

BEFORE THE OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING CALLED BY)
THE OIL CONSERVATION COMMISSION FOR THE)
PURPOSE OF AMENDING COMMISSION ORDER R-)
7940 TO PROVIDE FOR THE EXPANSION OF THE)
DESIGNATED VULNERABLE AREA OF THE SAN)
JUAN BASIN, ELIMINATION OF DISCHARGES TO)
UNLINED PITS, CREATION OF WELLHEAD)
PROTECTION AREAS, ESTABLISHMENT OF)
DEADLINES FOR COMPLIANCE, AND OTHER)
MATTERS)

CASE NO. 10436

UPON THE APPLICATION OF THE OIL)
CONSERVATION DIVISION)

Southwest Research
and Information Center's
Closing Statement

Introduction

This proceeding involves the application of the New Mexico Oil Conservation Division for expansion of the San Juan Basin Vulnerable Area that was defined by the Oil Conservation Commission in Order R-7940. The Vulnerable Area now includes all areas within 100 vertical feet of the San Juan, Animas, and La Plata rivers, as well as certain special areas that are listed individually. The Oil Conservation Division (hereafter "Division") has requested the Oil Conservation Commission (hereafter "Commission") to expand the Vulnerable Area to include areas within the valleys of the San Juan, Animas, La Plata, Chama, and Navajo Rivers that are 100 vertical feet above the river channel measured perpendicular to the channel, areas between those rivers and specified ditches, areas within 50 vertical feet of the drainage channels of major perennial and ephemeral surface water drainages, and wellhead protection areas.

The Division has also proposed that no new discharges of oil and natural gas wastes to unlined pits within the Vulnerable Area be permitted, and that existing discharges be eliminated within three years of the Commission's order in this matter. The details of the Division's proposal and the schedule for elimination of discharges are set forth in the Division's proposed order, which is Division exhibit 14.

As is more fully explained below, the New Mexico Oil and Gas Act mandates that the Division protect fresh water, including ground water, public health, and the environment from contamination by oil and natural gas wastes. Moreover, the evidence presented at the hearing in this matter demonstrates that in order to comply with those requirements, the Commission should expand the Vulnerable Area in accordance with the Division's recommendation and should prohibit new discharges of oil and natural gas wastes into unlined pits in that expanded area. The evidence also demonstrates that the Commission should adopt the proposals advanced by Southwest Research and Information Center (hereafter "SRIC") concerning the schedule for eliminating existing discharges, for protection of wellhead areas, for submission of information concerning pits that have been closed, and for criteria and notice of applications for variances. Those proposals are contained in SRIC's exhibit 14. The evidence also shows that the Commission should extend the definition of the expanded Vulnerable Area to include the drainage around the Lee Acres landfill site

located three miles east of Farmington. Finally, the evidence demonstrates as well that the arguments presented against these positions are not persuasive.

I. The Commission should expand the Vulnerable Area and prohibit new discharges into unlined pits within the existing and expanded Vulnerable Area.

A. The Oil and Gas Act requires the Division to protect ground water, public health, and the environment against contamination by oil and natural gas wastes.

The New Mexico Oil and Gas Act, NMSA 1978 sections 70-2-1 et seq., mandates that the Division regulate the disposition of water produced in connection with the production of oil and natural gas in a manner that will afford reasonable protection against contamination of fresh water supplies designated by the New Mexico State Engineer. (NMSA 1978 section 70-2-12.B(15)) As William Olson, a hydrologist for the Division, pointed out during the Commission hearing, this is an absolute mandate. (Testimony of William Olson, Oil Conservation Commission hearing transcript (hereafter "transcript") pages 179-80) In addition, this requirement applies even if the water is not being used, which is appropriate because water that is not used now may be used in the future. (Olson, transcript page 623) The Act requires as well that the Division regulate the disposition of nondomestic wastes resulting from the exploration, development, production, and storage of crude oil or natural gas to protect public health and the environment. (NMSA 1978 sections 70-2-12.B(21) and (22))

The Oil and Gas Act therefore mandates that the Division regulate the disposal of oil and gas wastes in a manner that protects both ground water and the public health and the environment. Since ground water and the environment are enumerated separately, the environment must include items other than ground water. More specifically, it includes the soils surrounding unlined pits in which oil and gas wastes have been disposed of in the past. (See Webster's New World Dictionary of the American Language, 1987, which defines environment as "surroundings". See also testimony of Randall Hicks, William Olson, and Christopher Shuey, all of whom testified that soils are part of the environment. (Hicks, transcript page 789; Olson, transcript page 676; Shuey, transcript pages 986-87))

B. The evidence presented demonstrates that expansion of the Vulnerable Area and elimination of discharges to unlined pits are necessary to prevent contamination of ground water and the environment.

1. The Commission should consider all of the evidence and determine what action to take on the basis of the record as a whole.

The Commission is required to consider all of the evidence presented, and its decision must be supported by the evidence in the record as a whole. (Alto Village Services Corporation v. New Mexico Public Service Commission, 92 N.M. 323, 587 P.2d 1334 (1978); see Trujillo v. Employment Security Department, 105 N.M. 467, 734 P.2d 245 (Ct. App. 1987)) In addition, the Commission should not ignore uncontroverted evidence that was presented. (See

Pruett v. Employment Division, 740 P.2d 196 (Ore. App. 1987))

2. The evidence demonstrates that disposal of oil and gas wastes in unlined pits causes contamination of ground water.

The contamination of ground water that results from disposal of oil and gas wastes (also known as produced water) in unlined pits was demonstrated by three items of evidence introduced during the Commission hearing. They are the testimony and study presented by William Olson of the Division, the data compiled and testified to by Christopher Shuey of SRIC, and the modeling and statistical work conducted and presented by Michael Wallace of RE/SPEC for SRIC.

Mr. Olson is well qualified to address the issue of contamination of ground water. He has B.S. and M.S. degrees in hydrology from the New Mexico Institute of Mining and Technology (Olson, transcript page 55), and he has worked as a hydrologist for the Division's Environmental Bureau for the past two years. (Olson, transcript page 54) He also was employed by the State Environmental Improvement Division (now the Environment Department) for a year and a half during 1986 and 1987, and worked with the San Juan Basin Produced Water Study Committee during his employment with the Oil Conservation Division and the Environmental Improvement Division. (Olson, transcript page 55) On the basis of those qualifications, Mr. Olson was accepted by the

Commission as an expert hydrogeologist. (Transcript, page 56)

Mr. Olson testified about the study titled "Volatile Organic Contamination of Ground Water around Unlined Produced Water Pits" (Open File Report H89-9) that he conducted in partial fulfillment of his Master's degree requirements. (Division exhibit 6) He pointed out that the purpose of the study was to determine whether the exemption allowing disposal of less than five barrels per day of oil and gas wastes in unlined pits located more than ten feet from ground water in the Commission's 1985 order, R-7940, was causing ground water contamination. (Olson, transcript pages 628, 969; Division exhibit 6, page 19)

As is explained in Division exhibit six, there were three reasons for Division concern about this issue. First, dissolved-phase hydrocarbons, which are present in produced water, contain benzene, ethylbenzene, and toluene, all of which have toxic effects. In addition, benzene is a known human carcinogen. (Division exhibit six, pages 14-15) Second, recent studies have confirmed the contamination of ground water by brine water that is disposed of in unlined pits. A review in the 1950s of brine production data from the southeastern part of New Mexico indicated that even under the most favorable conditions, only nine percent of produced water evaporated from disposal pits. In addition, studies in Utah and elsewhere have demonstrated that more than 90 percent of brine water that is disposed of in

unlined pits seeps directly into the underlying soil, taking with it a large amount of the dissolved salt load in the pit, and thereby causing contamination of the underlying ground water. (Id., page four) Finally, recent studies have recognized the potential for contamination of ground water caused by disposal in unlined pits of produced water that contains dissolved-phase volatile organic compounds (VOCs). (Id., page five)

