STATE OF NEW MEXICO

BEFORE THE OIL CONSERVATION COMMISSION

In the matter of the proposed amendments to NMAC §§19.15.2.7, 19.15.16 and 19.15.34 of the New Mexico Oil Conservation Commission Rules

No. 21281

THE RIO GRANDE CHAPTER OF THE SIERRA CLUB'S NOTICE OF INTENT TO PRESENT NON-TECHNICAL AND TECHNICAL TESTIMONY

Introduction

The Rio Grande Chapter of the Sierra Club (referred to as "the Sierra Club") hereby gives notice that it will present both non-technical and technical testimony at the hearing in this matter scheduled for July 30, 2020 before the New Mexico Oil Conservation Commission (referred to as "the Commission"). This Notice of Intent to Present Non-Technical and Technical Testimony (referred to as the "Notice of Intent") addresses three subjects.

First, this Notice of Intent outlines generally the issues that are of concern to the Sierra Club. Second, this Notice of Intent identifies the witnesses who will present non-technical and technical testimony at the hearing on July 30th and provides for each witness a summary of the subjects that the witness will address, his or her qualifications, a resume, and an estimate of the time that his or her direct testimony will take.

Third, this Notice of Intent provides (in Exhibit 4) the changes that the Sierra Club advocates to the language that is proposed by the Petition to Amend NMAC §§19.15.2.7, 19.15.16 and 19.15.34 of the Commission's Rules and request for Hearing filed in this matter (referred to as "the Petition"). The Petition was filed by the Oil Conservation Division of the

New Mexico Energy, Minerals and Natural Resources Department (referred to as "the Division").

I. The Sierra Club has significant interests in this proceeding.

The Sierra Club - Rio Grande Chapter is a volunteer-led organization representing more than 35,000 members and supporters in New Mexico and West Texas. The mission of the Sierra Club is to explore, enjoy and protect the planet, and the Rio Grande Chapter of the Sierra Club prioritizes protecting the climate, air, water, wildlife and public lands in New Mexico and West Texas. Because of these interests, particularly the Sierra Club's interest in protecting New Mexico's precious water resources, the Sierra Club has a significant interest in this proceeding.

II. The Sierra Club will present two witnesses in this proceeding.

A. The Sierra Club will present Camilla Feibelman.

Camilla Feibelman will testify as a non-technical witness. As is indicated by her resume, which is attached as Exhibit 1, Ms. Feibelman is the Director of the Rio Grande Chapter of the Sierra Club, a position she has held since May of 2013. The following is a brief summary of Ms. Feibelman's qualifications.

Ms. Feibelman has a master degree in planning from the University of Puerto Rico and an undergraduate degree in environmental biology from the University of Columbia in New York City. She received a Fulbright Scholarship to study in Peru. She serves as a Trustee of the Udall Foundation and was nominated for the position by President Barack Obama and was confirmed by the U.S. Senate. Ms Feibelman has been employed by the Sierra Club since 2000 and has various positions and participated in a multitude of technical rulemakings on the topics of environmental quality and protection.

Ms. Feibelman will address three subjects in her testimony. First, Ms. Feibelman will explain why the Sierra Club is interested in this proceeding. She will point out that protection and conservation of uncontaminated ground water and surface water resources (referred to as "fresh water") is a high priority for the Sierra Club, and that this proceeding has the potential to affect those fresh water resources in two different ways.

In the first place, Ms. Feibelman will explain that the fracking process uses very large amounts of water, and since fresh water resources are such a scarce and precious resources in New Mexico, it is essential that the amount of fresh water resources used in the fracking process be limited as much as possible. For that reason, any regulations that are adopted in this proceeding should emphasize the reuse of produced water in the fracking process whenever that is possible. As provided under the Produced Water Act, regulation of produced water should protect public health, the environment and freshwater resources.

In the second place, Ms. Feibelman will testify that any regulations that are promulgated in this proceeding should make clear that the fluid (referred to as "produced water") that is created during the process of oil and gas extraction, particularly extraction by means of hydraulic fracturing (referred to as "fracking") cannot be used in any manner that brings it into contact with fresh water resources, thereby contaminating those fresh water resources. Contact with fresh water can occur through spills that happen during treatment or even in transportation.

On the basis of those considerations, Ms. Feibelman will explain that the Sierra Club has four formal positions concerning the use of produced water. The Sierra Club's positions are:

1. produced water must be the fluid used, whenever possible, in the oil and gas industry (referred to as "within the oil field") for the fracking process instead of consuming fresh water resources;

2. the use of produced water must be limited to use within the oil field in situations in which the produced water does not contact fresh water resources;
3. transportation, storage, processing, and other handling of produced water for reuse within the oil field each increase the risks of public and environmental exposure which must be effectively regulated; and,
4. neither treated nor untreated produced water should be used outside of the oil field until it and the risks of its use are scientifically understood and proven safe to human health and the environment.

Ms. Feibelman will explain that the Sierra Club's positions concerning the use of produced water is based in part on the lack of information about produced water. There has been little research on New Mexico produced water and its potential impacts on water, soil, and human health. Because some fluids used in fracking are classified as trade secrets, little is known about the chemical and physical composition of produced water or how to treat it. Additionally, many of the constituent contaminants found in ancient saline waters are of concern to public and environmental health. For example, these waters contain high levels of salts and radioactive material. This lack of information is significant not just for off oil field use but could pose exposure and environmental risks for on oilfield treatment and reuse.

Ms. Feibelman's resume, which is attached as Exhibit 1, will be offered in conjunction with her testimony. The Sierra Club anticipates that Ms. Feibelman's direct testimony will take approximately one hour.

B. The Sierra Club will present Norman Gaume.

As is indicated by his resume, which is attached as Exhibit 2, Mr. Gaume has an extensive history of work on water issues in New Mexico. He is a retired licensed professional

water engineer. All of his 37 years of professional employment in New Mexico required a license as a professional water engineer. He has extensive management and engineering experience in water and wastewater systems, and in water resources planning and administration. In addition, Mr. Gaume is a member of the Produced Water Research Consortium Technical Steering Committee, which has been constituted by the New Mexico Environment Department and New Mexico State University, to address issues pertaining to produced water.

