11 and 70-2-12(B) grant OCD authority to implement rules to carry out the purposes of the Oil and Gas Act, Chapter 70, NMSA 1978 Article 2. NMSA 1978, Section 70-2-6(B) provides that the Commission shall have concurrent jurisdiction or authority with the Division to the extent necessary for the Commission to perform its duties. Generally, the Commission adopts rules, the Division implements those rules, and the Commission hears any final administrative adjudicatory proceedings.

C. The Commission is empowered to create rules. NMSA 1978, 70-2-12(B).

D. The Division has the jurisdiction, authority and control of and over all persons, matters or things necessary or proper to enforce effectively the provisions of the Oil & Gas Act or any other law of New Mexico relating to the conservation of oil and gas. NMSA 1978, 70-2-6.

E. The Commission has the statutory duty to prevent waste and protect correlative rights, and to adopt regulations that will provide reasonable protection of fresh water and protection of public health and the environment in the disposition of produced water and nondomestic waste NMSA 1978, 70-2-11 & 12.

F. The Commission finds and concludes that the Pit Rule that is attached to this Order as Attachment A provides reasonable protection of fresh water and protects public health and the environment, will assist the Division in carrying out its statutory obligations, is effectively enforceable by OCD, will not create waste and will not impair correlative rights.

G. In formulating the regulations that carry out its charge, the regulator must take into account the effect that its formulation may have on the regulated community. This not only is a matter of common sense and decent government, but it is reflected in the Small Business Regulatory Relief Act, NMSA 1978, §§ 14-4A-1 through 6 ("SBRA"), to which this Commission is subject. The SBRA requires a periodic

review of an agency's rules to investigate the nature of public complaints concerning the rule, the complexity of the rule, whether the rule continues to minimize adverse impacts on small businesses, and the changes in, among other things, the technology and economic conditions of the area that the rule affects. The importance of taking into account the effect of a regulation on the regulated community also is reflected in the Guidelines for Rulemaking of the Energy, Minerals and Natural Resources Department (OFS-118). Section III(E) of those Guidelines requires that draft regulations proposed by a division of the Department be circulated to a variety of stakeholders, including the regulated community. While the Commission may not be subject to these Guidelines, it agrees with the thrust of SBRA and the Guidelines that the regulator has a responsibility to take into account the effect that its regulations may have on the regulated community. This is not to say, of course, that the impacts on the regulated community take precedence or control. Far from it; the ultimate responsibility of a rulemaking body is its statutory charge. But to ignore the impacts of regulations on the regulated community is to ignore the responsibility to govern well.

H. It has been 5 years since the promulgation of the Pit Rule in 2008. The Applications filed by NMOGA and IPANM provide a timely opportunity to review certain aspects of the Pit Rule.

I. A majority of the Commission finds that the regulatory constraints in the Pit Rule, most notably, though not in isolation, the siting requirements and the indirect consequence of increasing the use of closed-loop drilling, have increased the direct costs of drilling an oil or gas well, and may have negatively impacted the growth of the oil and gas industry in New Mexico.

J. The Commission finds that aspects of the Pit Rule, as promulgated in 2008, are complex, have been difficult for operators to understand, create some unnecessary paperwork, are vague or ambiguous in certain respects, have provided a cumbersome process by which an operator may seek to vary from the rule, do not encourage the use of best practices to the extent that the Pit Rule might and do not provide the predictability that is desirable in regulations.

K. It appears, however, that the Pit Rule, as currently configured, has accomplished the goals of protecting fresh water, public health and the environment. Despite the inquiry being made during the hearing, no evidence was offered to the Commission of contamination occurring from pits constructed, or tanks and drying pads installed, and closed pursuant to current regulation.

L. The Pit Rule is a system of interrelated requirements concerning, among other things, permitting, record keeping and reporting; construction and design of pits, tanks and liners; siting from various water sources; testing; inspection; operational limits and requirements; maintenance; responses to potential releases; constituent limits in soil and buried, stabilized waste; soil cover; contouring; and revegetation. No one of these, in isolation, accomplishes the regulatory charge of protecting fresh

water, public health and environmental protection. The question placed before the Commission by the filing of the Applications is whether individual features of this system may be altered, while retaining the efficacy of the system, as a whole, to provide reasonable protection of fresh water, and protection of public health and the environment. The Commission finds that some, though not all, of the requested alterations of the Pit Rule may be made, while continuing to accomplish the Commission's statutory charge. Those alterations are reflected in the Pit Rule that is Attachment A to this Order. This is so for several reasons.

M. A majority of the Commission finds that testing for the constituents set forth in Table I and Table II in Section 19.15.17.13 of Attachment A, provides reasonable protection of fresh water, and protects public health and the environment. The evidence before the Commission is that samples were taken from over 30 pits in the primary oil and gas producing regions of the State. The sampling program, designed by a recognized expert in toxicology, as well as by OCD, was such that it commonly would be relied upon by an expert in the area of waste assessment, toxicology or risk assessment. The samples were analyzed in accordance with recognized EPA methodology and monitored by a quality assurance auditor, and the results of the toxicologist's sampling and the OCD sampling were consistent. The constituent levels from those samples were compared to published regulatory criteria. Based on that sampling, analysis and comparison, of the constituents found in the pits only those reflected in Tables I and II were sufficiently high as to warrant monitoring. Benzene was included in the tables in an abundance of caution, even though the level reflected by the analyses may have been artificially elevated. The Commission further finds that, while the Applicants proposed to state chloride levels in Table II in mg/l, it is more consistent with the measures of the other constituent levels in the Tables and more easily understood to state those chloride levels in mg/kg, particularly as they relate to vegetation. In order to convert evidence given the Commission in mg/l, for instance in Mr. Mullins' models, one may approximate a mg/l measure by multiplying the mg/l by twenty to arrive at a statement in mg/kg. Moreover, in order to arrive at a measurement of waste chlorides in mg/kg, the Commission finds that it is preferable for operators to use EPA Method 300.0, instead of the proposed combination of EPA Method SW-846 Method 1312, for extraction, and EPA Method 300.0, for analysis,

N. While chloride is not toxic, it is a valuable marker for other contaminates because it is more soluble and will travel ahead of other constituents. Modeling presented to the Commission of the transport of chlorides through the vadose zone from pit leachate with a chloride concentration of approximately 100,000 mg/l showed that it would take thousands of years for chloride to reach a receptor that is located 100 feet horizontally and 100 feet vertically from the bottom of the pit. The same model showed that, assuming leachate at 1,000 mg/l, it would take close to 1,000 years for chloride to reach a receptor that is 100 feet horizontally and 25 feet vertically from the bottom of the pit, and 700 years, if at all, to reach a receptor that is located 25 feet directly under the bottom of the pit. Moreover, the maximum concentrations of chloride that reached the receptors were de minimus. The fact that the models were two dimensional, as opposed to three dimensional, means that the

results are relatively conservative because the models did not take into account the diminution of chlorides as they disperse in a three dimensional plume The modeler, Mr. Mullins, used two accepted codes to construct the models; one provided the infiltration rate, or vertical drainage, of water, which, along with other data, was input into the second code, which produced the two dimensional model. Both users' manuals were provided to the Commission, as well as the engineering manual for the two dimensional code. To obtain the precipitation and other climatic values for the models, the modeler used 50 years of data from Hobbs, Maljamar, Carlsbad and Artesia, New Mexico, data from Aztec, New Mexico, and a 50-year synthetic model for the temperature and solar profile of Roswell, New Mexico, representative of the oil and gas producing regions in New Mexico. He compared the results of the code that yielded the infiltration rate to published literature on the infiltration rates for the areas modeled and found them to be reasonable. The models assumed pit construction to be as required by the Pit Rule. They also assumed solid pit contents, as is required by the Pit Rule, receiving intermittent fluid, and poor vegetation at the surface. The rest of the variables were similar to those used by OCD in earlier modeling. The modeler ran numerous sensitivity tests with respect to evaporative zone depth, precipitation, liner quality, soil conductivity, wind speed, humidity, solar radiation, and soil texture and hydraulic conductivity. The Commission also was presented with a simulation that showed a much faster rate of chloride transport, as quickly as 13 feet in 20 years. The point of the simulation, however, was to demonstrate how fast and how far it was theoretically possible for chloride to move, not an actual profile of chloride movement. The simulation was one dimensional, and the infiltration rates that were used were not compared to published New Mexico infiltration rates.

O. The Commission heard testimony from several soil physicists. With respect to downward migration of chlorides, evidence indicated that chlorides, regardless of concentration, would migrate to a particular depth, accumulate, and beyond that depth begin to taper off until the concentration resembled the native concentration in the soil. The depth of this accumulation of chlorides, the "bulge," varies depending on the flow of fluid into the soil. Most of the evidence indicated that the bulge tended to occur at 10 to 15 feet, under the climatic and soil conditions of New Mexico. Sampling taken by one of the soil physicists at New Mexico pit sites showed a salt plume as deep as 25 to 30 feet beneath the surface. The subject pits, however, were neither constructed, operated, nor closed under current Pit Rule conditions, and the Commission does not know the amount of fluid that the pits contained at burial, or whether the sites were subject to spills or other conditions that would have caused an extraordinary infiltration of fluids.

P. The Commission finds that constituents reflected in Tables I and II (other than chloride), benzene, and toluene, ethylbenzene and xylene (a compound commonly referred to as BTEX), as well as the gasoline range organics ("GRO") and diesel range organics ("DRO"), which are compounds in the total petroleum hydrocarbons ("TPH"), are light aromatics. While they are soluble and are able to travel to groundwater, they are slower than chlorides in unsaturated flow, which is why

chlorides are used as the outer boundary marker for contaminates. Moreover, the light aromatics are volatile, particularly benzene, which is highly volatile. The resident time for light aromatics is very short, and they will evaporate quickly and degrade in the soil. This is particularly true during closure and mixing. The benzene level that is reflected in Tables I and II, is lower than the levels recommended by the American Petroleum Institute, and GRO and DRO, while they could affect the odor and taste of water, are not a matter of concern with respect to toxicity. The other compounds in TPH, the oil range organics and asphaltenes, are made up of large molecules and are not sufficiently mobile to pose a concern for human health or fresh water.

Q. The Commission finds that control of potential releases of fluids from pits and below grade tanks is an important factor in providing reasonable protection of fresh water, and protection of public health and the environment. This is so, in part, because water moves very slowly in unsaturated conditions, and more quickly in saturated conditions. The risk of release, then, is greater in the operational phase, where pits contain liquids. It is necessary that a pit be constructed in an effort to reduce stress on the liner. The Commission received evidence that allowing pit slopes to be at the angle of repose would increase stress on the liner and would not guard against collapse. The Commission finds that the angle of pit slopes at ratio no less than 2 feet horizontally to 1 foot vertically will reduce liner stress. Additionally, pits that contain fluids for a relatively long period of time, permanent pits and multi-well fluid management pits, are required to have leak detection systems comprised of two liners and a drainage and removal system constructed and sloped in such a way as to achieve the earliest possible detection of a leak. While fluids are in those pits, they must be inspected weekly, including the leak detection system. Similarly, in order to minimize the risk of overflow from below grade tanks, the Commission finds that the use of an alarm is not sufficiently protective and that below grade tanks must be equipped with automatic high level shutoff controls device and manual controls. Regular inspections for leaks and to determine whether liners have been compromised are a necessary part of the Pit Rule system. In addition to the inspections required for permanent pits and multi-well fluid management pits, the Commission finds that temporary pits must be inspected daily, while the rig is on location and, thereafter, weekly, until the pit has been dewatered. The operator shall keep a log of such inspections, which shall be available to OCD on request. Moreover, response time to a release or liner damage must be short. While there was testimony that maintenance of a boom or other device on site was unnecessary, the Commission also heard testimony that not having a boom on site could cost a significant response time, and the Commission finds that maintenance of a boom or like device on site is prudent and is required. The Commission further heard testimony and finds that response time is enhanced by requiring a compromise in a liner that is above the fluid surface be repaired within 48 hours, or the operator must seek a variance from the appropriate district office. Finally, while fluid from a temporary pit should be removed promptly after cessation of operations, the Commission heard testimony that a requirement to remove fluid within 30 days has often proven not to be practicable because of weather or equipment availability. The Commission finds, then,

that the time limit for removing fluids from temporary pits should be lengthened to 60 days from the cessation of operations.