Mr. Olson's testimony and study also set forth the circumstances under which the study was conducted. The limited funding for the study was provided by the United States pursuant to section 106 of the Federal Clean Water Act and the study involved a year and a half of field work. (Olson, transcript pages 175-76, 122) Two hundred sites were originally selected for investigation, but only 13 of them had ground water that could be accessed with the hand augering equipment that was available for the study. (Olson, transcript page 76; Division exhibit six page 39) As Mr. Olson also pointed out, the pits that were used were selected randomly; there was no effort to preselect sites at which ground water had been contaminated. (Olson, transcript pages 967-69)

Mr. Olson's study described in detail the methods used in the investigation, including selection of sites, location, drilling, and installation of monitor wells, decontamination procedures, and sampling of water quality. (Division exhibit six, pages 20-38) As he also discussed in

his testimony, he drilled four monitoring wells at each site, three downgradient and one upgradient from the pit in question, and sampled the ground water for aromatic VOCs and general water chemistry. (Olson, transcript page 76; Division exhibit six, pages 20-31) The ground water samples were then submitted to the State Laboratory in Albuquerque for analysis by Environmental Protection Agency methods. (Olson, transcript pages 76-77)

The results of Mr. Olson's study demonstrate that disposal of produced water into unlined pits causes contamination of the ground water beneath the pits. Of the 13 sites that he examined, nine (which is more than 70 percent) had ground water contamination by dissolved-phase volatile organics. (Olson, transcript page 77; Division exhibit six, page 50) At more than half of the 13 sites (seven), contamination by benzene, toluene, ethylbenzene, and xylene exceeded the New Mexico Water Quality Control Commission standards. (Id.) Moreover, contamination occurred even when the amount of produced water being disposed of in the pit was small. Mr. Olson found contamination at six of the eight sites at which less than one barrel of produced water was disposed of in the pit per day. (Olson, transcript page 77)

Mr. Olson's study indicates as well that contamination from produced water pits can reach ground water at various levels. Because of limitations on his equipment, he was unable to sample ground water deeper than 31.5 feet from the

surface. Samples at that depth were taken with a drill rig that he borrowed from the State Environment Department. All other samples were taken using a hand auger, which was able to penetrate only about 28 feet. (Olson, transcript pages 155-56; Division exhibit six pages 23-24) Within those limits, contamination of ground water by dissolved-phase volatile organics was found at many different depths. High levels of dissolved BTEX were detected at all sites in depths of five to 10 feet; varying levels were found at 66 percent of the sites with ground water located between 10 and 15 feet and at 60 percent of the sites where ground water was from 15 to 35 feet beneath the surface. (Division exhibit six, page 49) Finally, as Mr. Olson pointed out in his testimony, the limits on his equipment made it impossible for him to sample ground water more than 31.5 feet from the surface. His study therefore does not demonstrate that there is no contamination at that level; rather, the study indicates nothing about whether contamination does or does not occur at that depth. (Olson, transcript page 165)

Importantly, Mr. Olson also sampled and tested the produced water being discharged into the pits, and at four sites, the produced water in the pit or the tank installed to replace the pit. With the exception of one well that had been shut in for four months before the sampling was conducted, all of the produced water sampled had high levels of dissolved-phase volatile organics. (Division exhibit

six, pages 30-31, 42-43) Ten of the 13 sites did not have any volatile organics in the background water, and it was not possible to determine the source of the volatile organics at the three remaining sites. All of them were located downgradient from oil and gas production facilities with unlined pits, and the presence of volatile organics in the background ground water could be due to releases from those facilities or from old buried reserve pits. Most importantly, the levels of BTEX in the ground water downgradient from these three sites were found to be higher than the levels in the ground water upgradient from the three sites. (Division exhibit six, pages 41-42) That finding indicates that the three unlined pits at these sites were contributing BTEX contamination to the ground water.

Mr. Olson's demonstration that disposal of produced water into unlined pits causes ground water contamination was confirmed by the data presented by Christopher Shuey of SRIC. Mr. Shuey, whose resume is SRIC exhibit one, has had extensive experience on the issue of disposal of produced water from oil and gas drilling operations. He is the director of the Community Water Quality Program for SRIC, which is a public interest organization that provides education and technical services on environmental and other issues to communities throughout the Southwest. Mr. Shuey is also the director of the National Citizens' Oil and Gas Waste Policy Project, and he was a member of the Short Term and the Long Term Produced Water Study Committees that have

studied the issues involved in this proceeding since 1984. Mr. Shuey's qualifications as an expert were recognized by the Commission during the course of Mr. Wallace's testimony at the hearing. (Transcript page 541)

Mr. Shuey presented to the Commission during the hearing the results of his review of Division records pertaining to contamination of ground water by produced water pits (SRIC exhibits two and 17). SRIC exhibit two shows the results of investigations performed at 22 produced water disposal pit sites at which ground water was sampled. BTEX contamination was found at 15 or 68 percent of those sites. That corresponds closely with Mr. Olson's finding of BTEX contamination at 69 percent of the sites that he investigated. In addition, Mr. Shuey's review revealed contamination in excess of Water Quality Control Commission standards at 11 of the 22 sites, which is close to Mr. Olson's finding of such contamination at seven of 13 sites. (Shuey, transcript pages 483-86; SRIC exhibit two)

The Division records also indicate that ground water contamination was found at seven of the nine pits that received one barrel or less of produced water per day. In addition, 11 of 15 sites where the ground water was at least 15 feet beneath the surface had contamination, as did five of the seven sites where the ground water was at a depth of at least 20 feet. (Shuey, transcript page 486; SRIC exhibit two) Finally, the records also listed 20 sites as having

soil contamination. (Shuey, transcript page 488; SRIC exhibit two)

As Mr. Shuey pointed out, these data demonstrate that discharges of small amounts of produced water to unlined pits within the existing Vulnerable Area will lead to ground water contamination in three of four cases, contamination of ground water by aromatic hydrocarbons in two of three cases, and contamination by aromatic hydrocarbons at levels that exceed Water Quality Control Commission standards in about half of the cases. In addition, the Division records indicate soil contamination at virtually all of the sites for which data were collected and reported. (Shuey, transcript page 490; SRIC exhibit two)

Moreover, the contamination of ground water and soils is not limited to the existing Vulnerable Area. At the Commission's request, Mr. Shuey prepared SRIC exhibit 17, which indicates the location of each of the sites on SRIC exhibit two relative to the existing and proposed expanded Vulnerable Areas. There are five sites that are located within the proposed expanded Vulnerable Area (Grambling A #3A, Riddle F LS #3A, Saiz #1, Dogie Canyon Compressor, and Johnston Federal #6A) and one that is on the border of that area (the Tapp Comm 5). Four of the five sites within the proposed expanded Vulnerable Area (Grambling, Riddle, Dogie Canyon, and Johnston Federal) have ground water contamination, soil contamination, BTEX contamination, and BTEX contamination in excess of Water Quality Control

Commission standards. The fifth site (Saiz) has soil contamination, but the records do not indicate whether the other categories of contamination are present. The records show all types of contamination at the one site that is on the border of the proposed expanded Vulnerable Area, but indicate that the BTEX contamination does not exceed Water Quality Control Commission standards. (SRIC exhibits two, 17)