Mr. Gaume will continue the introduction to his testimony by commending the Oil Conservation Division (referred to as "the Division") and the Oil Conservation Commission (referred to as "the Commission") for addressing the need to make the Commission's rules consistent with the Produced Water Act enacted by the New Mexico Legislature in 2019. He will point out, however, that the regulations proposed by the Division omit the important authority provided to the Division by the Act – that is, the authority to regulate produced water "in a manner that protects public health, the environment and fresh water resources." Mr. Gaume also will point out that the Division's application to amend the Commission's rules for produced water or the proposed regulations do not make clear whether the Division intends to follow up with additional rule making proceedings to implement its new statutory authority and to rectify the current unacceptable status quo with regard to the handling of produced water within the oil and gas industry (referred to as "within the oil field").

Following his introductory remarks, Mr. Gaume will testify that the regulations should include the authority given to the Division to regulate produced water "in a manner that protects public health, the environment and fresh water resources". He also will explain that the regulations should clarify the distinction made in the Produced Water Act between the

jurisdiction of the Division within the oil field and the jurisdiction of the New Mexico Environment Department outside the oil field.

Mr. Gaume will continue his testimony by pointing out the need for the regulations to be consistent with protection of fresh water resources, and the inappropriate use of the term "potable water" in the Division's proposed amendments to the regulations. He will explain that it would be more appropriate to categorize water on the basis of the level of total dissolved solids (referred to as "TDS") in the water. He also will explain that it is appropriate for the regulations to protect fresh water resources in two ways: by preventing produced water from contaminating fresh water resources and by promoting the use of produced water instead of fresh water resources in oil and gas industry uses.

Mr. Gaume also will address issues that the proposed regulations should have addressed but did not. The first issue is the unacceptable status quo pertaining to leaks and spills of produced water. These include leaks and spills that have been caused by equipment failure, corrosion, and human error. Mr. Gaume will point out that more stringent rules are needed to prevent such spills and to protect public health, the environment, and fresh water resources.

A second issue that the proposed regulations do not address is the increased number of facilities for transporting and storing produced water that will come with increased use of produced water within the oil field, and Mr. Gaume will explain that more stringent rules will be needed to address the larger number of facilities. Mr. Gaume also will address a third issue that the regulations should cover. It is the need for collection of more data concerning the quality and quantity of produced water within the oil field. These data are needed to provide more accurate information about how to ensure that produced water does not jeopardize public health, the environment, or fresh water resources. Information also is needed about the volume and

chemical characteristics of each spill, and the causes of each spill so that measures can be taken to prevent spills in the future.

As a member of the Produced Water Research Consortium, Mr. Gaume will explain that the consortium is just beginning its work, has not issued a single technical public report, and has not reached any conclusion about the safety of reuse of produced water outside the oil and gas industry, as authorized by the Produced Water Act after promulgation of regulations pertaining to such reuse pursuant to the Water Quality Act. He will point out that the Ground Water Protection Council, an association of state regulatory agencies, in its 2019 Produced Water Report, describes an extensive process of research that must be completed before any credible claim can be asserted pertaining to the safety of produced water reuse treated to meet "fit-for-purpose" proposed uses.

He also will testify that in his professional opinion that any contact or contamination of fresh water with produced water, with its very high salinity and uncharacterized contaminants and toxins will ruin that fresh water for the purposes of public water supply unless extensive and expensive investigations and potentially water treatment are first paid for and completed.

Another issue that Mr. Gaume will address is the inconsistency in the information provided to members of the public by various New Mexico governmental agencies. He will describe different statements made by different agencies, and will point out that the lack of consistent information presents problems for member of the public who deserve to receive accurate information.

Mr. Gaume will also address the very high salinity of Permian Basin produced water, and the huge amounts of energy that would be required to distill such water through "thermal

processes". These processes would contribute to the aridification of Southeastern New Mexico, which is already underway but which must be reduced.

In terms of the information that is available to members of the public, Mr. Gaume will point out that oil and gas operators have information that they consider to be proprietary, and that they will not release to members of the public. Mr. Gaume will assert that this is inappropriate, and that the Commission should act to make such information available to members of the public and decision-makers such as the Division, the Commission, and the State Legislature.

In conclusion, Mr. Gaume will point out that the current effort to "fast track" research on produced water treatment and re-use for uses outside the oil field is inappropriate because not enough is known about produced water, and even state agencies do not agree on foundational data concerning produced water. He will advocate that the Division and the Commission should focus on their charge, which is to regulate produced water in a manner that protects public health, the environment and fresh water resources.

Mr. Gaume also will urge that the Commission adopt the changes that the Sierra Club has proposed to the amendments proposed by the Division, and Mr. Gaume will explain the Sierra Club's proposed changes to the Commission.

In connection with his testimony, the Sierra Club will offer Mr. Gaume's resume, which is attached as Exhibit 2, as an exhibit. The Sierra Club anticipates that Mr. Gaume's direct testimony will take approximately one and one half hours.

Conclusion

On the basis of the testimony of these witnesses, the Sierra Club urges that the Commission adopt the changes that the Sierra Club has proposed (in Exhibit 4) to the regulation amendments proposed by the Division.

Dated: July 17, 2020.

NEW MEXICO
ENVIRONMENTAL LAW CENTER

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Attorneys for the Sierra Club

CAMILLA CATHERINE FEIBELMAN

3036 San Rafael Ave. SE, Albuquerque, NM 87106 * 505-715-8388 * camilla.feibelman@sierraclub.org

EDUCATION

Graduate School of Planning, University of Puerto Rico, San Juan, PR

Masters in Urban Planning, received August 2012

- Course work completed, Grade Point Average: 3.791
- Master's Thesis presented August 2012: "Can an ecotourism model be successfully applied to the town of Luquillo and the adjacent Northeast Ecological Corridor?"

Columbia College, Columbia University, New York, NY

Bachelor of Arts in Environmental Biology received May 1998

- Grade Point Average: 3.47
- Senior Thesis presented May 1998: "Over-Extraction of Fish in the Peruvian Amazon: Urban and Rural Interaction and Participation in the Iquitos Fish Market"

Albuquerque High School

Degree received May 1994

PROFESSIONAL EXPERIENCE

Sierra Club, Rio Grande Chapter

Chapter Director May 2013 – Present

Oversee and lead the Chapter's efforts to protect the climate, air, water, land, wildlife and communities of New Mexico and West Texas through science based campaigns and advocacy. Supervise four staff and support an extensive volunteer leadership. Lead staff and volunteer training. Manage chapter finances and raise funds.