R. The Commission finds that revegetation is an important factor in providing reasonable protection of fresh water, and protection of public health and the environment. Revegetation of the area over a pit protects against erosion and movement of chlorides and other waste constituents toward groundwater. Chlorides from pit waste are not only a concern because of potential groundwater contamination, but also because they stress vegetation. Shrubs generally root at 3 to 4 feet, while grasses are generally confined to the upper two feet. The Commission received evidence that, while some native species in New Mexico are more salt tolerant, a chloride concentration of 600 mg/kg is a conservative level for soil that will sustain vegetation. The Commission finds, then, that the top four feet of soil cover should have no greater chloride concentration than 600 mg/kg, unless the native soil concentration is greater. The Commission also received evidence that salt from pit contents will migrate up, thereby causing concern that it not migrate far enough toward the surface to affect vegetation. Evidence supports the conclusion, though, that such migration is limited and likely will be somewhere in the range of 12 inches. The Commission finds that four feet of cover, particularly in light of additional backfill at pit closure, is sufficient to protect against the threat to vegetation from the upward migration of salts. For shallow excavations to support drying pads and below grade tanks with no evidence of leaks or spills, if the soil under the pad or tank is no more than 600 mg/kg, cover need not be more than one foot. The Commission further finds that seeding to establish categories of vegetation, as opposed to specific species, allows flexibility and encourages successful revegetation. Moreover, revegetation is most successful where native species are used. In order to allow flexibility, however, "native" should not be interpreted to mean in the immediate vicinity of the revegetative efforts, and the Commission finds that revegetating with regional native life forms will enhance successful revegetation. Finally, because weather and planting conditions may not be favorable in the first growing season after pit closure, the operator should be required to seed in the first favorable growing season following pit closure.

S. Based on the modeling presented to the Commission and other evidence presented to the Commission regarding, without limitation, chloride movement through soils, the salt bulge, migration of salts toward the surface, the mobility of chlorides as compared to the non-chloride constituents reflected in the Tables in Section 19.15.17.13 of Attachment A, closure and revegetation, and the mobility, toxicity, and volatility of the constituents and compounds set forth in the Tables, a majority of the Commission finds that the closing standards that are the constituent levels set forth in Table I and Table II in Section 19.15.17.13 of Attachment A, in conjunction with the other requirements of Attachment A, including without limitation, requirements concerning construction and design of pits, burial trenches and below grade tanks, and operation, closure and revegetation, provide reasonable protection of groundwater and protection of public health and the environment. While the Applications requested higher chloride levels in Table II, the modeling presented

to the Commission for groundwater at a depth of 25 feet beneath pit waste was based on approximately 20,000 mg/kg of chloride, and the Commission declines to adjust the chloride level in Table II for stabilized waste where groundwater is 25 to 50 feet below the surface of the waste to a level greater than that which was modeled. Moreover, given the foregoing referenced evidence and requirements, a majority of the Commission finds that doubling the chloride levels in Table II as the groundwater depth increases at 50 foot increments is reasonable and consistent with typical engineering safety factors. Finally, because any pit may be sited where groundwater is 50 feet from the bottom of the pit, and the bottom of low chloride pits and below grade tanks may be sited 25 feet from groundwater, the Commission declines to set the chloride trigger for further investigation in Table I, where groundwater is less than 50 feet from the bottom of a pit, at 5,000 mg/kg, as requested by the Applicants. Given the proximity of the groundwater and the fact that the facilities that are subject to Table I criteria were fluid bearing prior to closure, the Commission believes that a conservative standard for triggering an investigation at that groundwater depth is more appropriate. Under Table I, the Commission finds that requiring further investigation where groundwater is 50 feet or less from the bottom of the structure and the chloride concentration of the soil exceeds 600 mg/kg provides reasonable protection of fresh water and protection of public health and the environment.

T. The Commission heard testimony that drilling muds with chloride levels of 12,000 to 13,000 mg/l are much lower in chloride content than other muds. Seawater has a chloride level of approximately 19,000 mg/l and protected water in New Mexico has a total dissolved solids level of 10,000 mg/l. Other states distinguish between low and non-low chloride fluids. Colorado, for instance, does not require a permit for pits containing fluids with a concentration of chlorides that is less than 15,000 mg/l. Because low chloride fluids present less risk to the environment, a majority of the Commission finds that allowing different siting requirements for low chloride pits provides reasonable protection of fresh water, and protects public health and the environment. A majority of the Commission further finds that 15,000 mg/l is a reasonable level for demarcation of a low chloride fluid and that establishing such a level for low chloride fluids provides reasonable protection of fresh water, and protects public health and the environment. The closure standards in Table II of Section 19.15.17.13 of Attachment A assume dewatered and stabilized waste, and apply to all pits. The significance of a low chloride fluid pit is operational, when a temporary pit contains fluid. The fact that the size and life span of a temporary pit before it is dewatered are limited, along with construction and operational requirements for temporary pits, further reduces the operational risk of a low chloride pit. Based on the foregoing, and on the modeling presented to the Commission and other evidence presented to the Commission regarding, without limitation, depth and constituent levels of the salt bulge, the depth below the salt bulge at which native chloride levels are reestablished, the mobility of chlorides as compared to the non-chloride constituents, migration of salts toward the surface, operational, closure and revegetation requirements, and the mobility, toxicity, and volatility of the non-chloride constituents in Table II, a majority of the Commission finds that prohibiting placement of a temporary pit with low chloride fluids where groundwater is less than

25 feet from the bottom of the pit provides reasonable protection of fresh water, and protects public health and the environment.

U. For a temporary pit, the primary concern of siting requirements, other than with respect to groundwater, is surface transport. Thus, construction, inspection and operational requirements, along with available response time, are significant. The Commission was provided with testimony that each of the siting requirements for temporary low chloride pits that is set forth in the Pit Rule that is Attachment A provides an adequate response time to address a release. A majority of the Commission finds that, in conjunction with the construction, inspection, closure and operational requirements set forth in the Pit Rule, the siting requirements for temporary low chloride pits that are set forth in the Pit Rule that is Attachment A provide reasonable protection of fresh water, and protect public health and the environment. The Commission further finds that a request by an operator to deviate from these siting requirements, with respect to any temporary pit or trench burial, shall be a request for an exception and shall require the opportunity for a public hearing.

V. Based on the modeling presented to the Commission, and the evidence before the Commission regarding the depth and constituent levels of the salt bulge, the depth below the salt bulge at which native chloride levels are reestablished, the mobility of chlorides as compared to the non-chloride constituents, migration of salts toward the surface, pit construction and design requirements, closure and revegetation requirements, and the mobility, toxicity, and volatility of the non-chloride constituents in Table II of 19.15.17.13, the siting requirements for on-site burial, whether in-place or trench, as set forth in the Pit Rule that is Attachment A provide reasonable protection of fresh water, and protect public health and the environment.

W. Material excavated from digging a pit is not contaminated and must be transported to a receptor over the surface if it is to affect fresh water, public health or the environment. Accordingly the risk of contamination for such excavated material is low. The Commission received testimony that the siting requirements for excavated material, as set forth in the Pit Rule that is Attachment A are reasonably protective of fresh water, public health and the environment. The Commission finds that the siting requirements for excavated material, as set forth in the Pit Rule that is Attachment A, provide reasonable protection of fresh water, and protect public health and the environment.

X. The Commission also received evidence that prohibiting placement of a temporary pit that contains fluids that are not low chloride within 300 feet of a wetland provides an adequate response time to address a release. The Commission further received evidence that if the risk to a wetland from such a pit is other than surface transport, the water table likely will be sufficiently shallow that the vertical siting requirement for a non-low chloride temporary pit, which is not amended by this Order, will prohibit a pit at that location. A majority of the Commission finds that, in conjunction with the construction, inspection and operational requirements set forth in

the Pit Rule, prohibiting placement of a temporary pit that contains fluids that are not low chloride within 300 feet of a wetland provides reasonable protection of fresh water, and protects public health and the environment.

Y. The Commission is aware that the 2009 Pit Rule contains certain siting requirements and constituent standards that are similar to those found in 19.15.36 NMAC, in order to achieve consistency with landfarm requirements and standards. 19.15.36.13(C) NMAC, however, limits the size of a surface waste management facility to 500 acres. The Commission finds that because of the differences in life span and size of a surface waste management facility and the pits that are governed by the Pit Rule, and based on the modeling presented to the Commission, and the evidence before the Commission regarding the depth and constituent levels of the salt bulge, the depth below the salt bulge at which native chloride levels are reestablished, the mobility of chlorides as compared to the non-chloride constituents, migration of salts toward the surface, pit construction and design requirements, closure, operational and revegetation requirements, and the mobility, toxicity, and volatility of the non-chloride constituents it is not necessary for the requirements of the Pit Rule to mirror those in 19.15.36 NMAC.

Z. A below grade tank typically is made of metal or fiberglass. Whether newly installed, retrofitted or installed prior to June 16, 2008 and not retrofitted, the tank must be capable of inspection and demonstrate integrity. Newly installed or retrofitted single-walled tanks must be capable of inspection, elevated, underlain with a specified quality geomembrane and with a leak diversion and detection system and automatic high level shut off control device. If the side walls of a newly installed tank are not open for inspection, the tank must be double walled, with a leak detection system. All tanks are required to be constructed so as to prevent overflow and the collection of surface water run-on. Under these conditions, it is reasonable to treat a below grade tank differently from a pit with respect to siting. The Commission also was provided with testimony that each of the siting requirements for below grade tanks that is set forth in the Pit Rule that is Attachment A provides an adequate response time to address a release. Even so, while the Commission believes that a reduction in setback restrictions for a below grade tank is justified, because of the possibility of a breach and the contents of a below grade tank, in an abundance of caution, the Commission will not allow such a tank to be sited within 10 feet of groundwater, as requested in the Applications, and the Commission prohibits siting a below grade tank where depth to groundwater is less than 25 feet from the bottom of the tank. The Commission finds that, in conjunction with the construction, inspection and operational requirements set forth in the Pit Rule, the siting requirements for below grade tanks that are set forth in the Pit Rule that is Attachment A provide reasonable protection of fresh water, and protect public health and the environment.