The third piece of evidence that supports the need to expand the Vulnerable Area and to ban discharges of produced water into unlined pits is the modeling and statistical analysis presented by Michael Wallace on behalf of SRIC. Mr. Wallace is a Senior Hydrogeologist at RE/SPEC, Inc., a consulting firm in Albuquerque, who has a B.S. degree in plant and soil science from Southern Illinois University and an M.S. degree in hydrology from the University of Arizona. He has extensive experience in hydrogeology, ground water contaminant transport and modeling, as well as expertise in statistical analysis (Wallace, transcript pages 538-40; SRIC exhibit 13 (Wallace resume)), and he was recognized by the Commission as an expert in all of those fields. (Transcript pages 541-42)

Mr. Wallace conducted two modeling studies. The first was for the purpose of determining whether discharges of small amounts of produced water into unlined pits located in unconsolidated geologic materials such as river-valley alluvium could cause contamination of ground water. His

methodology and results in that study were presented in his testimony and SRIC exhibits 11, 15, and 16. As he explained, he used the SUTRA model, which was the best model for this purpose in his professional opinion. (Wallace, transcript page 551) Mr. Wallace testified about the parameters that he selected for the model, and pointed out their sources in his testimony and in SRIC exhibit 11, including its Revised and Expanded Parameters Table and Revised and Expanded Reference List. (Wallace, transcript pages 552-567, 926-27, 930-31; SRIC exhibit 11) The use of those parameters was supported by Mr. Olson, who testified that they were reasonable. (Olson, transcript page 676)

The results of Mr. Wallace's first modeling study confirm the empirical results obtained by Mr. Olson in his study (Division exhibit six). Mr. Wallace's figure 11-1 indicates the results of discharging two and one-half barrels per day of produced water containing 30 parts per million of BTEX into a 12 foot by 12 foot unlined pit. Mr. Wallace used the model to simulate the effects of this disposal during a period of 44 days, at the end of which the model indicated that a five parts-per-million concentration of BTEX would have moved to almost 10 feet below the surface, a level at which ground water can be found. (Wallace, transcript pages 567-70) SRIC exhibit 16 demonstrates that the concentration of BTEX would continue to rise, even after six weeks, until it approached approximately 30 parts per million. (Wallace, transcript

page 572; SRIC exhibit 16) Moreover, as Mr. Wallace pointed out, these modeling results took into account contaminant retardation factors that industry asserted act to prevent or minimize the movement of BTEX into ground water. (Wallace, transcript pages 572-73)

Mr. Wallace testified to his professional opinion that the model he presented and its results are accurate. (Wallace, transcript page 576) He also indicated that the model was not intended to apply to all situations, and that the hydraulic conductivity parameters that he used are those for alluvial soils. (Wallace, transcript pages 922-23, 596) He stated as well that in his professional opinion disposal of small quantities of produced water in unlined pits can lead to contamination of ground water in excess of levels that are protective of public health and the environment. (Wallace, transcript page 576)

Mr. Wallace also presented a statistical analysis that he conducted to determine the likelihood that Mr. Olson and Mr. Shuey had happened to find the only pits in the San Juan Basin that had caused contamination. The results of that analysis are set forth in SRIC exhibit 12, which Mr. Wallace explained in his testimony. As he indicated, the probability is virtually zero that only 14 or 15 of the approximately 6,800 pits in the existing Vulnerable Area of the San Juan Basin have caused contamination and that Mr. Olson and Mr. Shuey would have stumbled onto those 14 pits in the 21 that have been investigated. Similarly, there is

virtually a zero probability that only 100 pits have caused contamination and a very small probability that only 1,000 pits that have caused contamination. Mr. Wallace therefore concluded that it is extremely likely that at least hundreds of pits have contaminated ground water, and that it is very likely that thousands of pits have caused such contamination. (Wallace, transcript pages 578-82; SRIC exhibit 12)

3. Disposal of produced water in unlined pits causes soil contamination.

The environment that the Division is required by the Oil and Gas Act to protect includes soils. (See page four, supra) As Mr. Shuey pointed out in his testimony, contamination of ground water and soil occurs when any one of three conditions is present. First, there is contamination when a chemical constituent is introduced in amounts that exceed the Water Quality Control Commission standards. (Water Quality Control Commission regulations section 3-103) Second, the introduction of a chemical constituent in an amount greater than background levels also constitutes contamination. (Water Quality Control Commission regulations section 3-101) Third, there is contamination when a chemical constituent that does not occur naturally is introduced.

This last point was the subject of some discussion during the hearing, particularly by Mr. Hicks of H⁺GCL, who testified for the Four Corners Gas Producers Association

(hereafter "Four Corners"). Mr. Hicks asserted that the introduction of a non-naturally occurring chemical does not constitute contamination of soil, for example, unless the chemical is present in amounts that require remediation pursuant to State regulations such as the Underground Storage Tank Regulations adopted by the Environmental Improvement Board. That approach is not authorized by law, however, and should not be adopted by the Commission for two reasons.

First, the Underground Storage Tank Regulations do not support the assertion that the introduction of non-naturally occurring chemicals should be permitted so long as they do not reach levels for which remediation is required. (Shuey, transcript page 973) The Underground Storage Tank Regulations require tank owners and operators to prevent releases due to spilling and overfilling. (Underground Storage Tank Regulations section 500) The Regulations also provide that owners and operators must maintain tanks so that releases are not caused by corrosion and structural failure. (Underground Storage Tank Regulations sections 501, 503) Moreover, the Regulations define "release" to mean "spilling, leaking, emitting, discharging, escaping, leaching or disposing from an underground storage tank into groundwater, surface water or subsurface soils" (Underground Storage Tank Regulations section 102.00), and all releases must be prevented. (Underground Storage Tank Regulations sections 500, 501, and 503) There is no requirement in the

Regulations that in order to be a "release" a spill, leak, discharge, or other emission must reach the levels for which remediation is required. There is therefore no basis for Four Corners' allegation that there is no contamination unless remediation levels are reached.

Second, the Commission should reject Four Corners' position because of the extremely high cost of cleaning up contamination once it has occurred. The evidence presented at the hearing (which is discussed in more detail at pages 21 to 22, infra) demonstrates that it is extremely expensive to clean up ground water when it is contaminated (Roger Anderson, transcript page 47; Olson, transcript pages 160-61; Shuey, transcript pages 497-98; Wallace, transcript pages 582-83) and that it may not be possible to return ground water to its original state if it has been contaminated with an actual product. (Olson, transcript pages 161-62) Given that, and because ground water is the source of drinking water for 90 percent of the people in New Mexico (Olson, transcript page 622; Shuey, transcript page 499), it would not be consistent with the Commission's responsibilities to permit the introduction of non-naturally occurring chemicals at any levels into ground water or the soil in which ground water may be located.