Sierra Club, Puerto Rico Office

Partnerships, Environmental Justice and Building Bridges to the Outdoors Programs

Regional Representative/Field Organizer *May* 2005-April 2013

Lead grassroots campaign to win protection by law of Puerto Rico's Northeast Ecological Corridor, the second most important Leatherback Turtle nesting beach in US jurisdiction, which we achieved in April of 2013. Worked with volunteer members of the Sierra Club to establish the organization's newest chapter in 10 years, growing local membership from 45 to over 1500. Built participant database from 100 to 25,000 members. Helped to establish each of the new Chapter's basic functions including the executive committee, outings program, tabling efforts, presentations efforts, newsletter production, Sierra Student Coalition and campaigns to protect the Northeast Ecological Corridor, to develop a Zero Waste concept for trash management on the Island and implement the Cool Cities program in 20 municipalities. Coordinated our Annual Leatherback Turtle Festival which includes active participation of 25 leaders, 100 volunteers and over 15,000 members of the public. Coordinated the Sierra Club participation in the National Puerto Rican Day Parade this year in New York City. Developed a network for all local environmental groups in Puerto Rico. Developed and carried out a 14-week grassroots organizing workshop for Chapter and Campaign volunteer leaders.

Sierra Club, Media & Partnerships Programs

Deputy Press Secretary for Diversity Programs January 2004-April 2005

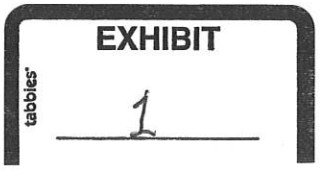
Spanish Language/Environmental Justice Media Coordinator September 2001-December 2003

Supported the media needs of environmental justice communities in Arizona, Detroit, Tennessee, Washington, DC and Appalachia. Created the Sierra Club's first nationally syndicated column which continues to run in Spanish language papers throughout the country. Developed extensive Spanish language media list and relationships with reporters and editors. Produced the Sierra Club's first national bilingual report, highlighting Bush administration environmental impacts on Hispanic communities. Created a roundtable model to help local Sierra Club leaders and Latino community leaders connect.

Sierra Student Coalition, *The Student-Run Arm of the Sierra Club*

National Director January 2000-August 2001

Supervised four staff members, office interns, 40 volunteer leaders, and activities for 20,000 members. Developed organizational vision and strategy. Worked with student leaders to develop and carry out national campaigns, trainings and outings. Coordinated major events for as many as 200 participants, including the Public Lands Action Summit in Washington DC. Facilitated networks with both national and local groups to stop the Free Trade Area of the Americas and its anti-environment clauses. Focused on the



development and expansion of international and fair trade campaigns. Managed an annual budget of $200,000. Carried out short and long-term fundraising efforts. Published national newsletter. Acted as liaison to Sierra Club.

Fulbright
Grant Recipient, Peru November 1998-December 1999
Worked with urban and rural fisherman in the Peruvian Amazon to resolve conflict over access to fishing territory. Organized multi-day conflict resolution workshop for fishermen and agencies. Collected data from the urban fish market, urban residents, and commercial fishing boats to better understand economic forced behind conflict. Traveled with commercial fishermen.

SustainUS
Co-Founder, Board Member January 2001-August 2001
As a member of United Nations Environment Programme's Youth Advisory Council, helped to form a network of American youth to work on the UN Earth Summit in Johannesburg. The organization now monitors and participates in UN environmental decision making and works with American youth to advance sustainable living in the US.

Earth Island Institute
Project Assistant Fall 1998
Wrote foundation and corporate grants for a sub-program of the International Marine Mammal Project.

Sierra Club, Development
Intern Fall 1998
Interviewed Membership Chairs. Created member recruitment guide. Helped develop recruitment contest.

Barnard-Columbia Earth Coalition
Head Coordinator Fall 1995- Spring1998
Coordinated campus environmental audit which resulted in major campus policy changes and formation of administration level conservation committee. Coordinated annual campus Earth Day celebrations. Developed a leadership development program in which each new leader developed one of our monthly educational forums.

New Mexico Conservation Voters' Alliance
Endorsement Coordinator Summer 1996
Distributed endorsement questionnaires. Created candidate scoring system. Led the endorsement decision-making process.
New Mexico Public Interest Research Group
Buy-Recycled Policy Coordinator Summer 1996
Worked with city councils throughout New Mexico to pass "buy-recycled" policies at the municipal level.

Boards

Morris K. Udall and Stewart L Udall Foundation
Trustee Winter 2013 - present
Nominated by President Barack Obama to serve on the Board. First student scholar to serve on the Board.

Coalición Pro Corredor Ecológico del Noreste
Advisor Summer 2005 - present
Provide support and advise to community leaders working towards the permanent protection of the Northeast Ecological Corridor Nature Reserve in Southeast Puerto Rico.

Awards

- 2012 Sierra Club Staff Special Achievement Award
- 1998 Fulbright Scholar
- 1997 Morris K. Udall Scholar
- King's Crown Award for Community Service, Spring 1998;
- Dean's List, Columbia College, Fall 1994, Spring 1995, Spring 1996

Skills and Interests

- **Computer:** Google Suite, Windows, Microsoft Programs, Special data skills in Excel and Power point
- **Languages:** Fully fluent in both written and spoken Spanish and English

Norman Gaume, P.E. (ret.)

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RESUME

Professional Experience

Water, Environment, and Good Government Advocate, 2014 to date.
Activist to Protect the Gila River; for New Mexico water resources and environmental stewardship; and for competent, transparent, honest, and forward-looking science-based governance of New Mexico water resources and our environment by State and local governments.

Water Resources and Water Utility Consulting Engineer, 2003 to 2014. Sole practitioner consultant providing professional services related to water resources policy, planning and administration and water utility management. Clients included the City of Santa Fe, the Buckman Direct Diversion Board, Think New Mexico, the New Mexico Attorney General, the New Mexico State Engineer, the New Mexico Interstate Stream Commission, New Mexico State University, the Gila Conservation Coalition, the New Mexico Wildlife Federation, and outside counsel and professional services contractors for the Albuquerque/Bernalillo County Water Utility Authority, the New Mexico State Engineer, and the New Mexico Interstate Stream Commission.

Consulting services provided included strategic planning facilitation, policy analysis and development, project management, project engineering support, management consulting, staff development, data and modeling analysis and interpretation, support of clients' compliance with federal environmental law, and providing consulting expert and expert witness services pertaining to water resources and water utility litigation.