AA. The Commission received evidence that the purpose of a multi-well fluid management pit is water storage, predominantly produced or recycled water, with some flowback water, so that it may be reused to fracture stimulate wells. Certain formations previously thought to be non-producing now are available due to

technological advances and are becoming the cornerstone of New Mexican production. Hydraulic fracturing is necessary in order to produce these formations. While hydraulic fracturing has been common in New Mexico, the size of hydraulic fracturing jobs, and therefore the need for water, has increased with the advent of horizontal drilling. There are a number of economic and environmental advantages to the use of multi-well fluid management pits. A multi-well fluid management pit holds much more water than the temporary tanks currently used for fracturing multi-well or horizontal projects. Moreover, the multi-well fluid management pit allows the reuse of water, not only decreasing the cost of purchasing and disposing of water, but reducing the use of New Mexico's fresh water. Use of these pits also reduces the need to haul fresh water to the site, reducing fuel cost and usage, as well as truck traffic; and it reduces the footprint and surface disturbance required for each hydraulic fracturing job. Multi-well fluid management pits are large, however, and may hold 20 to 40 acre feet of water, the chemical character of which, after reuse, is consistent with the contents of temporary, workover and drilling pits. The Commission finds that multi-well fluid management pits should be permitted under the Pit Rule, but that their life span and size must be controlled. The Commission further finds that the size and life span of a multi-well fluid management pit is controlled by the number of wells that may be serviced by the pit, by requiring those wells to be identified in the permit related to the pit, by requiring that the addition of any wells to the pit permit or the extension of any of the permits to drill originally identified to the pit permit will require a hearing, and by requiring that the pit be closed within six months of the date that the operator ceases all stimulation operations on all wells identified in the permit. While Applicants urge that a multi-well fluid management pit is most akin to a temporary pit, the Commission finds that the size and life span of a multi-well fluid management pit, which could be up to 5 years, and the fact that it is fluid bearing for that period of time, it is more prudent to treat the multi-well fluid management pit more like a permanent pit, with respect to siting, construction, operation and closure. The Commission finds that there is sufficient environmental and economic justification for permitting multi-well fluid management pits under the Pit Rule, and that doing so under, among other things, the siting, construction, inspection, operation and closure requirements of the Pit Rule that is Attachment A provides reasonable protection of fresh water, and protects public health and the environment.

BB. The Commission was presented with evidence, and finds, that the process for obtaining regulatory permission to vary from certain of the requirements of the 2009 Pit Rule has proved cumbersome and impracticable, and has not promoted the use of best practices in the industry. As a result the Commission now establishes a two tier system for obtaining permission to deviate from Pit Rule requirements. Allowing deviations from rule requirements in certain circumstances is advantageous because it allows flexibility in addressing peculiarities in specific fact situations and encourages the development of best practices and new technology. That advantage must not be gained, however, at the expense of allowing significant departures from a rule upon which the public relies and that has, after all, been adopted in a public forum and subject to public scrutiny. Having two tiers and processes to address operator requests for deviations, "exceptions" for significant deviations and

"variances" for relatively minor deviations, allows OCD and operators the flexibility necessary to address site specific problems with best practices, while assuring stakeholders that a rule adopted through public process will not be abandoned in practice. Exceptions shall be obtained at the division level in Santa Fe. Variances shall be obtained at the district office level, with different processes for each, as set forth in the Pit Rule that is Attachment A, and with the opportunity for a public hearing in the case of exceptions. In order to obtain either an exception or a variance, the operator must show that the proposed deviation provides equal or better protection of fresh water, public health and the environment than the rule or practice from which the operator seeks to depart. The Commission finds that the processes of obtaining exceptions and variances as set forth in the Pit Rule that is Attachment A provide reasonable protection of fresh water, and protect public health and the environment.

CC. The Commission finds that the language, organization, paperwork requirements and complexity of the 2009 Pit Rule are such it should be revised to make it more understandable and less cumbersome for both the regulators and the regulated community. Changes in the rule to remedy these problems, including definitions, are set forth fully in the Pit Rule that is Attachment A and explained by the findings in this Order and the transcript of proceedings. Some of these changes are set forth below, and the Commission finds that each of them reasonably protects fresh water and protects public health and the environment.

- 60 days is an adequate amount of time, generally, for OCD to evaluate and deny, approve or approve with conditions an application for a facility under the Pit Rule. The Commission finds, however, that if OCD fails to act on an application within the 60 days, the result shall be an automatic denial, not automatic approval, as suggested by the Applicants, as the latter would allow an operator to act under a permit that has not been properly evaluated.

- Requiring the applicant to demonstrate to the OCD district office the actual and potential effects on soil, surface water and groundwater in connection with an application for a temporary or multi-fluid management pit or a below grade tank is an unrealistic and unnecessary requirement. Data generated by models, cathodic well lithology and published information are typically used by professionals in hydrogeology in order to determine the approximate depth to groundwater, provide a reasonable approximation of the location of groundwater, are used in other states for such purpose, and will expand the sources that may be used in determining depth to groundwater.

- Requiring an operator to submit with an application an alternative closure plan, in case the initial closure plan is not approved, creates unnecessary work and paperwork, and should be eliminated.

- Requiring an application for a closed-loop system, as required under the 2009 Pit Rule, creates needless paperwork; and notification of closed-loop systems and registration of below grade tanks as required by the Pit Rule that is

Attachment A, provide information that is sufficient for OCD to monitor closed-loop systems and below grade tanks

- The requirement that a steel tank be used in connection with hydrocarbon based drilling fluids de facto means that hydrocarbon based drilling fluids must be used with a closed-loop system, as opposed to using a temporary pit. The requirements of soil testing, spill clean-up, in-place burial, and procedures after cessation of operations make the steel tank requirement unnecessary.

- Allowing the use of standardized plans for temporary and multi-well fluid management pits, as well as for below grade tanks, encourages consistency of design and construction, allows the operator to develop efficiencies and best practices in implementing the design, facilitates inspection and enforcement by OCD, and reduces paperwork in the permitting process.

- While addition of an inspection schedule for permanent pits was not requested in the Applications, the importance of an inspection schedule for permanent pits may be fairly inferred from the inspection requirements for other types of pits, and the Commission finds that the omission of an inspection schedule for permanent pits in the 2009 Pit Rule was inadvertent and that such an inspection schedule should be required.

- Allowing more than one well per temporary pit reduces surface disturbance and is more efficient. Allowing more than one well to use a temporary pit is preferable, so long as the life span may be controlled, which is accomplished by location, permitting and closure requirements.

- Because the length of time that fluids are allowed to remain in a pit and the length of time that a pit may remain open are important factors in the Pit Rule system, it is appropriate to maintain limits on the length of extensions that may be given regarding the deadlines for fluid removal and closure, and for the granting of extensions to be based on the facts of each situation, discretionary, and not automatic.

- Because the definition of "sump" is primarily a function of the use to which the vessel is put, and because the definition provides that the releases that are placed in the sump are "intermittent" and "de minimus" and that the sump remains "predominantly empty," the limit to 500 gallons in the 2009 Pit Rule is superfluous and may be deleted.

DD. The changes in the 2009 Pit Rule that are effected by this Order favorably impact small businesses. The majority of oil and gas producers in New Mexico are both small producers and small businesses. By streamlining and clarifying the Pit Rule, by requiring registration of below grade tanks, instead of permitting them, by relieving the operator of the responsibility to register or permit a closed-loop system, by allowing more flexibility in pit and onsite burial placement, by

reducing the instances where an operator is required to haul waste, by reducing needless paperwork and costs, and by simplifying the regulatory process, all operators benefit, including the small operator. Indeed, much of the impetus behind the Applications appears to be to make compliance with the Pit Rule simpler, more sensitive to operational necessities, and less costly to both small and large operations. The Commission finds that the rule adopted by this Order accomplishes those goals while at the same time providing reasonable protection of fresh water, and protection of public health and the environment.

EE. For the reasons set forth in this entire Order and Statement of Reasons and as further explained in the transcripts of these proceedings and based upon the testimony, exhibits and arguments placed before the Commission, as found herein and as set forth in more detail in the transcript of these proceedings, a majority of the Commission **FINDS** that the Pit Rule that is attached to this Order and Statement of Reasons as Attachment A and the amendments to the 2009 Pit Rule that are effected by Attachment A provide reasonable protection of freshwater, and protect public health and the environment, and that they neither cause waste nor impair correlative rights.

NOW THEREFORE, Title 19, Chapter 15 Part 17 NMAC, as adopted on June 16, 2008 and as amended from time to time is hereby **REPEALED** and **REPLACED** by Title 19, Chapter 15 Part 17 NMAC that is Attachment A and Title 19, Chapter 15 Part 17 NMAC that is Attachment A is hereby **ADOPTED**. Division staff is instructed to secure prompt publication of the referenced rule changes in the New Mexico Register. The Commission retains jurisdiction of this matter for entry of such further orders as may be necessary. **IT IS SO ORDERED**.

DONE in Santa Fe, New Mexico, this 6th day of June, 2013.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

ROBERT BALCH, Member

GREGORY BLOOM, Member

JAMI BAILEY, Chair

SEAL

TITLE 19 NATURAL RESOURCES AND WILDLIFE
CHAPTER 15 OIL AND GAS
PART 17 PITS, CLOSED-LOOP SYSTEMS, BELOW-GRADE TANKS AND SUMPS

19.15.17.1 ISSUING AGENCY: Energy, Minerals and Natural Resources Department, Oil Conservation Division.
[19.15.17.1 NMAC - Rp, 19.15.17.1 NMAC, 6/28/13]

19.15.17.2 SCOPE: 19.15.17 NMAC applies to persons engaged in oil and gas development and production within New Mexico.
[19.15.17.2 NMAC - Rp, 19.15.17.2 NMAC, 6/28/13]

19.15.17.3 STATUTORY AUTHORITY: 19.15.17 NMAC is adopted pursuant to the Oil and Gas Act, NMSA 1978, Section 70-2-6, Section 70-2-11 and Section 70-2-12.
[19.15.17.3 NMAC - Rp, 19.15.17.3 NMAC, 6/28/13]

19.15.17.4 DURATION: Permanent.
[19.15.17.4 NMAC - Rp, 19.15.17.4 NMAC, 6/28/13]

19.15.17.5 EFFECTIVE DATE: June 28, 2013, unless a later date is cited at the end of a section.
[19.15.17.5 NMAC - Rp, 19.15.17.5 NMAC, 6/28/13]

19.15.17.6 OBJECTIVE: To regulate pits, closed-loop systems, and below-grade tanks and sumps used in connection with oil and gas operations for the protection of fresh water, public health and the environment.
[19.15.17.6 NMAC - Rp, 19.15.17.6 NMAC, 6/28/13]

19.15.17.7 DEFINITIONS:

A. "Alluvium" means detrital material that water or other erosional forces have transported and deposited at points along a watercourse's flood plain. It typically is composed of sands, silts and gravels; exhibits high porosity and permeability; and generally carries fresh water.

B. "Below-grade tank" means a vessel with greater than a five barrel capacity, excluding sumps and pressurized pipeline drip traps, installed within an excavation or buried below the surrounding ground surface's elevation. Below-grade tank does not include an above-ground storage tank that is located above or at the surrounding ground surface's elevation and is surrounded by berms.

C. "Closed-loop system" means a system that uses above ground steel tanks for the management of drilling fluids.

D. "Continuously flowing watercourse" means a river, stream or creek that is named or delineated by a solid blue line on a USGS quadrangle map having a scale factor of 1:24,000, or an irrigation channel, or a water course that typically has water flowing during the majority of the days of the year. This does not include ephemeral washes, arroyos, and similar depressions that do not have flowing water during the majority of the days of the year.

E. "Division-approved facility" means a division-permitted surface waste management or injection facility, a facility permitted pursuant to 20.6.2 NMAC, a facility approved pursuant to 19.15.35.8 NMAC or other facility that the division specifically approves for the particular purpose. The division shall not approve any facility not otherwise permitted unless it finds that the facility's use for the specified purpose will protect fresh water, public health and the environment and comply with other applicable federal or state statutes, federal regulations, state rules and local ordinances.

F. "Emergency pit" means a pit that is constructed during an emergency to contain a spill in the event of a release.

G. "Exception" means authorization from the division's Santa Fe office to depart from the requirements of 19.15.17 NMAC.

H. "Floodplain" means US army corps of engineers or FEMA documented 100-year floodplain.

I. "Life-form ratio" means the relative percentage of regionally native plant species in each of the following classifications: shrubs, forbs, and grasses.

J. "Low chloride fluids" means water-based fluids that contain less than 15,000 mg/liter of chlorides as determined by field or laboratory analysis.

K. "Measureable" means a layer of oil, the thickness of which is discernible by color cutting or other acceptable method.