The evidence presented at the hearing demonstrated, however, that the disposal of produced water in unlined pits does cause contamination of the soils in which the pits are located. Mr. Shuey's review of Division records set forth

in SRIC exhibits two and 17 indicates that soils have been contaminated by produced water disposed in unlined pits in 20 of the 24 sites for which there are data. In addition, since it is not known whether contamination is present at the remaining four sites, the pits at those sites may also have contaminated soils. (Shuey, transcript page 488; SRIC exhibit two) Mr. Wallace also testified that soil contamination will be present in cases in which the ground water beneath an unlined disposal pit is contaminated. (Wallace, transcript page 583)

The studies presented by Four Corners confirmed that disposal of produced water in unlined pits contaminates soils. Mr. Hicks testified to the levels of toluene, ethylbenzene, total xylenes, and total petroleum hydrocarbons that were detected in the soils, and the levels and depths at which they were detected, at the 10 produced water pits studied by H⁺GCL (Hicks, transcript pages 301-03); those data are set forth in Four Corners exhibit one. As it indicates, and as Mr. Olson pointed out, those contaminants were detected in the soil at nine of the 10 dry gas well sites that H⁺GCL investigated. (Four Corners exhibit one, section 3.0; Olson, transcript page 627) Moreover, the data presented in section three of Four Corners exhibit 12 indicate the spread of BTEX from the produced water pits at five sites: Riddle FLS-3A, Valdez A-1, GCU-153-E, Mobil Thomas Well #1, and Valdez A-1-E. In his testimony, Mr. Hicks stated that there were levels of

contamination of concern at the Riddle site, GCU-153-E, and Valdez A-1, and that the levels of contamination at Valdez A-1-E exceeded Water Quality Control Commission standards. (Hicks, transcript pages 757-61)

Finally, the New Mexico Oil and Gas Association's exhibit one, which lists costs for 17 pit closures, also confirms the contamination of soil by produced water disposal in unlined pits. That exhibit indicates that those 17 pits had contaminated the soil to an average depth of 11 feet, and that the closure of each pit required removal and off-site disposal of an average of 205 cubic yards of soil. (New Mexico Oil and Gas Association exhibit one)

Soil is therefore contaminated by disposal of produced water in unlined pits. This contamination presents an additional problem because the levels of contamination in ground water may be higher than the levels in soil between the contaminant source and the ground water. (Olson, transcript page 673; Wallace, transcript page 584) Mr. Wallace explained that this occurs because processes such as volatilization have a stronger impact on contaminants when they are in soil. (Wallace, transcript pages 584-85) Mr. Wallace also pointed out that the water table fluctuates a great deal in alluvial valleys of the San Juan Basin, by as much as 20 feet, and that a rising water table can redissolve contaminants that are trapped in the soil and

bring them into the ground water. (Wallace, transcript page 586)

4. The extreme costs of cleaning up contaminated ground water mandate that the Commission expand the Vulnerable Area and prohibit discharges of produced water into unlined pits.

The extreme cost of cleaning up contaminated ground water was discussed by several witnesses at the hearing. Roger Anderson, who was recognized as an expert in environmental engineering for the Division (transcript page 44), testified that the cost of remediation at the Flora Vista site was about \$200,000 to \$250,000. (Anderson, transcript page 47) Mr. Olson, whose primary responsibility at the Division is remediation of contaminated ground water and who had experience in that area during his employment with the Environmental Improvement Division, stated that in situations involving contamination of water supplies the costs of remediation can range from hundreds of thousands to millions of dollars. He also indicated that the Lee Acres investigation has cost approximately five or six million dollars so far. (Olson, transcript pages 83, 160-61) Mr. Wallace, who also has extensive experience in clean up of contaminated ground water (SRIC exhibit 13), stated that because of the expenses associated with installation of monitoring wells, modeling design, logistics, soil removal, and other investigative and remedial measures, remediating contamination of ground water seldom costs less than

millions of dollars, and that it is usually astronomical. (Wallace, transcript pages 582-83)

These costs make it especially critical to prevent contamination of ground water from produced water disposal in unlined pits. As Mr. Olson pointed out, the Division's approach is to require prevention of contamination, rather than to deal with the expense of cleaning up contamination that has occurred. (Olson, transcript page 180) That is appropriate both because of the Oil and Gas Act's mandate that the Division protect ground water, public health, and the environment, and because of the comparatively small cost of eliminating unlined pits.

Both Mr. Anderson and Mr. Olson testified that a company had indicated that it would cost \$1,000 per site to comply with the Division's proposed regulation. (Anderson, transcript page 47; Olson, transcript page 124) Moreover, representatives of the oil and gas industry have had ample opportunities to provide additional data concerning costs to the Division.

Mr. Anderson stated generally that representatives of the industry were involved in the development of the Division's proposal through the Long Term Produced Water Study Committee, and that is confirmed by the Division's exhibit one, which is a list of the members of that Committee. It indicates that about 40 industry representatives were on that Committee, and Division exhibit two demonstrates that the Committee has been meeting and

receiving correspondence from the Division since mid 1985. (Division exhibits one, two) In addition, Mr. Olson testified that notice was provided to the oil and gas industry through the trade associations, and that the industry did provide comments, principally on the Division's proposed closure guidelines. (Olson, transcript pages 185-86) Mr. Olson also pointed out that the Division never told the industry representatives not to provide data on the economic impacts of the Division's proposal, but that he had heard no cost figures other than the \$1,000 estimate provided by one company. (Olson, transcript pages 163-64, 82)

The \$1,000 estimate was confirmed by the Meridian Oil Company figures presented by Mr. Shuey in SRIC exhibit six. It shows that Meridian projected its total cost for installation of fiberglass tanks with leak detection systems at 44 sites to be \$52,586.73, which is an average of less than \$1,200 per site. (Shuey, transcript page 497) Very different figures were presented by Darwin Van de Graaff, the Executive Director of the New Mexico Oil and Gas Association. He discussed the Association's exhibit one, which states that the average actual cost incurred for closure of 17 pits was \$12,237 per pit. Mr. Van de Graaff also testified that the incremental cost to replace each pit with a tank would be \$3,500. (Van de Graaff, transcript page 377) Mr. Van de Graaff did not, however, provide any evidence to indicate that the relatively large expenses

incurred in connection with the closure of those 17 pits was typical or would be required at all of the pits that would have to be closed pursuant to the Division's proposed regulation. Moreover, even those expenses for the individual pits are small compared to the costs necessary to clean up contamination of ground water.

II. The Commission should adopt the compliance schedule proposed by SRIC.

As has been discussed, disposal of produced water in unlined pits causes soil and ground water contamination. The Commission therefore should enact a regulation that requires elimination of those discharges as soon as possible. Mr. Shuey testified at the hearing that SRIC supports the Division's proposal that current discharges to unlined pits within the area defined by section I(d)(2) of the Division's proposed regulation be eliminated within one year. He asserted, however, that the Commission should adopt a shorter schedule than that proposed by the Division for discharges into unlined pits in other areas.

There are two issues presented by the Division's proposed regulation pertaining to the schedule for compliance. First, the Division's proposed sections 3(b)(2) and 3(B)(3) of the regulation state that discharges within the areas to which those sections apply shall be eliminated within two and three years, respectively. Second, the Division's proposed regulation section 7(b) would authorize the Division Director to extend the time for compliance by

as much as two years. SRIC urges that the Commission change this proposed schedule by adopting one of the following two amendments. The first would be to change sections 3(b)(2) and 3(b)(3) to require compliance within 18 months and two years, and to amend section 7(b) so that the Division Director is authorized to extend the compliance deadlines by only one year, as was proposed by the Division at the start of the hearing. (Olson, transcript pages 90-92, 108-09) The second would be to adopt the Division's proposed two and three year deadlines, but to eliminate section 7(b) of the Division's proposed regulation. Either of these approaches would be appropriate.

Compliance should be required by the deadlines proposed by SRIC because of the contamination that is caused by discharge of produced water into unlined pits and the exorbitant costs of remediating that contamination. Despite these factors, the Division's proposed regulation could allow discharges into unlined pits to continue for as much as five years. That is not consistent with the Division's mandate to protect ground water, public health, and the environment.

Moreover, the assertion by representatives of the oil and gas industry that they need even more time than the Division proposed in which to eliminate these discharges is not persuasive for two reasons. First, the technology necessary to eliminate discharges into unlined pits is both available and being used in the San Juan Basin. Mr. Shuey

testified at the hearing that the Division's files indicate that since late 1986 and early 1987, at least 562 pits in the Basin have, or shortly will be, eliminated, and that at least 17 different operators are or are anticipating replacing unlined pits with tanks or lined pits. (Shuey, transcript pages 492-93; see also SRIC exhibit three) Mr. Shuey also presented SRIC exhibits four through eight, which pertain to the elimination of these pits. (Shuey, transcript pages 492-96; SRIC exhibits four through eight) As he testified, those exhibits and his review of the Division files on pit closures demonstrate that the technology required to close pits is available and being utilized.