Director, New Mexico Interstate Stream Commission, 1997 through 2002. Managed the programs, staff, and budget resources of the New Mexico Interstate Stream Commission. Obtained approval for and implemented major new professional staff and budget resources and programs. Served as Engineer-Adviser to New Mexico's Rio Grande Compact Commissioner and advised the State Engineer. Led the collaborative development with stakeholders of a permanent solution authorized in state law to the Pecos River Compact compliance mandates of the US Supreme Court 1987 Amended Decree. This solution was implemented at substantial state effort and cost. It succeeded as projected.

Director, Water Resources Division, City of Albuquerque, 1992-1997. Managed the Water Resources Division from its creation in 1992. Led the planning and implementation of a major scientific program of water resources investigations of the groundwater resources of the Albuquerque Basin. Led the development of the Albuquerque Water Resources Management Strategy, a comprehensive and sustainable water resources solution for Albuquerque, including government approvals with rate increases to fund it. This strategy has been successfully implemented at very substantial public cost.

EXHIBIT 2

Co-managed with a Bernalillo County counterpart, the development, adoption, and initial implementation of the Albuquerque/Bernalillo County Groundwater Protection Policy and Action Plan.

Plant Operations Manager and Technical Services Manager, Water Utility Division, City of Albuquerque, 1986-1992. Managed water production and transmission facilities operations, a major fast-tracked rehabilitation city-wide of wells, reservoirs, and pump stations, and Safe Drinking Water Act compliance. Initiated and implemented new programs for aquifer and water system water quality surveillance and water conservation.

Assistant Division Manager, Capital Projects Engineer, Plant Manager, and Electrical/Mechanical Maintenance Engineer, Wastewater Utility Division, City of Albuquerque, 1978-1986. Held a series of line management positions with rapidly increasing responsibility. Key member of management team that implemented major new wastewater treatment facilities and operations and maintenance staffing and training programs to bring the City of Albuquerque into compliance with the Clean Water Act.

Staff Engineer, Water Resources Engineers, Inc., Austin, Texas, 1974-1978. Applied river, estuary, and reservoir computer simulation models to support planning and development of solutions to water resources problems.

Graduate Teaching Assistant and EPA Water and Wastewater Traineeship Grantee, 1972-1974. Obtained Master of Science degree in Civil Engineering, water and wastewater, supported by a graduate teaching assistantship and EPA grant. Secondary fields of study included hydrology and experimental statistics.

Education

Certificate, Basic Management Program, Anderson School of Management, University of New Mexico

Master of Science in Civil Engineering, New Mexico State University

Bachelor of Science in Electrical Engineering, New Mexico State University

Licenses, Honors

Licensed Professional Engineer, retired, New Mexico License No. 6969

Recipient of the New Mexico Foundation for Open Government's Citizen's Dixon Award

Recipient of the Water Pollution Control Federation's William D. Hatfield award "for outstanding performance in works operations, management and advancement of knowledge in the field of water pollution control"

Phi Kappa Phi and Eta Kappa Nu National Honor Societies

Licensed Instructor (ret.) and practitioner, whitewater open canoe, American Canoe Association

Norman Gaume, P.E. (ret.)

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July 17, 2020

Oil Conservation Commission
Ms. Florene Davidson, Commission Clerk
3rd Floor, Wendell Chino Building
1220 South St. Francis Drive
Santa Fe, New Mexico. 87505

Re: Technical Testimony Pertaining to the Matter of Proposed Amendments to the Commission's Rules on Produced Water, 19.15.2, 19.15.16, and 19.15.34 New Mexico Administrative Code

Dear Oil Conservation Commission Commissioners and Staff,

This letter presents my technical testimony pertaining to the proposed amendment to the rules on produced water. It is submitted on behalf of the Sierra Club – Rio Grande Chapter and on my behalf as a concerned New Mexican. The Sierra Club and I are represented in this matter by Douglas Meiklejohn.

I am a retired licensed professional water engineer. I was educated at Hobbs High School and New Mexico State University, where I earned two engineering degrees. All my professional employment in New Mexico over 37 years from 1978 through 2014 required a New Mexico professional engineering license. I have professional experience in water and wastewater facilities design, construction, operations, maintenance and management and in water resources planning and administration. My resume is attached.

This testimony is organized in five parts:

1. Introduction
2. Omissions of statutory authority and jurisdiction in this proposed conformed rule
3. Requested changes and additions to proposed rule
4. Summary of need for more effective produced water regulations to prevent produced water releases
5. Summary of need for better and more reliable produced water information
6. Summary and conclusions

Introduction

The Sierra Club – Rio Grande Chapter and I appreciate the efforts of the Oil Conservation Division to propose amendments to selected Oil Conservation Commission rules for regulation of produced water within New Mexico's oil fields to conform the

rules to the 2019 Produced Water Act. However, I perceive the proposed rules as premature because of important omissions of substantial public interest and consequence.

The Produced Water Act of 2019 provides explicit new authority to the Oil Conservation Commission and the Oil Conservation Commission (OCD/OCC) to regulate produced water "in a manner that protects public health, the environment and fresh water resources." The proposed amendments do not take material steps to more effectively carry out that writ by addressing the unacceptable status quo. Further, I am unaware of any public indications associated with this matter that the OCD/OCC intends to take additional actions to effectively implement this new statutory authority and jurisdiction to rectify the unacceptable status quo pertaining to handling of produced water internal to the oil field and to protect fresh water resources. Most of this technical testimony addresses these omissions.

In 2019, I applied and was accepted for one of 25 positions on the Produced Water Research Consortium Technical Steering Committee (https://nmpwrc.nmsu.edu/technical-research-committee/) representing three nongovernmental organizations including the Sierra Club. At the time of my application, committee membership required "recognized technical expertise." [That written requirement was informally relaxed subsequently to double the size of the steering committee for reasons that were never justified nor corrected on the consortium web pages on the NMSU website.] My technical testimony presented herein is informed by my participation with that committee including participation on its produced water quantity and produced water quality working groups.

The consortium is just beginning its work, has not issued a single technical public report, and has not reached any conclusion about the safety of reuse of produced water outside the oil and gas industry. Such reuse is authorized by the Produced Water Act after promulgation of regulations pursuant to the Produced Water Act and the Water Quality Act.