L. "Multi-well fluid management pit" means a pit used for the storage, treatment and recycling of stimulation fluids and flow-back water during the drilling and completion of multiple wells. Multi-well fluid management pits may not be used for the disposal of drilling, completion or other waste. Multi-well fluid management pits may be located either onsite or offsite of a well drilling location and may remain in use until all wells with approved application for permit to drill that are identified in the pit permit are completed. Any addition of wells or extensions for permits to drill identified in the pit permit shall go to hearing. Any containment structure such as a pond, pit, or other impoundment that holds only fresh water that has not been treated for oil field purposes, is not a multi-well fluid management pit.

M. "Onsite" means within the boundaries of a single lease where exploration and production waste is generated.

N. "Permanent pit" means a pit used for collection, retention or storage of produced water or brine that is constructed with the conditions and for the duration provided in its permit, and is not a temporary pit.

O. "Restore" means to return a site to its former condition, in the manner and to the extent required by applicable provisions of 19.15.17 NMAC.

P. "Significant watercourse" means a watercourse with a defined bed and bank either named or identified by a dashed blue line on a USGS 7.5 minute quadrangle map or the next lower order tributary with a defined bed and bank of such watercourse.

Q. "Sump" means a subgrade impermeable vessel that is partially buried in the ground, is in contact with the ground surface, or is a collection device incorporated within a secondary containment system, which remains predominantly empty, serves as a drain or receptacle for de minimis releases on an intermittent basis and is not used to store, treat, dispose of or evaporate products or wastes. Buckets, pails, drip pans or similar vessels that are not in contact with the ground surface are not sumps.

R. "Temporary pit" means a pit, including a drilling or workover pit, which is constructed with the intent that the pit will hold liquids and mineral solids. Temporary pits may be used for one or more wells and must be located at one of the associated permitted well drilling locations. Temporary pits must be closed within six months from the date the operator releases the drilling or workover rig from the first well using the pit. Any containment structure such as a pond, pit, or other impoundment that holds only fresh water that has not been treated for oil field purposes, is not a temporary pit.

S. "Variance" means authorization from the appropriate division district office to depart from the requirements of 19.15.17 NMAC. A variance may not be obtained where exceptions are required by a provision of 19.15.17 NMAC.

T. "Visible" when used with respect to oil on the surface of a pit means any amount of oil whether measurable or a sheen on the pit's liquid surface.

[19.15.17.7 NMAC - Rp, 19.15.17.7 NMAC, 6/28/13]

19.15.17.8 PERMIT OR REGISTRATION REQUIRED:

A. A person shall not construct or use a pit except in accordance with a division-issued permit. Only an operator may apply for a division-issued permit. After June 16, 2008, an unlined pit is prohibited and the division shall not issue a permit for an unlined pit.

B. The division may issue a single permit for all pits or division-approved alternative methods associated with a single application for permit to drill.

C. All below-grade tanks installed after June 28, 2013 must be registered with the appropriate division district office. The operator shall file a single registration for all below-grade tanks associated with a single application for permit to drill.

D. Closed-loop systems and sumps do not require a division-issued permit or registration with the division's district office.

[19.15.17.8 NMAC - Rp, 19.15.17.8 NMAC, 6/28/13]

19.15.17.9 PERMIT APPLICATION AND REGISTRATION:

A. An operator shall use the appropriate form C-144 to apply to the division for a permit to construct or use a pit or proposed alternative method, or to register a below-grade tank. The operator shall submit the form C-144 either separately or as an attachment to a permit application for a facility with which the pit, below-grade tank or proposed alternative method will be associated. An operator shall use a C-101, C-103 or applicable bureau of land management form to notify the appropriate division district office of construction or use of a closed-loop system.

B. The permit application shall include a detailed plan as follows.

(1) Permanent pits. A registered professional engineer shall certify engineering, design and construction specifications as contained in the plan for permanent pits. The plan shall include:

(a) a quality control/quality assurance construction and installation plan;

(b) operating and maintenance procedures;

(c) a closure plan;

(d) a hydrogeologic report that provides sufficient information and detail on the site's topography, soils, geology, surface hydrology and ground water hydrology to enable the division's Santa Fe office to evaluate the actual and potential effects on soils, surface water and ground water;

(e) detailed information on dike protection and structural integrity; and leak detection, including an adequate fluid collection and removal system;

(f) liner specifications and compatibility;

(g) freeboard and overtopping prevention;

(h) prevention of nuisance or hazardous odors, including H2S;

(i) an emergency response plan, unless the permanent pit is part of a facility that has an integrated contingency plan;

(j) type of oil field waste stream;

(k) climatological factors, including freeze-thaw cycles;

(l) a monitoring and inspection plan;

(m) erosion control; and

(n) other pertinent information the environmental bureau in the division's Santa Fe office requests.

(2) Temporary pits. The plan for design and construction of a temporary pit shall follow applicable liner manufacturers' requirements. The permit application also shall include operating and maintenance procedures, a closure plan and hydrogeologic data that provides sufficient information and detail on the site's topography, soils, geology, surface hydrology and ground water hydrology to enable the appropriate division district office to evaluate compliance with the siting criteria of 19.15.17.10 NMAC. In the absence of site-specific ground water data, the operator can provide a reasonable determination of probable ground water depth using data generated by models, cathodic well lithology, published information or other tools as approved by the appropriate division district office. The plan for a temporary pit may incorporate by reference a standard design for multiple temporary pits that the operator files with the application or has previously filed with the appropriate division district office. The operator may utilize, with approval by the appropriate division district office, standardized plans for pit construction, pit closure, and other plans which will remain approved until a subsequent plan is either required by the appropriate division district office or is submitted by the operator and approved by the appropriate division district office. A copy of the approved standardized plan shall be included in the division's electronic well file for each associated well.

(3) Below-grade tanks. The registration of a below-grade tank shall include operating and maintenance procedures, a closure plan and a hydrogeologic report that demonstrates compliance with the siting criteria of 19.15.17.10 NMAC. In the absence of site-specific ground water data, the operator can provide a reasonable determination of probable ground water depth using data generated by models, cathodic well lithology, published information or other tools as approved by the appropriate division district office. The registration of a below-grade tank may incorporate by reference a standard design for multiple below-grade tanks that the operator files with the application or has previously filed with the appropriate division district office. The operator may utilize, with approval by the appropriate division district office, standardized plans for below-grade tank construction, and other plans which will remain approved until a subsequent plan is either required by the appropriate division district office or is submitted

by the operator and approved by the appropriate division district office. A copy of the approved standardized plan shall be included in the division's electronic well file for each associated well.

(4) Multi-well fluid management pits. The design and construction plan for a multi-well fluid management pit shall follow applicable liner manufacturers' requirements. The permit application also shall include operating and maintenance procedures, a list of wells with approved application for permit to drill associated with the pit, a closure plan and hydrogeologic data that provides sufficient information and detail on the site's topography, soils, geology, surface hydrology and ground water hydrology to enable the appropriate division district office to evaluate compliance with the siting criteria of 19.15.17.10 NMAC. In the absence of site-specific ground water data, the operator can provide a reasonable determination of probable ground water depth using data generated by models, cathodic well lithology, published information or other tools as approved by the appropriate division district office. The plan for a multi-well fluid management pit may incorporate by reference a standard design for multiple fluid management pits that the operator files with the application or has previously filed with the appropriate division district office. The operator may utilize, with approval by the appropriate division district office, standardized plans for pit construction, pit closure, and other plans which will remain approved until a subsequent plan is either required by the appropriate division district office or is submitted by the operator and approved by the appropriate division district office.

C. Filing of permit application.

(1) Permanent pits: An operator shall file an application on form C-144, including required attachments, with the division's Santa Fe office to request approval to use or construct a permanent pit and shall provide a copy to the appropriate division district office.

(2) Temporary pits, and multi-well fluid management pits. An operator shall file an application on form C-144, including required attachments, with the appropriate division district office. If the operator plans to use a temporary pit, or multi-well fluid management pit, the operator shall provide the proposed pit location on form C-102.

[19.15.17.9 NMAC - Rp, 19.15.17.9 NMAC, 6/28/13]

19.15.17.10 SITING REQUIREMENTS:

A. Except as otherwise provided in 19.15.17 NMAC.

(1) An operator shall not locate a temporary pit containing low chloride fluid:

(a) where ground water is less than 25 feet below the bottom of the pit; a variance may be granted for a pit used solely to cavitate a coal bed methane well and where the operator demonstrated that the proposed operation will protect groundwater during the temporary pit's use;

(b) within (i) 100 feet of any continuously flowing watercourse or any other significant watercourse, or (ii) 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark);

(c) within 300 feet from an occupied permanent residence, school, hospital, institution or church in existence at the time of initial application;

(d) within (i) 200 feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or (ii) 300 feet of any other fresh water well or spring, in existence at the time of the initial application;

(e) within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended, unless the municipality specifically approves;

(f) within 100 feet of a wetland;

(g) within the area overlying a subsurface mine, unless a variance is granted that approves the proposed location based upon the operator's demonstration that the temporary pit's construction and use will not compromise the subsurface integrity;

(h) within an unstable area, unless a variance is granted upon a demonstration that the operator has incorporated engineering measures into the design to ensure that the temporary pit's integrity is not compromised; or

(i) within a 100-year floodplain.

(2) Unless a variance is specifically provided for in Paragraph (1) of Subsection A of 19.15.17.10 NMAC, an operator must obtain an exception to locate a temporary pit containing low chloride fluids inside setbacks set forth in Paragraph (1) of Subsection A of 19.15.17.10 NMAC.

(3) An operator shall not locate a temporary pit containing fluids that are not low chloride fluids:

(a) where ground water is less than 50 feet below the bottom of the pit; a variance may be granted for a pit used solely to cavitate a coal bed methane well and where the operator demonstrated that the proposed operation will protect groundwater during the temporary pit's use;

(b) within (i) 300 feet of any continuously flowing watercourse or any other significant watercourse or (ii) 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark);

(c) within 300 feet from an occupied permanent residence, school, hospital, institution or church in existence at the time of initial application;

(d) within (i) 500 feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or (ii) 1,000 feet of any other fresh water well or spring, in existence at the time of the initial application;

(e) within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended, unless the municipality specifically approves;

(f) within 300 feet of a wetland;

(g) within the area overlying a subsurface mine, unless a variance is granted that approves the proposed location based upon the operator's demonstration that the temporary pit's construction and use will not compromise the subsurface integrity;

(h) within an unstable area, unless a variance is granted upon a demonstration that the operator has incorporated engineering measures into the design to ensure that the temporary pit's integrity is not compromised; or

(i) within a 100-year floodplain.

(4) An operator must obtain a variance to locate a temporary pit containing non-low chloride fluids inside setbacks set forth in Paragraph (3) of Subsection A of 19.15.17.10 NMAC. The operator must obtain an exception to locate a non-low chloride fluids temporary pit inside setbacks set forth in Paragraph (1) of Subsection A of 19.15.17.10 NMAC.

(5) An operator shall not locate a permanent pit or multi-well fluid management pit:

(a) where ground water is less than 50 feet below the bottom of the permanent pit;

(b) within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole or playa lake (measured from the ordinary high-water mark), unless the division's Santa Fe office approves an alternative distance based upon the operator's demonstration that surface and ground water will be protected;

(c) within 1000 feet from a permanent residence, school, hospital, institution or church in existence at the time of initial application;

(d) within 500 feet of a spring or a fresh water well used for domestic or stock watering purposes, in existence at the time of initial application;

(e) within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended, unless the municipality specifically approves;

(f) within 500 feet of a wetland;

(g) within the area overlying a subsurface mine, unless the operator obtains an exception and demonstrates that the pit's construction and use will not compromise subsurface integrity;

(h) within an unstable area, unless the operator demonstrates that it has incorporated engineering measures into the design to ensure that the pit's integrity is not compromised; or

(i) within a 100-year floodplain.