Second, the oil and gas industry has had ample notice that it would have to eliminate these discharges. As Mr. Shuey pointed out in his testimony, the minutes of the Long Term Produced Water Study Committee meeting of November 18, 1986 indicate that the Committee discussed Mr. Olson's study and began the process of expanding the Vulnerable Area. (Shuey, transcript pages 510-13; SRIC exhibit 10) The minutes of the Committee meeting on December 8, 1987 show that Mr. Olson and David Boyer set forth the results of their investigation of unlined pits, and that the Committee understood those results. (Shuey, transcript pages 510-13; SRIC exhibit nine) The representatives of the oil and gas industry on the Committee therefore have been aware for at least four and one-half years that discharges into unlined

pits created contamination. Since they also knew of the Division's mandates to protect ground water (which was in effect in 1986 and 1987) and to protect public health and the environment (which was enacted in 1989), they have had ample notice that discharges to unlined pits would have to be eliminated.

For those reasons, the Commission should not act on the basis of the assertion by the industry representatives at the hearing that the deadlines for elimination of unlined pits in the three areas covered by the Division's proposed regulation should be one, three, and five years, and that the Division Director should have discretion to extend those deadlines for another two years (Hicks, transcript page 341). Rather, the Commission should act to eliminate the contamination caused by discharges into unlined pits as soon as possible, in accordance with the schedule proposed by SRIC.

III. The Commission should enact the well protection measures advocated by SRIC.

Mr. Olson and the Division's exhibit 14 set forth the Division's proposed measures to protect wellhead areas. Specifically, the Division has requested that no unlined pits be permitted within 1,000 feet of any public water supply well or within 200 feet of any other fresh water well or spring. SRIC advocated instead that the 1,000 foot requirement be applied to all drinking water wells and springs. (Shuey, transcript page 514) The Commission

should adopt this latter proposal in order to protect public health and ground water that may be affected through contamination of wells.

Messrs. Olson and Shuey both testified that approximately 90 percent of New Mexico's drinking water comes from ground water. (Olson, transcript page 162; Shuey, transcript page 499) For that reason, protection of the public health requires protection of fresh water wells and springs. In addition, as Mr. Olson pointed out, wells may represent shallow ground water, and because of the way in which many wells are completed, they can act as conduits for migration of contamination to ground water. (Olson, transcript page 72) It is therefore particularly important to provide protection for wellhead areas.

Moreover, Mr. Shuey testified that contamination at the Flora Vista site has traveled 500 to 600 feet. He also stated that the end of the contaminant plume from the Lee Acres site has not been located, and that the contaminants in that plume have moved more than half a mile. (Shuey, transcript pages 976-79) Finally, Mr. Shuey pointed out that the water in private drinking water supplies should be protected to the same extent as that in public drinking water supplies. (Shuey, transcript page 514) For that reason, the Commission should prohibit disposal of produced water in unlined pits within 1,000 feet of all drinking water wells and springs.

IV. The Commission should require that applicants for variances demonstrate equivalent protection and that adequate notice be given of variance applications.

The provisions of the Division's proposed regulation pertaining to variances should be amended to assure protection of public health and the environment and to provide for appropriate public notice. Mr. Shuey pointed out that a variance should be allowed only if the applicant demonstrates that the proposed treatment of produced water will provide the same level of protection as compliance with the regulation. (Shuey, transcript pages 502-04) There are three reasons for inclusion of this criterion. First, the evidence demonstrates that discharges into unlined pits cause contamination of ground water in approximately 70 percent of the cases that have been investigated and of soils in virtually all of the situations studied. Second, the costs of dealing with that contamination are enormous. Third, the Oil and Gas Act requires the Division to protect ground water, public health, and the environment, and it does not provide exceptions to that requirement. (See pages two and three, supra.)

The second respect in which the Division's proposed variance provision should be amended is to mandate that meaningful notice be given of a variance application. As Mr. Shuey indicated, the owner of the surface land on which the disposal occurs and owners of adjacent properties will be most directly affected by a variance. (Shuey, transcript pages 505-06, 982) He also testified that members of the

public have legitimate concerns about the effects of variances on ground water supplies, public health, and the environment. (Shuey, transcript pages 505-06) For those reasons, the regulation should require that actual notice be given to the surface landowner and to people who own adjacent properties. In addition, notice should be given to the general public by means other than the legal advertisements, since very few people read those. (Shuey, transcript page 982)

Mr. Shuey pointed out that the 1991 New Mexico Solid Waste Management Regulations require publication of notice in a newspaper by means other than a legal advertisement, such as a display advertisement. (Shuey, transcript page 908) The variance notice requirement of those Regulations is the same as the requirement for notice of a permit application set forth in the New Mexico Solid Waste Act, which was enacted by the Legislature in the 1990 session and therefore reflects the very recent view of the Legislature on this issue. The Solid Waste Act and the 1991 Solid Waste Management Regulations require that notice be given to owners of neighboring properties and local governments in the area by certified mail, and to the general public by posting at the facility property and by publishing in a newspaper both in the classified or legal advertisements and in another section, calculated to give the public the best possible notice. (Solid Waste Act, NMSA 1978 section 74-9-22; 1991 Solid Waste Management Regulations section 901.B)

- V. The Commission should mandate that operators who have closed pits in the San Juan Basin since January 1, 1987 submit the results of investigations, studies, and closures to the Division for review and approval as well as further action required by the Division.

Mr. Shuey pointed out that information on pit closures is not now provided to the Division routinely, and that the Division therefore does not know the locations or conditions of closed pits until they cause contamination. (Shuey, transcript pages 501-02) A requirement that operators provide the Division with information on pits closed after January 1, 1987 is appropriate because that is the date on which compliance was originally required with Order R-7940. Mr. Shuey also proposed that operators be given six months in which to gather this information on closed pits and to submit it to the Division. (Shuey, transcript page 502) That would both insure that the Division could act to prevent problems from closed pits and provide operators with a reasonable amount of time in which to comply.

- VI. The Commission should include as a special area within the expanded Vulnerable Area the drainage around the Lee Acres landfill site located three miles east of Farmington.

In presenting SRIC exhibit 17, Mr. Shuey stated that one of the pit sites listed in the exhibit, the Lee Acres landfill site, was not included in the existing Vulnerable Area or the proposed expanded Vulnerable Area. (Shuey, transcript page 985) He also indicated that the depth to ground water at the site is about 35 feet (SRIC exhibit two) and that the geology of the drainage system at the site is similar to the geology in such systems in the existing and

proposed expanded Vulnerable Area. (Shuey, transcript pages 985-86) Mr. Shuey asserted, therefore, that the unnamed drainage at the site should be added to the proposed expanded Vulnerable Area. (Shuey, transcript page 986)

Upon further review of the documentation for the Lee Acres site and the documents that Mr. Shuey consulted in the preparation of SRIC exhibit two (Shuey, transcript page 482), SRIC asserts that the exact coordinates of the unnamed drainage around the Lee Acres landfill site should be as follows:

T29N, R12W, section 15, units F, K, N,
T29N, R12W, section 21, units H, I, P,
T29N, R12W, section 22, units C, D, E, L, M,
T29N, R12W, section 27, units D, E, and
T29N, R12W, section 28, units A, H, I, J.