The Ground Water Protection Council, an association of state regulatory agencies, in its 2019 Produced Water Report http://www.gwpc.org/producedwater , describes an extensive program of research that must be completed before any credible claim can be asserted pertaining to the safety of produced water reuse treated to meet "fit-for-purpose" proposed uses. As a member of the Technical Steering Committee, I have neither seen nor as of yet had the opportunity to review any consortium work plan that would be equivalent to or would satisfy the recommendations and cautions of this seminal, authoritative report. Therefore, it is my professional opinion that any plans for reuse of treated produced water for non-oil-and-gas-industry purposes are premature and speculative. The discussion in a recent paper whose authors include three members of the Technical Steering Committee is informative on this point. https://doi.org/10.1016/j.scitotenv.2020.137085

The amended rules mention such reuse by amending the existing rules to partially conform them to the language of 2019 Produced Water Act. That is appropriate. It

would be highly inappropriate and premature to presume that such reuse outside the oil field is practical, feasible, or economically possible if conducted in a manner that would protect public health, the environment, and fresh water resources. In contrast, recycling produced water to displace use of scarce southeast New Mexico fresh water resources for the oil and gas industry purposes is practical, desirable, and should be encouraged as set forth in the Sierra Club's proposed rule revisions.

It is my professional opinion that any contact or contamination of fresh water with produced water, with its very high salinity and uncharacterized contaminants and toxins, within or outside of the oil field, will ruin that fresh water for the purposes of public water supply unless extensive and expensive investigations and effective water treatment are applied to define and treat the volume of fresh water contaminated by such contact.

OCD/OCC Statutory Authority and Jurisdiction

Proposed amendments to 19.15.34.3 and 19.15.34.6 muddle statutory authority with objectives. The recitation of statutory authority proposed for 19.15.34.3 omits important new language of the Produced Water Act. The OCD statutory authority was strengthened to regulate "in a manner that protects public health, the environment and fresh water resources." These statutory criteria for regulation replace the former, weaker criterion. While I fully support inclusion of this important statutory phrase in the context of amended objectives, I request that the amended rules clearly include this phrase as new statutory authority of its regulation of produced water within the oil field.

Similarly, the Produced Water Act also clarified jurisdiction for the regulation of produced water. The OCC/OCD's statutory authority is to be exercised over all aspects of produced water within the oil field and meets but does not overlap the New Mexico Environment Department's jurisdiction over reuse of produced water for non-oil-field purposes. I request the amended rules make clear this unambiguous statutory assignment of jurisdiction and responsibility.

Protection of Fresh Water Resources

The proposed rules unnecessarily and incorrectly use the term "potable water" in a manner that does not conform to OCD's statutory authority to regulate "in a manner that protects public health, the environment and fresh water resources."

Potable water is outside the regulatory writ of the OCC/OCD and should be left to the federal and state agencies that are specifically changed with defining and regulating potable water. Potable water means drinking water that meets or is better than regulatory numerical criteria for a host of water quality constituents and contaminants, not merely the concentration of total dissolved solids.

Both the New Mexico Oil and Gas Act and the New Mexico Water Quality Act confer protection on water that has a total dissolved solids (TDS) concentration of 10,000

milligrams per liter (mg/l). These statutes recognize that brackish waters with less than 10,000 mg/l TDS deserve protection from contamination because that water is a potential future water resource in all areas of the state. The bleak long-term picture for water resources availability in southeast New Mexico due to the exhaustion of the Ogallala Aquifer over the current and past couple of generations make protection of brackish water even more important.

Water with a TDS concentration of 1,000 mg/l meets the New Mexico Water Quality Control Commission's standards for domestic water supply [20.6.2.3103 NMAC].

The proposed amendments would have oil and gas operators report the quantity of water used in fracking that contains less than 1000 mg/l TDS, more than 1000 mg/l TDS, or that is recycled produced water. This is a positive but insufficient first step for the OCC/OCD to implement its writ to protect fresh water resources.

OCC/OCD needs to regulate produced water in a manner that protects fresh water resources. Two related sets of actions are needed to protect the finite supply of fresh water. One set of actions is needed to protect fresh water from oil and gas industry contamination. The other set is needed to protect finite fresh water resources from unnecessary depletion by oil and gas industry uses, specifically hydraulic fracturing and water flood or enhanced oil recovery operations, that can instead utilize produced water requiring little or no pre-treatment.

A shift within the oil and gas industry is underway to use produced water for all these purposes in southeast New Mexico. The OCC/OCD rules should support and accelerate that shift by requiring that fresh water not be used for these purposes unless produced water cannot reasonably be made available to supply those uses.

The OCC/OCD rules should also require reporting by operators of the amounts of three classifications of fresh water—less than 1000 mg/l TDS, more than 1000 mg/l TDS but less than 10,000 mg/l TDS, and more than 10,000 mg/l TDS—and the amounts of produced water used in hydraulic fracturing. This aligns with limits set forth in New Mexico law.

The Produced Water Regulatory Status Quo is Unacceptable; More Protective Produced Water Regulations Are Needed to Prevent Produced Water Releases

OCD/OCC is requested to promulgate and enforce regulations that are more protective of public health, the environment, and fresh water resources from inadequacies in the disposition, handling, transport, storage, recycling, treatment, and disposal of produced water within the oil field. The status quo is not acceptable.

Produced water is a toxic hazardous waste byproduct of oil and gas production. The 2019 Produced Water Report describes an extensive program of research needed to characterize the unknown contaminants that do not have accepted standard methods of analysis and measurement and are believed toxic. Such a program of research is required to define wastewater treatment required to protect public health, the environment, and fresh water resources before any reuse.

Presently, New Mexico produced water regulations and management is failing to protect public health and the environment from the careless or negligent release of produced water.