(6) An operator must obtain an exception to locate a permanent pit or multi-well fluid management pit inside setbacks set forth in Paragraph (5) of Subsection A of 19.15.17.10 NMAC.

(7) An operator shall not locate material excavated from a pit's construction:

(a) within 100 feet of a continuously flowing watercourse or a significant watercourse;

(b) 200 feet from a lakebed, sinkhole or playa lake (measured from the ordinary high-water mark);

(c) within 100 feet of a wetland; or

(d) within a 100-year floodplain.

(8) An operator shall not locate a below-grade tank:

(a) within 100 feet of a continuously flowing watercourse, significant watercourse, lakebed, sinkhole, wetland or playa lake (measured from the ordinary high-water mark);

(b) within 200 feet of a spring or a fresh water well used for public or livestock consumption;

(c) where depth to ground water is less than 25 feet below the bottom of the tank.

B. An emergency pit is exempt from the siting criteria of 19.15.17 NMAC.

C. Closure for burial trenches and in place closure.

(1) An operator shall not implement trench or in-place closure:

(a) where ground water is less than 25 feet below the bottom of the buried waste;

(b) within 100 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole or playa lake (measured from the ordinary high-water mark);

(c) within 300 feet from an occupied permanent residence, school, hospital, institution or church in existence at the time of initial application;

(d) within 300 feet of a spring or private, domestic fresh water well used for domestic or stock watering purposes;

(e) within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended, unless the municipality specifically approves;

(f) within 300 feet of a wetland;

(g) within the area overlying a subsurface mine, unless the division specifically approves the proposed location based upon the operator's demonstration that subsurface integrity will not be compromised;

(h) within an unstable area, unless the operator demonstrates that it has incorporated engineering measures into the design to ensure that the onsite closure method will prevent contamination of fresh water and protect public health and the environment; or

(i) within a 100 year floodplain.

(2) An operator must obtain a variance to locate a burial trench inside setbacks set forth in Paragraph (3) of Subsection A of 19.15.17.10 NMAC. The operator must obtain an exception to locate a burial trench inside setbacks set forth in Paragraph (1) of Subsection A of 19.15.17.10 NMAC.
[19.15.17.10 NMAC - Rp, 19.15.17.10 NMAC, 6/28/13]

19.15.17.11 DESIGN AND CONSTRUCTION SPECIFICATIONS:

A. General specifications. An operator shall design and construct a pit, closed-loop system, below-grade tank or sump to contain liquids and solids; prevent contamination of fresh water; and protect public health and the environment.

B. Stockpiling of topsoil. Prior to constructing a pit, except a pit constructed in an emergency, the operator shall strip and stockpile the topsoil for use as the final cover or fill at the time of closure.

C. Signs. The operator shall post an upright sign not less than 12 inches by 24 inches with lettering not less than two inches in height in a conspicuous place on the fence surrounding the pit or below-grade tank, unless the pit or below-grade tank is located on a site where there is an existing well, signed in compliance with 19.15.16.8 NMAC, that is operated by the same operator. The operator shall post the sign in a manner and location such that a person can easily read the legend. The sign shall provide the following information: the operator's name; the location of the site by quarter-quarter or unit letter, section, township and range; and emergency telephone numbers.

D. Fencing.

(1) The operator shall fence or enclose a pit or below-grade tank in a manner that deters unauthorized access and shall maintain the fences in good repair. Fences are not required if there is an adequate surrounding perimeter fence that prevents unauthorized access to the well site or facility, including the pit or below-grade tank. During drilling or workover operations, the operator is not required to fence the edge of the pit adjacent to the drilling or workover rig.

(2) The operator shall fence or enclose a pit located within 1000 feet of an occupied permanent residence, school, hospital, institution or church with a chain link security fence, at least six feet in height with at least two strands of barbed wire at the top. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite. During drilling

or workover operations, the operator is not required to fence the edge of the temporary pit adjacent to the drilling or workover rig.

(3) The operator shall fence any other pit or below-grade tank to exclude livestock with a four foot fence that has at least four strands of barbed wire evenly spaced in the interval between one foot and four feet above ground level.

E. Netting. The operator shall ensure that a permanent pit, a multi-well fluid management pit, or an open top tank is screened, netted or otherwise rendered non-hazardous to wildlife, including migratory birds. Where netting or screening is not feasible, the operator shall on a monthly basis inspect for, and within 30 days of discovery, report discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the appropriate division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

F. Temporary pits. The operator shall design and construct a temporary pit in accordance with the following requirements.

(1) The operator shall design and construct a temporary pit to ensure the confinement of liquids to prevent releases.

(2) A temporary pit shall have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. The operator shall construct a temporary pit so that the slopes are no steeper than two horizontal feet to one vertical foot (2H:1V). The appropriate division district office may approve an alternative to the slope requirement if the operator demonstrates that it can construct and operate the temporary pit in a safe manner to prevent contamination of fresh water and protect public health and the environment.

(3) The operator shall design and construct a temporary pit with a geomembrane liner. The geomembrane liner shall consist of 20- mil string reinforced LLDPE or equivalent liner material that the appropriate division district office approves. The geomembrane liner shall be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. The liner material shall be resistant to ultraviolet light. Liner compatibility shall comply with EPA SW-846 Method 9090A.

(4) The operator shall minimize liner seams and orient them up and down, not across, a slope. The operator shall use factory welded seams where possible. Prior to field seaming, the operator shall overlap liners four to six inches. The operator shall minimize the number of field seams in corners and irregularly shaped areas. Qualified personnel shall field weld and test liner seams.

(5) Construction shall avoid excessive stress-strain on the liner.

(6) Geotextile is required under the liner where needed to reduce localized stress-strain or protuberances that may otherwise compromise the liner's integrity.

(7) The operator shall anchor the edges of all liners in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep, unless anchoring to encountered bedrock provides equivalent anchoring.

(8) The operator shall ensure that the liner is protected from any fluid force or mechanical damage at any point of discharge into or suction from the lined temporary pit.

(9) The operator shall design and construct a temporary pit to prevent run-on of surface water. A berm, ditch, proper sloping or other diversion shall surround a temporary pit to prevent run-on of surface water. During drilling operations, the edge of the temporary pit adjacent to the drilling or workover rig is not required to have run-on protection if the operator is using the temporary pit to collect liquids escaping from the drilling or workover rig and run-on will not result in a breach of the temporary pit.

(10) The volume of a temporary pit shall not exceed 10 acre feet, including freeboard.

(11) The part of a temporary pit used to vent or flare gas during a drilling or workover operation that is designed to allow liquids to drain to a separate temporary pit does not require a liner, unless the appropriate division district office requires an alternative design in order to protect surface water, ground water and the environment. The operator shall not allow freestanding liquids to remain on the unlined portion of a temporary pit used to vent or flare gas.

G. Permanent pits. The operator shall design and construct a permanent pit in accordance with the following requirements.

(1) Each permanent pit shall have a properly constructed foundation consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. The operator shall construct a permanent pit so that the inside grade of the levee is no steeper than

two horizontal feet to one vertical foot (2H:1V). The levee shall have an outside grade no steeper than three horizontal feet to one vertical foot (3H:1V). The levee's top shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance.

(2) Each permanent pit shall contain, at a minimum, a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions. The edges of all liners shall be anchored in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep.

(3) The primary (upper) liner and secondary (lower) liner shall be geomembrane liners. The geomembrane liner shall consist of 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner material the division's Santa Fe office approves. The geomembrane liner shall have a hydraulic conductivity no greater than 1 x 10-9 cm/sec. The geomembrane liner shall be composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. Liner compatibility shall comply with EPA SW-846 Method 9090A, or subsequent relevant publication.

(4) The division's Santa Fe office may approve other liner media if the operator demonstrates to the satisfaction of the division's Santa Fe office that the alternative liner protects fresh water, public health, and the environment as effectively as the specified media.

(5) The operator shall minimize liner seams and orient them up and down, not across, a slope. The operator shall use factory welded seams where possible. The operator shall ensure field seams in geosynthetic material are thermally seamed (hot wedge) with a double track weld to create an air pocket for non-destructive air channel testing. The operator shall test a seam by establishing an air pressure between 33 and 37 psi in the pocket and monitoring that the pressure does not change by more than one percent during five minute after the pressure source is shut off from the pocket. Prior to field seaming, the operator shall overlap liners four to six inches and orient seams, up and down, not across, the slope. The operator shall minimize the number of field seams in corners and irregularly shaped areas. There shall be no horizontal seams within five feet of the slope's toe. Qualified personnel shall perform field welding and testing.

(6) At a point of discharge into or suction from the lined permanent pit, the operator shall ensure that the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines shall not penetrate the liner.

(7) The operator shall place a leak detection system between the upper and lower geomembrane liners that consists of two feet of compacted soil with a saturated hydraulic conductivity of 1 x 10-5 cm/sec or greater to facilitate drainage. The leak detection system shall consist of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions and sloped to facilitate the earliest possible leak detection. Piping used shall be designed to withstand chemical attack from oil field waste or leachate; structural loading from stresses and disturbances from overlying oil field waste, cover materials, equipment operation or expansion or contraction; and to facilitate clean-out maintenance. The material the operator places between the pipes and laterals shall be sufficiently permeable to allow the transport of fluids to the drainage pipe. The slope of the interior sub-grade and of drainage lines and laterals shall be at least a two percent grade, i.e., two feet vertical drop per 100 horizontal feet. The piping collection system shall be comprised of solid and perforated pipe having a minimum diameter of four inches and a minimum wall thickness of schedule 80. The operator shall seal a solid sidewall riser pipe to convey collected fluids to a collection, observation and disposal system located outside the permanent pit's perimeter. The operator may install alternative methods that the division's Santa Fe office approves.

(8) The operator shall notify the division's Santa Fe office at least 72 hours prior to the primary liner's installation so that a representative of the environmental bureau in the division's Santa Fe office may inspect the leak detection system before it is covered.

(9) The operator shall construct a permanent pit in a manner that prevents overtopping due to wave action or rainfall and maintain a three foot freeboard at all times.

(10) The volume of a permanent pit shall not exceed 10 acre-feet, including freeboard.

(11) The operator shall maintain a permanent pit to prevent run-on of surface water. A permanent pit shall be surrounded by a berm, ditch or other diversion to prevent run-on of surface water.

H. Drying pads associated with closed-loop systems.

(1) An operator of a closed-loop system with drying pads shall design and construct the drying pads to include the following:

(a) appropriate liners that prevent the contamination of fresh water and protect public health and the environment;

(b) sumps to facilitate the collection of liquids derived from drill cuttings; and

(c) berms that prevent run-on of surface water or fluids.

I. *Below-grade tanks. The operator shall design and construct a below-grade tank in* accordance with the following requirements, as applicable.

(1) The operator shall ensure that a below-grade tank is constructed of materials resistant to the below-grade tank's particular contents and resistant to damage from sunlight.

(2) A below-grade tank shall have a properly constructed foundation consisting of a level base free of rocks, debris, sharp edges or irregularities to prevent punctures, cracks or indentations of the liner or tank bottom.

(3) The operator shall construct a below-grade tank to prevent overflow and the collection of surface water run-on.

(4) An operator shall construct a below-grade tank in accordance with one of the following designs.

(a) An operator may construct and use a below-grade tank that does not have double walls provided that the below-grade tank's side walls are open for visual inspection for leaks, the below-grade tank's bottom is elevated a minimum of six inches above the underlying ground surface and the below-grade tank is underlain with a geomembrane liner, which may be covered with gravel, to divert leaked liquid to a location that can be visually inspected. The operator shall equip below-grade tanks *designed in this manner with a properly operating automatic high-level shut-off control device and manual* controls to prevent overflows. The geomembrane liner shall consist of 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner material that the appropriate division district office approves. The geomembrane liner shall have a hydraulic conductivity no greater than 1 x 10-9 cm/sec. The geomembrane liner shall be composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. Liner compatibility shall comply with EPA SW-846 Method 9090A, or subsequent relevant EPA publication.