Those portions of the unnamed drainage that are located in sections 27 and 28 of T29N, R12W are already included in the existing Vulnerable Area; the other portions of the unnamed drainage are not. Inclusion of the portions of sections 15, 21, and 22 of T29N, R12W listed above is consistent with Mr. Shuey's testimony that the Commission should protect the areas around the Lee Acres landfill where shallow ground water is likely to be present. (Shuey, transcript pages 985-86)

VII. The Commission should not adopt an exemption for dry gas wells.

The evidence presented at the hearing demonstrates that Four Corners' proposal to exempt approximately 2,150 dry gas wells (Hicks, transcript page 271) from regulation would be inconsistent with the requirements of the Oil and Gas Act, and that the Commission should not adopt such an exemption. There are two reasons for this.

First, the evidence presented by Four Corners in support of its request for an exemption for these wells did not demonstrate that they do not pose a threat to ground water, public health, and the environment. On the contrary, the study presented by Four Corners demonstrated that disposal of produced water from dry gas wells in unlined pits does contaminate soils, and that study provided no evidence to indicate that such disposal does not contaminate ground water.

In his testimony and in the exhibits that he presented, Mr. Hicks indicated that there were detectable levels of several petroleum hydrocarbons in the soil beneath the ten dry gas well pits that H⁺GCL investigated. Toluene was detected in six samples beneath four pits; five samples taken under three separate pits contained ethylbenzene; there were detectable levels of total xylenes in 15 samples below nine pits; and total petroleum hydrocarbons were found in 19 samples beneath eight pits. (Hicks, transcript pages 301-03, Four Corners exhibit two) This is contamination of the soil, and Mr. Hicks' assertion that it is not is

unpersuasive. As was pointed out above (pages 16 to 18, supra), his assertion is based upon the levels detected being below the remediation action levels¹ in the New Mexico Underground Storage Tank Regulations (Hicks, transcript page 261), but those Regulations require prevention of releases of any levels of contaminants into the soil. (See Underground Storage Tank Regulations sections 102(00), 500, 501, 503) There is therefore no basis for Mr. Hicks' proposition that no contamination occurs unless the remediation action levels are exceeded.

As Mr. Olson pointed out, Four Corners' evidence proved that discharges from dry gas wells into unlined pits did contaminate soils at nine of the 10 sites studied. (Olson, transcript page 627; Four Corners exhibit one, section 3.0) In addition, the study conducted by H⁺GCL for Four Corners did not examine ground water at any of the ten dry gas well sites that were investigated. The study therefore presented no evidence to indicate that disposal of produced water into those pits had not contaminated ground water. Moreover, as Messrs. Olson and Wallace stated, the level of contamination in ground water beneath a pit can be higher than the level of contamination in the soil between the pit and the ground water. (Olson, transcript page 673; Wallace, transcript

1. A sample of total petroleum hydrocarbons taken at the Claude Smith well did exceed the Underground Storage Tank Regulations remediation action level, but Mr. Hicks asserted that the high level of total petroleum hydrocarbons in that sample was caused by up-hole contamination.

pages 584-85) For that reason, H⁺GCL's data on levels of soil contamination do not demonstrate whether contaminants were present in the ground water at the sites investigated. (Olson, transcript page 627; Wallace, transcript page 584)

In addition, although H⁺GCL investigated 10 wells, only two of those are within the proposed expanded Vulnerable Area. (Olson, transcript page 628) It is therefore not clear that a large majority of the sample used by Four Corners has any application to this proceeding.

The second reason that no exemption should be provided for dry gas wells is that Four Corners' definition of a dry gas well does not address the factors that will determine whether discharges from such a well will adversely affect ground water, public health, and the environment. Mr. Hicks defined a dry gas well as a well that has an oil to gas ratio of less than one to 100,000, at which no liquid hydrocarbons are recovered, and that discharges less than one barrel of produced water per day. (Hicks, transcript pages 271-72) As Mr. Olson testified, that definition does not provide the information necessary to determine whether contamination will result from discharges of produced water from the well.

In order to know whether discharges from certain wells will cause contamination, it is necessary to determine the composition of the discharge and the depth to ground water. (Olson, transcript page 627) More importantly, the Four Corners definition is based upon the extent to which

hydrocarbons can be recovered from produced water, not upon its possible impact on ground water. The relevant issue is the potential impact on ground water and the environment, however, and an exemption based upon hydrocarbon recovery and marketability would therefore not be appropriate. (Olson, transcript page 627)

VIII. The Commission should not adopt the 324-square-mile exemption proposed by BCO, Inc.

The other major exemption that was proposed at the hearing would exclude from regulation the Lybrook area, which includes approximately 324 square miles. (Olson, transcript pages 629-30) The evidence introduced at the hearing demonstrated that there is not a basis for this exemption, which was proposed by BCO, and that it therefore should not be adopted by the Commission.

The basis for BCO's proposal was the assertion by Clay Kilmer that there is either no or very little alluvium in the Lybrook area. (Kilmer, transcript pages 457, 879) Mr. Olson testified, however, that he found extensive alluvium in the valleys and extensive shallow ground water in the systems that BCO urged be exempt. Specifically, Mr. Olson investigated and found ground water at a depth of 15 feet in alluvium in Johnson Canyon adjacent to the Nacimiento well there. He also located ground water at 20 feet in alluvium in Rincon Largo, and he characterized both of these areas as having "pretty extensive" alluvial systems. He stated as well that there was 24 feet of alluvium in the Rock House

Canyon, that the Crow Lake Windmill is a perennial alluvial well with a depth to ground water of 73 feet, and that there is alluvial water at a depth of one foot throughout the Blanco Wash area. He pointed out that the water in the well located farthest to the west in that Wash has only 15 parts per million total dissolved solids, and is therefore better quality than a lot of Santa Fe water. Finally, Mr. Olson testified that the bulk of the BCO data was taken from outside the proposed expanded Vulnerable Area, but that within the major systems in that Area there are both ground water and extensive alluvium. (Olson, transcript pages 630-37)

The evidence presented also disproved Mr. Kilmer's assertion (Kilmer, transcript page 870) that BCO is not contaminating ground water in the Lybrook area. Mr. Kilmer discussed BCO's B Battery disposal location, which is the subject of BCO exhibit six. As is indicated in that exhibit and his testimony, the saturated sediments beneath that disposal pit contain 36 micrograms per liter of BTEX. (BCO exhibit six; Kilmer, transcript pages 866-67) That is contamination of ground water, and there is no basis for Mr. Kilmer's assertion that it is not because the saturated sediments are not ground water. (Kilmer, transcript pages 912-13) As Mr. Wallace pointed out, BCO did not demonstrate that those saturated sediments are perched water. (Wallace, transcript page 945) More importantly, as Mr. Wallace also indicated, New Mexico law does not make a distinction

between perched water and other ground water (Wallace, transcript page 970); all ground water is required to be protected. Finally, on the basis of the other evidence introduced in the hearing, it is almost certain that the BTEX in the B Battery pit has contaminated the soil beneath that pit, which is part of the environment.


The proposed Lybrook area exemption is inappropriate for a second reason as well. Although that proposal was based upon the absence of alluvium from the area, Mr. Kilmer stated that his assertion that there was no alluvium there was just a general statement intended to refer to the proposed Vulnerable Area as it affects BCO's production. (Kilmer, transcript page 874) Moreover, he also indicated that the boundaries of the Lybrook area were drawn to include all of BCO's production facilities and that he could not guarantee that there would never be production within the area. (Kilmer, transcript pages 874, 901-02) The proposed exemption is therefore based upon the location of BCO's production facilities and not upon the geology of the area or any other factor that would determine whether pits associated with those facilities could contaminate ground water or the environment. For that reason, there is no basis on which the Commission should determine that pits in the Lybrook area will not cause contamination, and the Commission should not adopt the proposed exemption.