The proposed rules could have but do not address the unacceptable status quo pertaining to spills and leaks of produced water. The recent drenching of Ms. Peggy Aucoin's Carlsbad, New Mexico family home and livestock from a burst high pressure produced water pipeline is a prominent example of the unacceptable status quo.
https://nmpoliticalreport.com/2020/01/24/it-was-raining-on-us-family-awoken-by-produced-water-pipe-burst-near-carlsbad/

OCD on-line records report a plethora of produced water releases, spills and leaks to the surface environment. An OCD on-line report for 2019 reports a summary characterization for each of 821 produced water releases that year.
https://wwwapps.emnrd.state.nm.us/ocd/ocdpermitting/Data/Spills/SpillSearchResults.aspx?IncidentIdSearchClause=BeginsWith&Severity=All&Incident_Type=SWS&OperatorSearchClause=BeginsWith&FacilityIdSearchClause=BeginsWith&FacilityNameSearchClause=BeginsWith&WellNameSearchClause=BeginsWith&Incident_DateRangeStart=01/01/2019&Incident_DateRangeEnd=12/31/2019&Section=00

This report shows that equipment failure, corrosion, human error, and "overflow – tank, pit, etc." are common causes of these produced water spills. These types of spills are negligent and preventable. The frequency of negligent, preventable releases indicates that more stringent rules requiring better oil and gas industry materials of construction and design to prevent releases, timely and adequate maintenance or replacement of equipment in poor condition or likely to fail, and operational controls are needed to prevent these spills and releases of toxic and highly saline produced water in order to protect public health, the environment, and fresh water resources.

Spills that are caused by neglect or inadequate facilities and not caused by an act of God, although not currently illegal per se, could be much more effectively regulated by rules that would require proactive prevention of spills and releases, and not merely after-the-fact reporting and an attempt at clean-up by the responsible party.

For OCC/OCD to require or encourage the use of produced water in lieu of fresh water for hydraulic fracturing is a very good thing, but the OCC/OCD must recognize that implementation requires significantly more facilities for transporting and storing produced water. More facilities means proportionally greater risks of releases, other factors being equivalent. This increased risk supports the need for effective prevention of spills and releases by regulating the current inadequacies in facilities, maintenance, and operations that are the industry-reported causes of most spills and releases. Otherwise, the numbers of spills and releases will increase proportionally to produced water handling, transportation, and storage.

I am unaware of data to demonstrate this but it is my opinion that all spills of the same volume do not have the same toxicity or salinity that cause adverse impacts to public health, the environment, and fresh water resources. For example, a produced water release that is primarily flowback water from a hydraulic fracturing operation will have

different contaminants of different toxicities that a release of produced water comprised of the ancient in-situ waters co-produced with oil or gas after a well has been in sustained production.

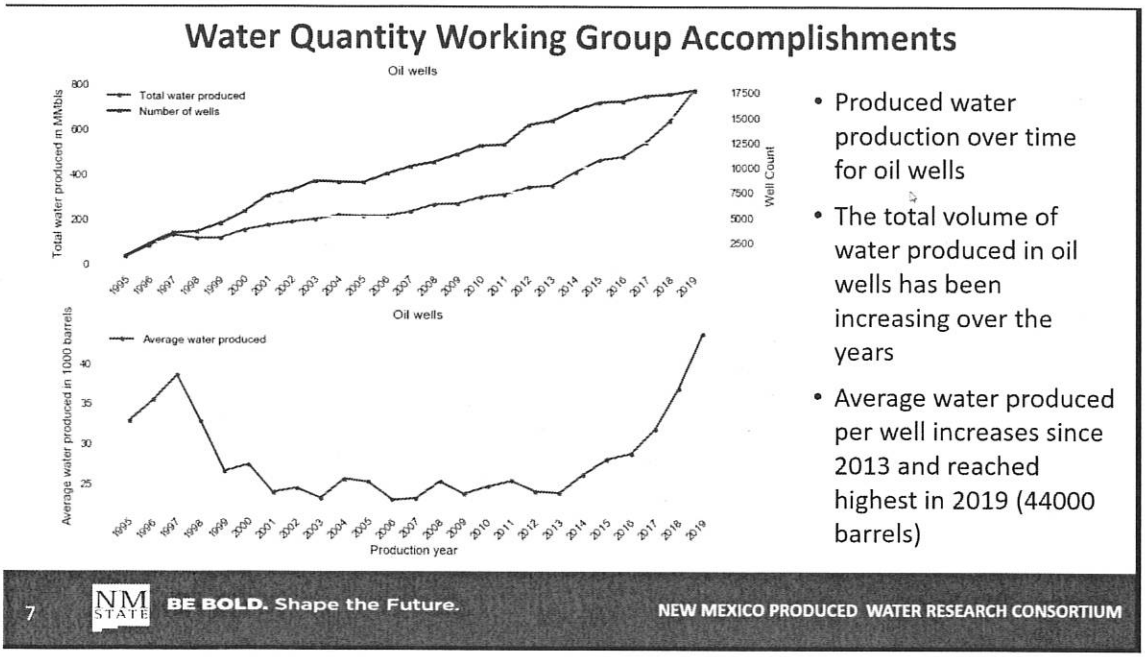
The OCC/OCD should require that operators collect and submit a sample of the release or the spill residue for independent laboratory analysis at the operator's expense. OCC/OCD should require prompt public reporting of the concentration and estimated quantity of the contaminants released to the environment and a characterization of the relative toxicity of the release. The OCC/OCD additionally should require a narrative explanation for each release prepared by the manager with responsibility for the human or facility or equipment that failed and caused the release, rather than be satisfied with only a label that names the cause.

Summary of Need for Reliable Public Information Pertaining to Produced Water

The OCD/OCC is also requested to remedy deficiencies in produced water data that limit the data's veracity and usefulness.

Various state agencies and state officials have made conflicting public statements pertaining to produced water volumes and the volumes of fresh water used for hydraulic fracturing. Other public statements by state officials have implied the tremendously high salinity of Permian Basin produced water is not a virtually insurmountable barrier to any rationally economic or feasible reuse scheme. My public comments presented orally at the October 31, 2019 Santa Fe public meeting on produced water sponsored by the New Mexico Environment Department with the Energy, Minerals and Natural Resources Department and Office of the State Engineer highlighted the conflicting public statements made by state officials employed by these agencies. I subsequently submitted those comments in writing.

Data describing the quantity, quality, and disposition or fate of produced water are poor quality and are unreliable as the basis of regulation or management for reuse. For example, a presentation by the New Mexico Produced Water Research Consortium to the consortium membership on July 14, 2020, included the following graphic:



The information presented in that slide is substantially different from the information available in the Excel spreadsheet available for download on the OCD website at https://wwwapps.emnrd.state.nm.us/ocd/ocdpermitting/Reporting/Production/ExpandedProductionInjectionSummaryReport.aspx I asked why. The answer, as I understood it, was that much of the OCD data were found by NMSU to be incomplete, making the EMNRD compiled data unsuitable for NMSU's purposes. The variance is large. The NMSU slide shows less than 800 million barrels of produced water in 2019. The slide does not establish the geographic area to which this applies. In contrast, the OCD data shows 1,009 million barrels of produced water from SE NM oil wells in 2019 and another 198 million barrels from SE NM gas wells in 2019. The difference is more than 50% of the slide's 2019 produced water volume value.