(b) All below-grade tanks, in which the side walls are not open for visible inspection for leaks shall be double walled with leak detection capability.

(c) An operator may construct a below-grade tank according to an alternative system that the appropriate division district office approves based upon the operator's demonstration that the alternative provides equivalent or better protection.

(5) The operator of a single walled below-grade tank constructed and installed prior to June *16, 2008 that has the side walls open for visual inspection and that does not meet all the requirements in* Paragraphs (1) through (4) of Subsection I of 19.15.17.11 NMAC is not required to equip or retrofit the below-grade tank to comply with Paragraphs (1) through (4) of Subsection I of 19.15.17.11 NMAC so long as it demonstrates integrity. If the existing below-grade tank does not demonstrate integrity, the operator shall promptly drain the below-grade tank and remove it from service and comply with the closure requirements of 19.15.17.13 NMAC.

(6) The operator of a single walled below-grade tank constructed and installed prior to June 16, 2008 and where any portion of the tank sidewall is below the ground surface and not visible shall equip or retrofit the below-grade tank to comply with Paragraphs (1) through (4) of Subsection I of 19.15.17.11 NMAC, or close it, by June 16, 2013. If the existing below-grade tank does not demonstrate integrity, the operator shall promptly drain the below-grade tank, remove it from service and comply with the closure requirements of 19.15.17.13 NMAC.

(7) The operator of a double walled below-grade tank constructed and installed prior to June 16, 2008 and which does not meet all the requirements in Paragraphs (1) through (4) of Subsection I of 19.15.17.11 NMAC is not required to equip or retrofit the below-grade tank to comply with Paragraphs (1) through (4) of Subsection I of 19.15.17.11 NMAC so long as it demonstrates integrity. If the existing *below-grade tank does not demonstrate integrity, the operator shall promptly drain the below-grade tank,* remove it from service and comply with the closure requirements of 19.15.17.13 NMAC.

J. Multi-well fluid management pits. The operator shall design and construct a multi-well fluid management pit in accordance with the following requirements.

(1) The operator shall design and construct the pit to ensure the confinement of liquids to prevent releases and to prevent overtopping due to wave action or rainfall.

(2) The pit shall have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. Geotextile is required under the liner where needed to reduce localized stress-strain or protuberances that may otherwise compromise the liner's integrity. The operator shall construct a multi-well fluid management pit so that the slopes are no steeper than two horizontal feet to one vertical foot (2H:1V). The levee shall have an outside grade no steeper than three horizontal feet to one vertical foot (3H:1V). The levee's top shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance. The appropriate division district office may approve an alternative to the slope requirement if the operator demonstrates that it can construct and operate the pit in a manner that provides equivalent or better protection to fresh water, public health and the environment.

(3) Each multi-well fluid management pit shall contain, at a minimum, a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions. The edges of all liners shall be anchored in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep.

(4) The primary (upper) liner and secondary (lower) liner shall be geomembrane liners. The geomembrane liner shall consist of 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner material that the division's district office approves. The geomembrane liner shall have a hydraulic conductivity no greater than 1 x 10-9 cm/sec. The geomembrane liner shall be composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. Liner compatibility shall comply with EPA SW-846 Method 9090A or subsequent relevant publication.

(5) The appropriate division's district office may approve other liner media if the operator demonstrates to the satisfaction of the appropriate division's district office that the alternative liner protects fresh water, public health, and the environment as effectively as the specified media.

(6) The operator shall minimize liner seams and orient them up and down, not across, a slope. The operator shall use factory welded seams where possible. The operator shall ensure field seams in geosynthetic material are thermally seamed. Prior to field seaming, the operator shall overlap liners four to six inches. The operator shall minimize the number of field seams in corners and irregularly shaped areas. There shall be no horizontal seams within five feet of the slope's toe. Qualified personnel shall perform field welding and testing.

(7) At a point of discharge into or suction from the lined multi-well fluid management pit, the operator shall ensure that the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines shall not penetrate the liner.

(8) The operator shall place a leak detection system between the upper and lower geomembrane liners that consists of two feet of compacted soil with a saturated hydraulic conductivity of 1 x 10-5 cm/sec or greater to facilitate drainage. The leak detection system shall consist of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions and sloped to facilitate the earliest possible leak detection. The operator may install alternative methods that the appropriate division's district office approves.

(9) The operator shall maintain a multi-well fluid management pit to prevent run-on of surface water. A multi-well fluid management pit shall be surrounded by a berm, ditch or other diversion to prevent run-on of surface water.

K. Burial trenches for closure. The operator shall design and construct a burial trench in accordance with the following requirements.

(1) A trench shall have a properly constructed foundation and side walls consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear.

(2) Geotextile is required under the liner where needed to reduce localized stress-strain or protuberances that may otherwise compromise the liner's integrity.

(3) A trench shall be constructed with a geomembrane liner. The geomembrane shall consist of a 20-mil string reinforced LLDPE liner or equivalent liner that the appropriate division district office approves. The geomembrane liner shall be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. Liner compatibility shall comply with EPA SW-846 Method 9090A.

(4) The operator shall minimize liner seams and orient them up and down, not across, a slope. The operator shall use factory welded seams where possible. Prior to field seaming, the operator

shall overlap liners four to six inches and orient liner seams parallel to the line of maximum slope, i.e., oriented along, not across, the slope. The operator shall minimize the number of field seams in corners and irregularly shaped areas. Qualified personnel shall perform field welding and testing.

(5) The operator shall install sufficient liner material to reduce stress-strain on the liner.

(6) The operator shall ensure that the outer edges of all liners are secured for the deposit of the excavated waste material into the trench.

[19.15.17.11 NMAC - Rp, 19.15.17.11 NMAC, 6/28/13]

19.15.17.12 OPERATIONAL REQUIREMENTS:

A. General specifications. An operator shall maintain and operate a pit or closed-loop system, below-grade tank or sump in accordance with the following requirements.

(1) The operator shall operate and maintain a pit or closed-loop system, below-grade tank or sump to contain liquids and solids and maintain the integrity of the liner, liner system or secondary containment system, prevent contamination of fresh water and protect public health and the environment.

(2) The operator shall recycle, reuse, reclaim or dispose of all drilling fluids in a manner consistent with division rules.

(3) The operator shall not discharge into or store any hazardous waste in a pit, closed-loop system, below-grade tank or sump.

(4) If a pit liner's integrity is compromised above the liquid's surface then the operator shall repair the damage or initiate replacement of the liner within 48 hours of discovery or seek a variance from the appropriate division district office.

(5) If a pit or below-grade tank develops a leak, or if any penetration of the pit liner occurs below the liquid's surface, then the operator shall remove all liquid above the damage or leak within 48 hours of discovery, notify the appropriate division office pursuant to 19.15.29 NMAC and repair the damage or replace the pit liner or below-grade tank as applicable.

(6) The injection or withdrawal of liquids from a pit shall be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.

(7) The operator shall operate and install a pit, below-grade tank or sump to prevent the collection of surface water run-on.

(8) The operator shall install, or maintain on site, an oil absorbent boom or other device to contain an unanticipated release.

B. Temporary pits. An operator shall maintain and operate a temporary pit in accordance with the following additional requirements.

(1) Only fluids or mineral solids generated or used during the drilling, completion or workover process may be discharged into a temporary pit. The operator shall maintain a temporary pit free of miscellaneous solid waste or debris. Immediately after cessation of a drilling or workover operation, the operator shall remove any visible layer of oil from the surface of a drilling or workover pit.

(2) The operator shall maintain at least two feet of freeboard for a temporary pit. For temporary extenuating circumstances an operator may maintain a freeboard of less than two feet. In such circumstances the operator shall maintain a log describing such circumstances and make the log available to the division upon request.

(3) The operator shall inspect a temporary pit containing drilling fluids at least daily while the drilling or workover rig is on location. Thereafter, the operator shall inspect the temporary pit weekly so long as liquids remain in the temporary pit. The operator shall maintain a log of such inspections and make the log available for the appropriate division district office's review upon request.

(4) The operator shall remove all free liquids from the surface of a temporary pit within 60 days from the date that the operator releases the last drilling or workover rig associated with the relevant pit permit. The operator shall note the date of the drilling or workover rig's release on form C-105 or C-103 upon well or workover completion. The appropriate division district office may grant an extension of up to two months, not to exceed temporary pit life span under Subsection R of 19.15.17.7 NMAC.

(5) The operator shall remove any liquids from the temporary pit used for cavitation within 48 hours after completing cavitation. The operator may request and receive additional time to remove the liquids from the temporary pit used for cavitation if the operator demonstrates to the appropriate division district office's satisfaction that it is not feasible to access the location within 48 hours.

C. Permanent pits. An operator shall maintain and operate a permanent pit in accordance with the following additional requirements.

(1) The operator shall maintain at least three feet of freeboard for a permanent pit; the operator shall permanently mark such level on the permanent pit.

(2) No oil or floating hydrocarbon shall be present in a permanent pit.

(3) The operator shall inspect the pit weekly while the pit has fluids and document at least monthly until the pit is closed. Inspections will include monitoring of the leak detection system. The operator shall maintain a log of such inspections and make the log available for the appropriate division district office's review upon request.

D. Below-grade tanks. An operator shall maintain and operate a below-grade tank in accordance with the following additional requirements.

(1) The operator shall not allow a below-grade tank to overflow or allow surface water run-on to enter the below-grade tank.

(2) The operator shall remove any measurable layer of oil from the fluid surface of a below-grade tank.

(3) The operator shall inspect the below-grade tank for leakage and damage at least monthly. The operator shall document the integrity of each tank at least annually and maintain a written record of the integrity for five years.

(4) The operator shall maintain adequate freeboard to prevent overtopping of the below-grade tank.

(5) The operator of a below-grade tank who discovers that the below-grade tank does not demonstrate integrity or that the below-grade tank develops any of the conditions identified in Paragraph (5) of Subsection A of 19.15.17.12 NMAC shall repair the damage or close the existing below-grade tank pursuant to the closure requirements of 19.15.17.13 NMAC.

(6) The operator of a below-grade tank who equips or retrofits the existing tank to comply with Paragraphs (1) through (4) of Subsection I of 19.15.17.11 NMAC shall visually inspect the area beneath the below-grade tank during the retrofit and document any areas that are wet, discolored or showing other evidence of a release on form C-141. The operator shall measure and report to the division the concentration of contaminants in the wet or discolored soil with respect to the standards set forth in Table I of 19.15.17.13 NMAC. If there is no wet or discolored soil or if the concentration of contaminants in the wet or discolored soil is less than the standard set forth in Table I of 19.15.17.13 NMAC, then the operator shall proceed with the closure requirements of 19.15.17.13 NMAC prior to initiating the retrofit or replacement.

E. Sumps. The operator shall maintain and operate a sump in accordance with the following additional requirements.

(1) The operator shall visually inspect a sump's integrity annually and promptly repair or replace a sump that fails the inspection.

(2) The operator shall maintain records of sump inspections and make the records available for the appropriate division district office's review upon request.

F. Multi-well fluid management pits. An operator shall maintain and operate a multi-well fluid management pit in accordance with the following additional requirements.

(1) No operator shall place any substances in the pit other than stimulation fluids, produced water used for stimulation and drilling, and flow back from multiple wells.

(2) The operator shall remove any visible layer of oil from the surface of the pit.

(3) The operator shall maintain at least three feet of freeboard for the pit.