Conclusion

On the basis of the Oil and Gas Act's requirements that the Division protect ground water, public health, and the environment, as well as the evidence presented at the hearing, the Commission should adopt the Division's proposed regulation with the modifications pertaining to schedules for compliance, wellhead protection, reporting, and variance procedures proposed by SRIC.

Dated: June 26, 1992.

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STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

IN THE MATTER OF THE APPLICATION
BY THE OIL CONSERVATION DIVISION
FOR EXPANSION OF THE SAN JUAN BASIN
"VULNERABLE AREA", WHICH WAS
ESTABLISHED BY OCC ORDER R-7940
IN 1985; San Juan, Rio Arriba,
McKinley and Sandoval Counties,
New Mexico.

CASE NO. 10436

CLOSING STATEMENT

Four Corners Gas Producers Association ("FCGPA") entered an appearance in this case on January 16, 1992 - the date on which the Oil Conservation Commission of the State of New Mexico ("OCC") first convened for the purpose of hearing the application in the above referenced matter.

At the January 16, 1992 hearing, the State of New Mexico Oil Conservation Division ("OCD") presented its direct case in support of its application. Testimony at the hearing revealed that the application by the OCD was based on a study conducted by Mr. William C. Olson entitled "Volatile Organic Contamination of Ground Water Around Unlined Produced Water Pits", pursuant to which Mr. Olson concluded that small volume discharges of produced water into unlined pits can result in the contamination of ground water. All of the wells studied by Mr. Olson were located within, or adjacent to, the boundaries of the existing vulnerable area as defined in Order R-7940.

During the January 16, 1992 hearing, the OCC heard several motions for continuance submitted by interested parties. These motions were based, in large part, upon inadequate time to review and critique Mr. Olson's study and upon the lack of opportunity to accumulate or develop independent scientific and technical data. The OCC granted the motions for continuance and continued the case to April 9, 1992. Beginning April 9, 1992, one and one-half days of testimony was received by the OCC, at which time the OCC recessed the hearing until May 21, 1992. On May 21, 1992, the OCC reconvened the hearing and received one day of testimony from interested parties.

Subsequent to the January 16, 1992 hearing, members of FCGPA met on more than one occasion to discuss the approach the organization would take with respect to the application submitted by the OCD. Many issues were discussed. Principal among them was the basis for the OCD application - the Olson study and report. Several members of the organization believed that the Olson study should be limited in its application because the study, itself, was limited to conditions found primarily in the alluvial river valley systems. These members argued that the Olson report did not provide an adequate basis for the expansion of the existing vulnerable area. A majority of the membership of the organization agreed that the Olson study and report should be limited in its application; however, they realized that the Olson report and study addressed an environmental issue which was of major concern

to state and federal regulatory agencies and environmental interest groups.

After much discussion, a consensus position was adopted by the FCGPA. The organization decided to undertake its own study in an attempt to understand the scope and magnitude of the problem raised by the Olson study and report. The organization also decided to work cooperatively with regulatory agencies and special interest groups to address environmental concerns which had a basis in fact. From the outset, it has been the desire of FCGPA to have an order issued by the OCC in this case which is based on the substantial evidence tendered by interested parties. It is the position of FCGPA that such an order should not be based on mere speculation or possibilities. Such an order should give weight to the economics of compliance in relationship to the risk that a particular activity will result in environmental harm or injury. Such an order should be structured so as to provide flexibility to the OCD in the performance of its regulatory responsibilities and to industry in its efforts to comply with regulation.

FCGPA and the New Mexico Oil & Gas Association ("NMOGA") have jointly drafted an order that they propose be adopted by the OCC in this case. That proposed order is enclosed as an attachment to this Closing Statement.

There are both substantive and non-substantive differences between the FCGPA/NMOGA draft order and the draft order submitted

into evidence by OCD. The non-substantive differences are in the nature of formatting and changes in word usage and are suggested for purposes of clarification. For purposes of this Closing Statement, those non-substantive changes are not discussed. The substantive changes deal with major issues raised during the hearings in this case and upon which there is some degree of disagreement by and among interested parties.

Following is a brief discussion of the substantive issues which are addressed in the FCGPA/NMOGA draft order.

I.

THE ORDER ISSUED IN THIS CASE SHOULD
PROVIDE FOR AN EXCLUSION FOR DRY NATURAL
GAS WELLS LOCATED WITHIN THE BOUNDARIES
OF THE PROPOSED EXPANDED VULNERABLE AREA.

Substantial evidence has been presented by FCGPA that suggests that, due to the nature of the discharge, produced water from dry natural gas wells, as defined by testimony submitted on behalf FCGPA, does not constitute a threat to human health or the environment. That evidence is in the form of the results of the ten (10) well study conducted by Mr. Randall Hicks on behalf of FCGPA. No credible evidence contradicting the conclusions drawn by Mr. Hicks from his study was introduced by OCD or Southwest Research Information Center ("SRIC"). In addition, Mr. Hicks solidified the conclusions drawn from the (ten) 10 well study with the results of a study involving ground water sampling and

testing at two dry natural gas wells - one of which was located within the boundaries of the existing vulnerable area and the other which was located within the boundaries of the proposed expanded vulnerable area. That (two) 2 well study revealed no evidence of ground water contamination.

It should be noted that Mr. Hicks testified under oath that it was his opinion that an exclusion from the operation of an order entered in this case would be appropriate for dry natural gas wells located within the boundaries of the existing vulnerable area. However, FCGPA has chosen not to pursue an exclusion for dry natural gas wells located within the boundaries of the existing vulnerable area. FCGPA has taken this position based on the existence of higher population bases in the existing vulnerable area and the corresponding greater risk of environmental harm or injury in those areas.

As a final comment on this issue, it is the position of FCGPA that dry natural gas wells should be handled by an exclusion mechanism rather than a variance mechanism. The evidence in support of an exclusion mechanism is now in the record. That evidence has not been discredited in any form or fashion. All parties interested in this particular issue have had an opportunity to be heard. A decision to require dry natural gas wells to be the subject of a variance request after the issuance of an order in this case would result in a duplication of effort on the part of all interested parties.

II.

THE ORDER ISSUED IN THIS CASE SHOULD ESTABLISH REASONABLE WELLHEAD PROTECTION AREAS.

FCGPA supports the creation of wellhead protection areas within a 1,000 foot radius from municipal water supply wells, a 200 foot radius from public water supply sources, and a 100 foot radius from all other freshwater springs and wells. The position of FCGPA on this issue is supported by the provisions of the New Mexico Drinking Water Regulations. In addition, FCGPA submitted other evidence during the hearings in support of its position on this issue. Specifically, the FCGPA position is supported by (a) Mr. Hicks' discussion of maximum transport distance in areas of low permeability, (b) the result of the diffusion experiment conducted by Mr. Hicks, (c) the result of actual case studies conducted by Mr. Hicks regarding areal transport of contaminants in ground water, (d) the testimony of Mr. Hicks regarding the impact of mechanisms of attenuation on contaminants in the unsaturated and saturated zones, and (e) the absence of evidence of contamination of freshwater wells and springs from produced water.

The only evidence submitted in opposition to the FCGPA position was the SRIC saturated model. However, much of the testimony and evidence delivered at the May 21, 1992 hearing in this case convincingly discredited the SRIC saturated model by

showing it to be inapplicable to typical field conditions in the existing and proposed expanded vulnerable areas.