Another topic of particular concern is the very high salinity of Permian Basin produced water, which is generally three or more times as saline as ocean water. This high salinity presents unique problems for produced water treatment and reuse. For example, the high salinity renders sea water membrane removal unworkable due to the natural laws of physical chemistry. Any desalination must also deal with the fact that salt is 10% or more of the produced water by weight. Desalination of sufficient produced water containing 10% salt to irrigate 100 acres for one year will produce about 1,800 10-yard dump truck loads of salt.

So-called "thermal processes" seems to be preferred to remove salts from the highly saline Permian Basin produced water. "Thermal processes" means distillation. The energy requirements for distillation of sufficient produced water to make any difference in the quantity of usable southeast New Mexico water resources and the associated carbon footprint are huge and inconsistent with what we must do to reduce the aridification of New Mexico that is well underway. New Mexico's severe climate change challenges are well described in the current issue of the New Mexico Tech publication *Earth Matters* https://geoinfo.nmt.edu/publications/periodicals/earthmatters/current/home.cfml .

I have developed an opinion through my participation in the research consortium technical steering committee that the oil and gas industry operators possess useful data but they consider their data to be proprietary and will not release their data publicly. This is counter to the public interest and needs regulatory correction. Data describing the characterization, geographic generation, transportation, and disposal of huge volumes of hazardous oil field wastewater are not suitably deemed private or proprietary. OCC has the statutory authority and jurisdiction to regulate so that the public is informed accurately of this problem of substantial public interest and the regulators, legislators, and the public have reliable information.

Data should be collected, compiled, described by metadata, and managed for public purposes commensurate with the New Mexico Water Data Act and the Water Data Initiative and plan. https://newmexicowaterdata.org/WaterDataPlan_April2020.pdf

Summary and Conclusions

As a New Mexico water resources professional engineer, I believe the current effort to fast track research on produced water treatment and reuse for non-oil industry uses is analogous to a teenager trying to drive at high speed after getting behind the wheel for the first time. The foundational data on quantity is not agreed between state agencies, standard methods of analysis for contaminants of concern do not exist, and the quality and toxicity of produced water are very poorly characterized. This is the opposite of putting first things first.

OCC/OCD should concentrate on fulfilling their writ, which is to regulate produced water "in a manner that protects public health, the environment and fresh water resources." The OCC/OCD should prioritize correction of obvious deficiencies and the unacceptable status quo as set forth in this technical testimony and the Sierra Club's proposed changes to the proposed rules. I fully support and will explain these proposed changes and the reasons they are recommended to the Oil Conservation Commission in my oral testimony.

Preventing releases of produced water, requiring use of produced water in lieu of fresh water whenever and wherever use of produced water is possible, and requiring better data on produced water and making it publicly available commensurate with the NM Water Data Initiative's plan are essential elements of the OCC/OCD role.

Sincerely,

A N Gaume

Norm Gaume, P.E. (ret.)

Proposed Rule Changes for the Oil Conservation Commission

(The Oil Conservation Division's proposed amendments to the regulations are shown in black, and the Sierra Club's proposed changes to those amendments are shown in purple.)

TITLE 19 NATURAL RESOURCES AND WILDLIFE
CHAPTER 15 OIL AND GAS
PART 2 GENERAL PROVISIONS FOR OIL AND GAS OPERATIONS

19.15.2.7 DEFINITIONS: These definitions apply to 19.15.2 NMAC through 19.15.39 NMAC.

P. Definitions beginning with the letter "P".

(10) "Produced water" means [~~water~~] a fluid that is an incidental byproduct from drilling for [~~or~~] and/or the production of oil and gas.

TITLE 19 NATURAL RESOURCES AND WILDLIFE
CHAPTER 15 OIL AND GAS
PART 16 DRILLING AND PRODUCTION

19.15.16.21 WATER USE REPORT: To provide for improved measurement and reporting of all aspects of produced water production, storage, transportation, and reuse within the oil and gas industry, [~~F~~]for a hydraulically fractured well, an operator shall report, on form C-103 or C-105, the amount of water and produced water [~~reported on the disclosure~~] required to be disclosed by Subsection B of 19.15.16.19 NMAC and the breakdown of that amount by types of water including: [~~produced water, nonpotable water and potable water. As used in 19.15.16.21 NMAC~~]

A. [~~"nonpotable water" means water, other than produced water, which contains 1,000 mg/l or more of TDS; and~~] produced water;

B. [~~"potable water" means water, other than produced water, which contains less than 1,000 mg/l of TDS.~~] water other than produced water that has 10,000 or more mg/l TDS;

C. water other than produced water that has more than 1,000 mg/l TDS but less than 10,000 mg/l TDS;

D. Water other than produced water that has less than 1,000 mg/l TDS; and,

E. All such reports shall be compiled and reported monthly on the Oil Conservation Division section of the New Mexico Energy, Minerals & Natural Resources Department website statistics and reporting page.

TITLE 19 NATURAL RESOURCES AND WILDLIFE
CHAPTER 15 OIL AND GAS
PART 34 PRODUCED WATER, DRILLING FLUIDS AND LIQUID OIL FIELD WASTE

19.15.34.2 SCOPE: 19.15.34 NMAC applies to the transportation, disposal, recycling, re-use or the direct surface or subsurface disposition [~~by use~~] of produced water [~~produced or used~~] in connection with the development or production of oil or gas or both [~~; in road construction or maintenance, or other construction; in the generation of electricity or in other industrial processes~~]. 19.15.34 NMAC also applies to the transportation of drilling fluids and liquid oil field waste.

19.15.34.3 STATUTORY AUTHORITY: 19.15.34 NMAC is adopted pursuant to the Oil and Gas Act, Paragraph (15) of Subsection B of Section [~~70-2-12(B)~~] 70-2-12 NMSA 1978, which authorizes the division to regulate the disposition, handling, transport, storage, recycling, treatment and disposal of

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produced water during, or for reuse in, the exploration, drilling, production, treatment or refinement of oil or gas [~~of water produced or used in connection with the drilling for or producing of oil and gas or both~~] and Paragraph (21) of Subsection B of Section [~~70-2-12(B)~~] 70-2-12 NMSA 1978 which authorizes the regulation of the disposition of nondomestic wastes from the exploration, development, production or storage of crude oil or natural gas; and the Produced Water Act, 70-2-12B(15), which provides that regulation should be in a manner that protects the public health, the environment, and fresh water resources.