(4) The operator shall inspect the pit weekly while the pit has fluids and document at least monthly until the pit is closed. Inspections will include monitoring of the leak detection system. The operator shall maintain a log of such inspections and make the log available for the appropriate division district office's review upon request.

(5) The operator shall remove all fluids within 60 days from the date the operator ceases all stimulation operations associated with the pit permit. The appropriate division district office may grant an extension of up to two months.

[19.15.17.12 NMAC - Rp, 19.15.17.12 NMAC, 6/28/13]

19.15.17.13 CLOSURE AND SITE RECLAMATION REQUIREMENTS:

A. Closure plans. A closure plan that an operator submits in an application or registration pursuant to Subsection B of 19.15.17.9 NMAC, or any other closure plan required pursuant to 19.15.17 NMAC, shall describe the proposed closure method and the proposed procedures and protocols to implement and complete the closure.

B. Closure plans for a multi-well fluid management pit shall be filed with the appropriate division district office and shall describe the proposed procedures and protocols for the removal of all unused stimulation liquids and the disposition of liner materials and other pit contents.

C. Closure where wastes are destined for disposal at division approved off-site facilities. This subsection applies to permanent pits, temporary pits, multi-well fluid management pits, drying pads and tanks associated with closed-loop systems and below-grade tanks.

(1) Notwithstanding the following, the operator of any pit or below-grade tank shall not commence closure without first obtaining approval of the closure plan submitted with the permit application or registration pursuant to 19.15.17.9 NMAC.

(2) The operator shall close the pit, drying pad or below-grade tank by first removing all contents and, if applicable, synthetic liners and transferring those materials to a division approved facility.

(3) The operator shall test the soils beneath the pit, drying pad for closed-loop system or below-grade tank as follows.

(a) At a minimum, a five point composite sample to include any obvious stained or wet soils, or other evidence of contamination shall be taken under the liner or the below-grade tank and that sample shall be analyzed for the constituents listed in Table I of 19.15.17.13 NMAC.

(b) If any contaminant concentration is higher than the parameters listed in Table I of 19.15.17.13 NMAC, the division may require additional delineation upon review of the results and the operator must receive approval before proceeding with closure.

(c) If all contaminant concentrations are less than or equal to the parameters listed in Table I of 19.15.17.13 NMAC, then the operator can proceed to backfill the pit, pad, or excavation with non-waste containing, uncontaminated, earthen material.

D. Closure where wastes are destined for burial in place or into nearby division approved pits or trenches. This subsection applies to waste from temporary pits and closed-loop systems, when such waste may be disposed of in place in the existing temporary pit or disposed of at a nearby temporary pit or burial trench that is not a permitted commercial facility regulated under 19.15.36 NMAC. A nearby temporary pit or burial trench that receives waste from another temporary pit must be onsite within the same lease.

(1) The operator shall not commence closure without first obtaining approval of the closure plan submitted with the permit application.

(2) The operator shall demonstrate and comply with the siting criteria set forth in Subsection C of 19.15.17.10 NMAC.

(3) Prior to closure the operator shall remove all free liquids reasonably achievable from the pit or drying pad and tank associated with a closed-loop system and dispose of such liquids at a division approved facility.

(4) When closing a temporary pit the operator shall stabilize or solidify the remaining temporary pit contents to a capacity sufficient to support the final cover of the temporary pit. When transferring the waste contents from a drying pad and tank associated with a closed-loop system into a temporary pit or burial trench, the operator shall stabilize or solidify the waste contents to a capacity sufficient to support the final cover of the temporary pit or burial trench. The operator shall not mix the contents with soil or other material at a mixing ratio of greater than 3:1, soil or other material to contents. The waste mixture must pass the paint filter liquids test (EPA SW-846, Method 9095 or other test methods approved by the division).

(5) The operator shall collect, at a minimum, a five point composite of the contents of the temporary pit or drying pad/tank associated with a closed-loop system to demonstrate that, after the waste is solidified or stabilized with soil or other non-waste material at a ratio of no more than 3:1 soil or other non-waste material to waste, the concentration of any contaminant in the stabilized waste is not higher than the parameters listed in Table II of 19.15.17.13 NMAC.

(6) If, after appropriate stabilization, the concentrations of all contaminants in the contents from a temporary pit or drying pad and tank associated with a closed-loop system are less than or equal to

the parameters of listed in Table II of 19.15.17.13 NMAC, the operator may either proceed to dispose of wastes in an existing temporary pit or construct a burial trench for disposal of these wastes.

(7) If the concentration of any contaminant in the contents, after mixing with soil or non-waste material to a maximum ratio of 3:1, from a temporary pit or drying pad/tank associated with a closed-loop system is higher than constituent concentrations shown in Table II of 19.15.17.13 NMAC, then closure must proceed in accordance with Subsection C of 19.15.17.13 NMAC.

(8) Upon achieving all applicable waste stabilization in the temporary pit or transfer of stabilized wastes to the temporary pit or burial trench, the operator shall:

(a) fold the outer edges of the trench liner to overlap the waste material in the trench prior to the installation of the geomembrane cover;

(b) install a geomembrane cover over the waste material in the lined trench or temporary pit; the operator shall install the geomembrane cover in a manner that prevents the collection of infiltration water in the lined trench or temporary pit and on the geomembrane cover after the soil cover is in place; the geomembrane cover shall consist of a 20-mil string reinforced LLDPE liner or equivalent cover that the appropriate division district office approves; the geomembrane cover shall be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions; cover compatibility shall comply with EPA SW-846 Method 9090A;

(c) cover the pit/trench with non-waste containing, uncontaminated, earthen materials and construct a soil cover prescribed by the division in Paragraph (3) of Subsection H of 19.15.17.13 NMAC.

(9) If the operator has removed the wastes and the liner to a burial trench pursuant to this subsection, the operator shall test the soils beneath the temporary pit as follows.

(a) At a minimum, a five point composite sample to include any obvious stained or wet soils, or other evidence of contamination shall be taken under the liner or the below-grade tank and that sample shall be analyzed for the constituents listed in Table I of 19.15.17.13 NMAC.

(b) If any contaminant concentration is higher than the parameters listed in Table I of 19.15.17.13 NMAC, the division may require additional delineation upon review of the results and the operator must receive approval before proceeding with closure.

(c) If all contaminant concentration are less than or equal to the parameters listed in Table I of 19.15.17.13 NMAC, then the operator can proceed to backfill the pit, pad, or excavation with non-waste containing, uncontaminated, earthen material.

E. Closure notice.

(1) The operator shall notify the surface owner by certified mail, return receipt requested that the operator plans closure operations at least 72 hours, but not more than one week, prior to any closure operation. Notice shall include well name, API number and location. Evidence of mailing of the notice to the address of the surface owner shown in the county tax records is sufficient to demonstrate compliance with this requirement.

(2) The operator of a temporary pit, multi-well fluid management pit, below-grade tank or an operator who is approved for onsite closure shall notify the appropriate division district office verbally and in writing at least 72 hours, but not more than one week, prior to any closure operation. The notice shall include the operator's name and the location to be closed by unit letter, section, township and range. If the closure is associated with a particular well, then the notice shall also include the well's name, number and API number.

(3) An operator of a permanent pit shall notify the Santa Fe office at least 60 days prior to cessation of operations and provide a proposed schedule for closure. If there is no closure plan on file with the Santa Fe office applicable to the permanent pit, the operator shall provide a closure plan with this notice. Upon receipt of the notice and proposed schedule, the Santa Fe office shall review the current closure plan for adequacy and inspect the site.

(4) When onsite burial occurs on private land, the operator shall file a deed notice identifying the exact location of the onsite burial with the county clerk in the county where the onsite burial occurs.

F. Closure report and burial identification.

(1) Within 60 days of closure completion, the operator shall submit a closure report on form C-144, with necessary attachments to document all closure activities including sampling results; information required by 19.15.17 NMAC; and details on back-filling, capping and covering, where applicable. In the closure report, the operator shall certify that all information in the report and attachments

is correct and that the operator has complied with all applicable closure requirements and conditions specified in the approved closure plan. If the operator used a temporary pit, the operator shall provide a plat of the pit location on form C-105 within 60 days of closing the temporary pit.

(2) If the operator elects to conduct onsite burial under Subsection D of 19.15.17.13 NMAC, the operator shall report the exact location of the onsite burial on form C-105 filed with the division.

(3) The operator shall place a steel marker at the center of an onsite burial. The steel marker shall be not less than four inches in diameter and shall be cemented in a three-foot deep hole at a minimum. The steel marker shall extend at least four feet above mean ground level and at least three feet below ground level. The operator name, lease name and well number and location, including unit letter, section, township and range, and that the marker designates an onsite burial location shall be welded, stamped or otherwise permanently engraved into the metal of the steel marker. A person shall not build permanent structures over an onsite burial without the appropriate division district office's written approval. A person shall not remove an onsite burial marker without the division's written permission.

G. Timing requirements for closure. An operator shall close a pit, drying pad associated with a closed-loop system or below-grade tank within the following time periods.

(1) An operator shall close a permitted permanent pit within 60 days of cessation of operation of the pit in accordance with a closure plan approved by the appropriate office.

(2) An operator shall close a permitted temporary pit within six months from the date that the operator releases the drilling or workover rig. The operator shall note the date of the drilling or workover rig's release on form C-105 or C-103, filed with the division, upon the well's or work-over's completion. The appropriate division district office may grant an extension not to exceed three months.

(3) An operator shall close a drying pad used for a closed-loop system within six months from the date that the operator releases the drilling or workover rig. The operator shall note the date of the drilling or workover rig's release on form C-105 or C-103, filed with the division, upon the well's or work-over's completion. The appropriate division district office may grant an extension not to exceed six months.

(4) Closure methods for below-grade tanks.

(a) Within 60 days of cessation of operations, the operator shall remove liquids and sludge from a below-grade tank prior to implementing a closure method and shall dispose of the liquids and sludge in a division-approved facility.

(b) Within six months of cessation of operations, the operator shall remove the below-grade tank and dispose of it in a division-approved facility or recycle, reuse, or reclaim it in a manner that the appropriate division district office approves. If there is any equipment associated with a below-grade tank, then the operator shall remove the equipment, unless the equipment is required for some other purpose.

(5) An operator shall close a multi-well fluid management pit within six months from the date that the operator ceases all stimulation operations on all wells identified in the permit. The operator shall note the date of the cessation of drilling and stimulation operations on form C-105 or C-103 filed with the division. The appropriate division district office may grant an extension for closure not to exceed six months.

H. Reclamation of pit locations, onsite burial locations and drying pad locations.

(1) Site contouring.

(a) Once the operator has closed a pit or trench or is no longer using a drying pad, below-grade tank or an area associated with a closed-loop system, pit, trench or below-grade tank, the operator shall reclaim the pit location, drying pad location, below-grade tank location or trench location and all areas associated with the closed-loop system, pit, trench or below-grade tank including associated access roads to a safe and stable condition that blends with the surrounding undisturbed area. The operator shall substantially restore the impacted surface area to the condition that existed prior to oil and gas operations by placement of the soil cover as provided in Paragraph (2) of Subsection H of 19.15.17.13 NMAC, recontour the location and associated areas to a contour that approximates the original contour and blends with the surrounding topography and re-vegetate according to Paragraph (5) in Subsection H of 19.15.17.13 NMAC.

(b) The operator may propose an alternative to the re-vegetation or recontouring requirement if the operator demonstrates to the appropriate district office that the proposed alternative provides equal or better prevention of erosion, and protection of fresh water, public health and the environment. The proposed alternative shall be agreed upon by the surface owner. The operator shall

submit the proposed alternative, with written documentation that the surface owner agrees to the alternative, to the division for approval.