As a final matter on this issue, FCGPA believes that discharges of produced water into unlined pits or onto the ground surface located in a defined wellhead protection area should be allowed to continue, provided that (a) the wellhead protection area was created or established after the effective date of an order issued in this case, (b) the wellhead protection area was created or established after the commencement of the discharges, and (c) the discharges are otherwise permitted pursuant to the terms and provisions of the order issued in this case. Appropriate language addressing this matter is included in the FCGPA/NMOGA draft order.

III.

THE ORDER ISSUED IN THIS CASE SHOULD ESTABLISH
A REASONABLE TIME PERIOD FOR THE ELIMINATION
OF DISCHARGES OF PRODUCED WATER INTO
UNLINED PITS OR ONTO THE GROUND SURFACE.

The FCGPA/NMOGA draft order provides that discharges of produced water into unlined pits or onto the ground surface shall be eliminated within one year after the effective date of an order entered in this case within the existing vulnerable area and within municipal water supply wellhead protection areas, within three years after the effective date of an order entered in this case in that part of the proposed expanded vulnerable

area represented by the ephemeral washes and major tributaries to the major river systems and within public water supply wellhead protection areas, and within five years after the effective date of an order entered in this case in the remainder of the proposed expanded vulnerable area and within all other wellhead protection areas. In addition, the FCGPA/NMOGA draft order gives to the director of the OCD the discretion to grant reasonable extensions to these time guidelines for good cause shown.

Again, the evidence and testimony presented at the hearings support the FCGPA position. In the proposed expanded vulnerable area, it has been demonstrated that the discharge of produced water to unlined pits presents no danger or no immediate danger to groundwater. Hundreds of wells have been in operation for 30 to 40 years with discharges of produced water to unlined pits and, yet, there is only one documented case of water well contamination from produced water and that well is located within the boundaries of the existing vulnerable area. Such field results are consistent with evidence submitted by FCGPA that shows that contaminant movement in the ground water is relatively slow and that mechanisms of attenuation are operating to retard the movement of, or eliminate, contaminants. FCGPA has demonstrated that there is substantially less risk of groundwater contamination outside the boundaries of the existing vulnerable area and, consequently, longer time periods for the elimination

of discharges of produced water to unlined pits or onto the ground surface in those areas is warranted.

The positions advocated by OCD and SCRIC with respect to the time guidelines for elimination of discharges are not supported by the evidence submitted at the hearings. The Olson report and study does not provide adequate support for the OCD proposal. The only evidence submitted by SRIC in opposition to the FCGPA proposal was its saturated model and, again, that model has been discredited because it does not represent typical field conditions in the existing and proposed expanded vulnerable area.

IV.

THE ORDER ISSUED IN THIS CASE SHOULD
PROVIDE FOR THE OPPORTUNITY TO OBTAIN
VARIANCES FROM DISCHARGE ELIMINATION AND
PIT CLOSURE REQUIREMENTS ON AN AREA-WIDE BASIS.

After three and one-half days of hearings in this case, there can be no serious doubt that conditions do exist on an area-wide basis that preclude the contamination of fresh water at any future point of foreseeable beneficial use resulting from discharges of small volumes of produced water into unlined pits. Examples of such conditions are depths to groundwater, soil conditions, and geologic conditions. If it can be shown that the existence of such conditions precludes contamination of fresh water sources, then an area-wide variance makes sense in terms of the economy and efficiency of regulatory administration.

Much of the testimony and evidence submitted by FCGPA and BCO, Inc. at the hearings focused on the existence of such conditions. Particularly, the FCGPA request for an exclusion for dry natural gas wells is based on conditions that exists over a large area. Also, the BCO request for the exclusion of its operations in the Lybrook area is based on the existence of such conditions.

The draft order submitted by OCD indicates that OCD supports the concept of area-wide variances. However, implicit in the testimony and evidence submitted by SRIC is the belief that variances should be granted only on a site specific, i.e. well-by-well, basis. Again, SRIC bases its position on speculation and possibilities - it has presented no substantial evidence.

V.

THE ORDER ISSUED IN THIS CASE
SHOULD PROVIDE THAT PITS CLOSED
PRIOR TO THE DATE OF THE ISSUANCE OF
THE ORDER ARE NOT SUBJECT TO ITS PROVISIONS.

In this regard, SRIC has proposed that for pits closed prior to the effective date of the order and after January 1, 1987 the operator should be required to submit reports of that activity for review and retroactive approval. SRIC also proposes that these pits be subject to closure guidelines that have not yet been adopted.

There are several problems with the SRIC proposal.

OCC Order R-7940 created the existing vulnerable area and set forth requirements that would govern certain operations of oil and gas producers in that area. That order also provided certain exemptions from the operation of the order. To the extent any activity was governed by the provisions of Order R-7940, then it is appropriate that compliance be required.

It is important to note, however, that the scope of Order R-7940 is limited to the existing vulnerable area. There is no order or rule in effect that governs the disposal of produced water into unlined pits or the closure of such pits in the proposed expanded vulnerable area. If that activity is to be regulated, then it will be by virtue of a new order and rule entered in this case. Consequently, it would be improper for the OCC to attempt to retroactively regulate, pursuant to a new order and rule, activities which have not been prohibited by existing order and rule.

In addition, as a practical matter, there has been no evidence submitted that supports a contention that pit closures in the proposed expanded vulnerable area have caused problems to ground water, human health, or the environment. Finally, and as a further practical consideration, the proposal of SRIC, if adopted by the OCC, would create a further significant administrative burden on the agency - one that is not, in any way,

justifiable when considered in the context of risk associated with no regulatory action.

VI.

THE OCC SHOULD MAKE PROVISION FOR
REASONABLE NOTICE AND HEARING REQUIREMENTS
WITH RESPECT TO VARIANCE APPLICATIONS.

This issue is not specifically addressed in the draft order submitted by FCGPA/NMOGA. However, OCC should take the necessary steps to assure that notice and hearing requirements with respect to variance applications are reasonable.

It is the position of FCGPA that notice by publication should be given by the OCD upon receipt of an application for variance. The owner of the land upon which the activity is taking place should receive actual notice of the application from the applicant. The Director of the OCD should be empowered to act administratively on a variance application if no objection is received by it within twenty (20) days after the date of publication of notice or the date actual notice is mailed to an owner entitled to notice. On the other hand, the Director of the OCD should also be empowered to set an application for hearing on its own motion. Objections, if they are to be considered, must (a) be made by an individual or entity having a proprietary interest in the lands upon which the activity is taking place and (b) be accompanied by scientific and/or technical data specific

to the lands which would support a claim that the proprietary interest will be harmed or injured if the application is granted. Upon receipt of an objection that meets these criteria, the Director may, but shall not be required to, set the application for hearing. This procedure would adequately address the interest of those who have legitimate concerns regarding the impact on the environment of the regulated activity. At the same time, this procedure provides industry with some protection against unfounded objections.

SRIC's proposal that all applications for variance be set for hearing would result in an administrative nightmare. In addition, SRIC has submitted no credible evidence to support its proposal.

CONCLUSION

In conclusion, it has been the philosophy of FCGPA since it became involved in this case in January to work cooperatively with all other interested parties to achieve an order that adequately addresses concerns about the disposal of produced water to unlined pits and the impact of that activity on the environment. The effort of FCGPA in this regard has been controlled by the belief of its membership that rules and regu-

lations should be reasonably related to demonstrated problems. Rulemaking should not occur in a vacuum. Risks and economics must be considered.

It is the belief of FCGPA that the draft order submitted by FCGPA/NMOGA represents a fair treatment of the evidence submitted at the hearings in this case. If adopted by the OCC, the FCGPA/NMOGA draft order would permit regulation to occur in a manner that would equitably balance the concerns of regulators, industry, and special interest groups.

Respectfully submitted,

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Enclosure