19.15.34.6 OBJECTIVES: [~~To encourage the recycling [,] or re-use [or disposition] of produced water [by use] in a manner that [will afford reasonable protection against contamination of fresh water] protects public health, the environment and fresh water resources and establish procedures by which persons may transport, recycle, reuse and dispose [of] produced water, drilling fluids and other liquid oil field waste in activities related to the exploration, drilling, production, treatment or refinement of oil or gas.~~] These regulations have three objectives of equal importance. They are:

A. To provide protection of public health, the environment, and fresh water resources from produced water production, storage, transportation, and reuse within the oil and gas industry.

B. To prohibit the use of fresh water in hydraulic fracturing unless there is no alternative to the use of fresh water for hydraulic fracturing.

C. To encourage the recycling or re-use of produced water in activities related to the exploration, drilling, production, treatment or refinement of oil and gas that permanently and physically separate the reused produced water from groundwater or surface water or deep brackish water.

19.15.34.7 DEFINITIONS: These definitions apply to 19.15.34.2 NMAC through 19.15.34.21 NMAC. See 19.15.2.7 NMAC for additional definitions.

A. "Recycling facility" is a stationary or portable facility used exclusively for the treatment, re-use or recycling of produced water [~~intended for disposition by use~~]. A recycling facility does not include oilfield equipment such as separators, heater treaters and scrubbers in which produced water may be used.

19.15.34.8 REQUIREMENTS FOR [~~DISPOSITION BY USE~~] REUSE, RECYCLING [~~FACILITIES~~] OR DISPOSAL OF PRODUCED WATER:

A. Recycling or [~~disposition by use~~] reuse of produced water.

(1) [~~No permit or~~] [~~r~~]Registration by operators is required [~~from~~] with the division for the [~~disposition by use~~] reuse of produced water for drilling, completion, producing [~~, secondary~~] or enhanced recovery [~~, pressure maintenance~~] of oil or natural gas or plugging of wells pursuant to 19.15.34 NMAC.

(2) Any other [~~disposition by use~~] reuse of produced water in the exploration, drilling, production, treatment or refinement of oil or gas requires prior approval by the appropriate division district office on form C-147. Approval requirements will be determined by the district office based upon the proposed use.

(3) Research using produced water is to be encouraged through pilot projects approved by the appropriate division district office.

(4) All produced water for recycling or [~~disposition by use~~] reuse shall be handled and stored in a manner that [~~will afford reasonable protection against contamination of fresh water~~] protects public health, the environment and fresh water resources.

(5) All operations in which produced water is used shall be conducted in a manner consistent with hydrogen sulfide gas provisions in 19.15.11 NMAC or NORM provisions in 19.15.35 NMAC, as applicable.

(6) All releases from the recycling and re-use of produced water shall be handled in accordance with 19.15.29 NMAC.

(7) Any discharge, handling, transport, storage, recycling or treatment for the disposition of treated produced water, including disposition in road construction maintenance, roadway ice or dust control or other construction, or in the application of treated produced water to land, for activities unrelated to the exploration, drilling, production, treatment or refinement of oil or gas is subject to rules adopted by the water quality control commission pursuant to the Water Quality Act.

B. Produced water, drilling fluids, and other liquid oil field waste may be transported, recycled, reused and disposed of only in accordance with procedures promulgated by the Division, and only if those activities are related to the exploration, drilling, production, treatment, or refinement of oil or gas.

C. Produced water or recycled produced water shall not be used in any activities that are not related to the exploration, drilling, production, treatment, or refinement of oil and gas or that could result in the produced water contacting ground water or surface water.

[B]D. Disposal of produced water. Persons disposing of produced water shall use one of the following disposition methods:

(1) [~~disposition in a manner that does not constitute a hazard to fresh water, public health, or the environment;~~] delivery to a [~~permitted salt~~] produced water disposal well [~~or facility~~] permitted pursuant to 19.15.26 NMAC, a surface waste management facility permitted pursuant to 19.15.36 NMAC or a permanent pit permitted pursuant to 19.15.17 NMAC; [~~or to a drill site for use in drilling fluid; or~~]

(2) [~~use~~] recycling or reuse in accordance with 19.15.34 NMAC; or [~~other authorization from the division.~~]

(3) for uses regulated by the water quality control commission pursuant to the Water Quality Act, a person shall obtain a permit from the department of environment before using the produced water, recycled or treated water or treated product or any byproduct of the produced water.

E. No fresh water shall be used in hydraulic fracturing unless there is not alternative fluid including recycled produced water available for use.

19.15.34.9 RECYCLING FACILITIES:

B. In addition to the other applicable rule requirements, registration of a recycling facility is required in the following circumstances:

(3) when the recycling facility is an addition to a [~~salt~~] produced water disposal well permitted under 19.15.26 NMAC;

19.15.34.13 OPERATIONAL REQUIREMENTS FOR RECYCLING CONTAINMENTS:

C. A recycling containment shall be deemed to have ceased operations if less than [~~20%~~] twenty percent of the total fluid capacity is used every six months following the first withdrawal of produced water for use. The operator must report cessation of operations to the appropriate division district office. The appropriate division district office may grant an extension to this determination of cessation of operations not to exceed six months.

19.15.34.14 CLOSURE AND SITE RECLAMATION REQUIREMENTS FOR RECYCLING CONTAINMENTS:

F. 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.

19.15.34.18 DENIAL OF FORM C-133: The division may deny approval of a form C-133 if:

D. the applicant or officer, director or partner in the applicant, or a person with an interest in the applicant exceeding twenty-five percent [~~(25%)~~], is or was within the past five years an officer,

director or partner in the applicant, or a person with an interest in the applicant exceeding twenty-five percent [~~(25%)~~] in another entity that possesses or has possessed an approved form C-133 that has been cancelled or suspended, has a history of violating division or other state or federal environmental laws; is subject to a commission or division order, issued after notice and hearing, finding such entity to be in violation of an order requiring corrective action; or has a penalty assessment for violation of division or commission rules or orders that is unpaid more than 70 days after issuance of the order assessing the penalty.