(c) Areas reasonably needed for production operations or for subsequent drilling operations shall be compacted, covered, paved, or otherwise stabilized and maintained in such a way as to *minimize dust and erosion to the extent practicable.*

(2) Soil cover designs for drying pads associated with closed-loop systems and below-grade tanks. The soil cover for closures after site contouring, where the operator has removed the below-grade tank or drying pad contents and liner, and if necessary remediated the soil beneath the below-grade tank or drying pad liner to chloride concentrations less than 600 mg/kg as analyzed by EPA Method 300.0, shall consist of the background thickness of topsoil or one foot of suitable material, whichever is greater.

(3) Soil cover designs for reclamation of pit locations and onsite burial locations. The soil cover for burial in-place or trench burial shall consist of a minimum of four feet of non-waste containing, uncontaminated, earthen material with chloride concentrations less than 600 mg/kg as analyzed by EPA Method 300.0. The soil cover shall include either the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater.

(4) The operator shall construct the soil cover to the site's existing grade and prevent ponding of water and erosion of the cover material.

(5) *Reclamation and re-vegetation.*

(a) Reclamation of areas no longer in use. All areas disturbed by the closure of pits and below-grade tanks, except areas reasonably needed for production operations or for subsequent drilling operations, shall be reclaimed as early and as nearly as practicable to their original condition or their final land use and shall be maintained to control dust and minimize erosion to the extent practicable.

(b) Topsoils and subsoils shall be replaced to their original relative positions and contoured so as to achieve erosion control, long-term stability and preservation of surface water flow patterns. The disturbed area then shall be reseeded in the first favorable growing season following closure of a pit, drying pad associated with a closed-loop system or below-grade tank.

(c) Reclamation of all disturbed areas no longer in use shall be considered complete when all ground surface disturbing activities at the site have been completed, and a uniform vegetative cover has been established that reflects a life-form ratio of plus or minus fifty percent (50%) of pre-disturbance levels and a total percent plant cover of at least seventy percent (70%) of pre-disturbance *levels, excluding noxious weeds.*

(d) Other regulatory requirements. The re-vegetation and reclamation obligations imposed by other applicable federal or tribal agencies on lands managed by those agencies shall supersede these provisions and govern the obligations of any operator subject to those provisions, provided that the other requirements provide equal or better protection of fresh water, human health and the environment.

(e) The operator shall notify the division when reclamation and re-vegetation are complete.

Table I
Closure Criteria for Soils Beneath Below-Grade Tanks, Drying Pads Associated with Closed-Loop Systems and Pits where Contents are Removed

Depth below bottom of pit to groundwater less than 10,000 mg/l TDS	Constituent	Method*	Limit**
≤50 feet	Chloride	EPA 300.0	600 mg/kg
	TPH	EPA SW-846 Method 418.1	100 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
51 feet-100 feet	Chloride	EPA 300.0	10,000 mg/kg
	TPH	EPA SW-846 Method 418.1	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
> 100 feet	Chloride	EPA 300.0	20,000 mg/kg
	TPH	EPA SW-846 Method 418.1	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg

*Or other test methods approved by the division
**Numerical limits or natural background level, whichever is greater

Table II
Closure Criteria for Burial Trenches and Waste Left in Place in Temporary Pits

Depth below bottom of pit to groundwater less than 10,000 mg/l TDS	Constituent	Method*	Limit**
25-50 feet	Chloride	EPA Method 300.0	20,000 mg/kg
	TPH	EPA SW-846 Method 418.1	100 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
	Chloride	EPA Method 300.0	40,000 mg/kg

51-100 feet	TPH	EPA SW-846 Method 418.1	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
> 100 feet	Chloride	EPA Method 300.0	80,000 mg/kg
	TPH	EPA SW-846 Method 418.1	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg

*Or other test methods approved by the division
**Numerical limits or natural background level, whichever is greater
[19.15.17.13 NMAC - Rp, 19.15.17.13 NMAC, 6/28/13]

19.15.17.14 EMERGENCY ACTIONS:

A. Permit not required. In an emergency an operator may construct a pit without a permit to contain fluids, solids or wastes, if an immediate danger to fresh water, public health or the environment exists.

B. Construction standards. The operator shall construct an emergency pit, to the extent possible given the emergency, in a manner that is consistent with the requirements for a temporary pit specified in 19.15.17 NMAC and that prevents the contamination of fresh water and protects public health and the environment.

C. Notice. The operator shall notify the appropriate division district office as soon as possible (if possible before construction begins) of the need for such pit's construction.

D. Use and duration. A pit constructed in an emergency may be used only for the emergency's duration. If the emergency lasts more than 48 hours, then the operator shall seek the appropriate division district office's approval for the pit's continued use. The operator shall remove all fluids, solids or wastes within 48 hours after cessation of use unless the appropriate division district office extends that time period.
[19.15.17.14 NMAC - Rp, 19.15.17.14 NMAC, 6/28/13]

19.15.17.15 EXCEPTIONS AND VARIANCES:

A. Variances.

(1) An operator shall demonstrate with a complete application to the appropriate division district office that the requested variance provides equal or better protection of fresh water, public health and the environment. The appropriate division district office shall approve or deny the variance within 60 days of receipt of the complete application.

(2) If the appropriate division district office denies the variance then it shall notify the operator within 60 days of receipt of the complete application for the reasons of denial by certified mail, return receipt requested. If the operator requests a hearing within 10 days after receipt of such notice, the division shall set the matter for hearing, with notice to the operator and the appropriate division district office.

(3) An application for a variance shall include:

(a) a statement in detail explaining why the applicant wants to vary from the requirement of 19.15.17 NMAC, and

(b) a detailed written demonstration that the variance will provide equal or better protection of fresh water, public health and the environment.

(4) If a variance goes to hearing pursuant to Paragraph (2) of Subsection A of 19.15.17.15 NMAC, in addition to the hearing process required by 19.15.4 NMAC, the application for hearing shall include:

(a) a copy of the complete application submitted for a variance under Paragraph (3) of Subsection A of 19.15.17.15 NMAC;

(b) proof of notification to the surface owner of the location of the requested variance.

(5) The division clerk will set the application for hearing as soon as practicable.

B. Exceptions.

(1) An operator may apply to the division's Santa Fe office for an exception that is allowed by a provision of 19.15.17 NMAC.

(2) The operator shall give written notice by certified mail, return receipt requested, to:

(a) the surface owner of record where the exception is requested, or will be located;

(b) surface owners of record within one-half mile of such location;

(c) the county commission of the county where the pit, or proposed alternative is, or will be, located;

(d) the appropriate city official if the pit, or proposed alternative is, or will be, located within city limits, within one-half mile of the city limits or within the city's zoning and planning jurisdiction;

(e) federal agencies managing lands within one-half mile of such location;

(f) affected tribal or pueblo governments; and

(g) such other persons as the division's Santa Fe office may direct.

(3) Receipt of notice that is given pursuant to this sub-part shall not be construed as an indication of standing to request a hearing pursuant to Paragraph (6) of Subsection B of 19.15.17.15 NMAC.

(4) The operator shall issue public notice by publication one time in a newspaper of general circulation in the county where the pit, or proposed alternative, is, or will be located. Required written and public notices require the division's Santa Fe office's approval. The division shall post notice of the application on the division's website.

(5) An operator shall demonstrate with a complete application to the Santa Fe office that the requested exception provides equal or better protection of fresh water, public health and the environment. The Santa Fe office shall approve or deny the exception within 90 days of receipt of the complete application.

(6) Within 30 days after the operator or the division sends notice of the requested exception anyone may submit comments to the director and any person with standing to contest the requested exception may request a hearing. If the director determines that a request for hearing presents issues that have technical merit or there is significant interest from the affected public, then the director may cause the matter to be set for hearing. If the director determines that a hearing is not necessary due to technical merit, significant public interest or otherwise then the Santa Fe office may grant the exception without a hearing. The Santa Fe office may grant the exception administratively if the Santa Fe office receives no comments or requests for hearing within the time for commenting.

(7) If the Santa Fe office denies the exception then it shall notify the operator within 90 days of receipt of the complete application for the reasons of denial by certified mail, return receipt requested. If the operator requests a hearing within 21 days after receipt of such notice, the division shall set the matter for hearing, with notice to the operator and the appropriate division district office.

(8) An application for an exception shall include:

(a) a statement in detail explaining why the applicant wants an exception to the requirement of 19.15.17 NMAC, and

(b) a detailed written demonstration that the exception will provide equal or better protection of fresh water, public health and the environment.

(9) If an exception goes to hearing pursuant to Subsection B of 19.15.17.15 NMAC, in addition to the requirements of 19.15.4 NMAC, the hearing application shall include:

(a) a copy of the complete application submitted for the exception; and

(b) a proof of notification of the hearing application to parties identified in Paragraph (2) of Subsection B of 19.15.17.15 NMAC.

(10) The division clerk will set the application for hearing as soon as practicable.

[19.15.17.15 NMAC - Rp, 19.15.17.15 NMAC, 6/28/13]

19.15.17.16 PERMIT APPROVALS, CONDITIONS, DENIALS, REVOCATIONS, SUSPENSIONS, MODIFICATIONS OR TRANSFERS:

A. The division shall review all applications to permit facilities subject to 19.15.17 NMAC. Within 30 days of receiving an application the division shall make an administrative completeness determination or provide written notice of deficiencies to the application's signatory. The application will be considered complete if written notice is not provided by the division within the 30 day evaluation period.

B. Whether or not the division deems an application to be administratively complete within the 30 day evaluation period, the division shall also have an additional 30 days to approve, deny or approve with conditions an application. If the division does not take action within the 60 days review period, then the application is deemed denied and the operator may file an application for hearing with the division clerk.

C. Conditions. The division may impose conditions or requirements that it determines are necessary and proper for the protection of fresh water, public health, and the environment provided the conditions or requirements are based on the provisions of the Oil and Gas Act 70-2 NMSA or current division regulations. The division shall incorporate such additional conditions or requirements into the permit.

D. Denial of application. The division shall deny, in writing, an application for a permit if it finds that the application and materials that the operator submitted for consideration with the application do not sufficiently demonstrate that the operator can construct, operate and close the proposed pit, or proposed alternative in a manner that is protective of fresh water, public health, and the environment.

E. Revocation, suspension or modification of a permit. The operator may apply to the division for a modification of the permit pursuant to 19.15.17 NMAC. The operator shall demonstrate that the proposed modification complies with the applicable provisions of 19.15.17 NMAC. The division may revoke, suspend or impose additional operating conditions or limitations on a permit at any time, after notice and opportunity for a hearing, if the division determines that the operator or the permitted facility is in material breach of any applicable statutes or rules, or that such action is necessary for the protection of fresh water, public health or the environment. The division shall notify the operator by certified mail, return receipt requested, of any intended revocation, suspension or imposition of additional conditions, and the operator shall have 10 days after receipt of notification to request a hearing pursuant to 19.15.4 NMAC. The division may suspend a permit or impose additional conditions or limitations without hearing in an emergency to forestall an imminent threat to fresh water, public health, or the environment, subject to the provisions of NMSA 1978, Section 70-2-23, as amended.

F. Transfer of a permit. The operator shall not transfer a permit without the division's prior written approval. The division's approval of an application to transfer a well or other facility with which a permitted pit is associated shall constitute approval of the transfer of the permit for the pit.

G. Division approvals. The division shall grant or confirm any division approval authorized by a provision of 19.15.17 NMAC by written statement. Written statements include e-mail.

[19.15.17.16 NMAC - Rp, 19.15.17.16 NMAC, 6/28/13]

HISTORY OF 19.15.17 NMAC:

History of Repealed Material:

19.15.17 NMAC, Pits, Closed-Loop Systems, Below-Grade Tanks and Sumps, filed 5/30/2008 - Repealed effective 6/28/2013.