MEMORANDUM OF UNDERSTANDING
BETWEEN
THE NEW MEXICO ENVIRONMENT DEPARTMENT
AND
REGENTS OF THE NEW MEXICO STATE UNIVERSITY

This **MEMORANDUM OF UNDERSTANDING** ("MOU") is entered into by and between the **State of New Mexico, Environment Department**, hereinafter referred to as the "Department" or "NMED," and **Regents of the New Mexico State University**, hereinafter referred to as "NMSU," and is effective as of the date of the last signatory authority.

WHEREAS, NMED is an executive agency of the State of New Mexico created under the Department of Environment Act, NMSA 1978, Sections 9-7A-1 to -15, and is authorized by NMSA 1978, Sections 74-1-6(B) to enter into this MOU to establish and manage a public-private Consortium to advance produced water research and policy;

WHEREAS, NMSU is a state institution of higher education established under Section 11 of Article XII of the Constitution of the State of New Mexico, and is authorized to implement the Produced Water Research Consortium, hereinafter referred to as the "Project";

WHEREAS, this MOU is exempt from the provisions of the Procurement Code in accordance with NMSA 1978, Section 13-1-98(A);

WHEREAS, NMED and NMSU desire to enter into this MOU to accomplish the Project in the most cost-effective and administratively efficient manner by designating NMSU on behalf of NMED to undertake and oversee Project activities in support of this MOU's purposes; and

WHEREAS, the Parties desire findings from the Project to inform NMED of relevant factors to consider in fulfilling NMED's regulatory mission.

NOW, THEREFORE, the parties mutually agree as follows:

1. Purpose.

House Bill 546, which includes the Produced Water Act, passed the New Mexico State Legislature in 2019 and was signed into law by the governor, for an effective date of July 1, 2019. The bill amended portions of the Water Quality Act (NMSA 1978, Sections 74-6-1 to -17). Pursuant to House Bill 546, the Water Quality Control Commission shall adopt regulations to be administered by the Department for "the discharge, handling, transport, storage, recycling or treatment for the disposition of 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." NMSA 1978, Section 74-6-4(P). In order to better understand the scientific and technical challenges and opportunities surrounding produced water, the Department seeks to collaborate with NMSU for oversight of the Project to fill scientific and technical gaps

related to produced water.

2. Roles and Responsibilities.

NMED and NMSU shall ensure that the Project is conducted in compliance with all applicable laws and regulations. NMED and NMSU shall complete the Project in accordance with Attachment A, in any appropriate manner including associating any third party in fulfilling any project objective.

3. Funding.

A. This MOU is not intended to affect a commitment or obligation of specific funds by the parties and does not include the reimbursement of funds between NMED and NMSU. Cooperative activities under this MOU shall be subject to the availability of funds and personnel. If sufficient funds or authorizations are not granted, this MOU shall be terminated upon written notice from either party, in accordance with paragraph 8.

B. Subject to any applicable law and any reasonable NMED determination that an arrangement is contrary to NMED's regulatory mandate, NMSU may require any third party to pay a certain fee in exchange for certain Project participation rights.

4. Term.

This MOU shall not take effect until signed and accepted by all parties. This MOU shall terminate on **September 30, 2022** unless amended pursuant to paragraph 7 or terminated pursuant to paragraph 8.

5. Reporting Requirements.

NMED and NMSU shall share available data regarding the Project, including reports, task completion progress, reasons for delay of task implementation (if any), and results of Project implementation, and shall make such information available to members of the public upon request. NMED and NMSU will each identify a lead point of contact for this MOU by September 30, 2019. By October 11, 2019, the lead points of contact shall develop an agreed upon process for sharing information, including routine meetings and summary reports, as appropriate.

6. Access to Records.

NMED and NMSU, through any authorized representative, shall be granted access to and have the right to examine all books, papers, or documents related to this MOU.

7. Amendment.

This MOU shall not be altered, changed or amended except by instrument in writing executed by the parties hereto.

8. Termination.

This MOU may be terminated by either of the parties upon written notice delivered to the other party at least thirty (30) days prior to the proposed termination date. By such termination, neither party may nullify obligations already incurred for performance prior to the date of termination. Upon termination, all obligations incurred under this MOU shall terminate.

9. Applicable Law.

The laws of the State of New Mexico shall govern this MOU, without giving effect to its choice of law provisions. Venue shall be proper only in a New Mexico court of competent jurisdiction in accordance with NMSA 1978, Section 38-3-1(G). By execution of this MOU, NMSU acknowledges and agrees to the jurisdiction of the courts of the State of New Mexico over any and all lawsuits arising under or out of any term of this MOU.

10. Liability.

Each party shall be liable for its own actions incurred as a result of its negligence, acts or omissions in connection with this MOU. Any liability incurred by either party in connection with this MOU is subject to the immunities and limitations of the New Mexico Tort Claims Act, NMSA 1978, Sections 41-4-1 to -30.

11. Equal Opportunity Compliance.

A. NMSU shall abide by all state and federal laws and regulations pertaining to equal employment opportunity. In accordance with these laws and regulations, NMSU shall assure that no person in the United States shall, on the grounds of race, color, national origin, sex, age, sexual preference or handicap, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity related to this MOU. If NMSU is found not to be in compliance with these requirements during the life of the MOU, NMSU agrees to take appropriate steps to correct these deficiencies.

B. Any person, group, or organization that signs this MOU shall comply with the following federal statutes: Title VI of the Civil Rights Act of 1964, Section 13 of the Federal Water Pollution Control Act Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972 and their implementing regulations at 40 C.F.R. Parts 5 and 7, where applicable.

12. Participation in Similar Projects.

This MOU in no way restricts NMSU or NMED from entering into other agreements with other public or private agencies, organizations, and individuals, or participating in similar projects.

13. Authority.

13. Authority.

The representatives of the public entities below represent that they have the authority to bind their department or agency, and that no further action, resolution, or approval is necessary to enter into this MOU.

THE PARTIES HERETO HAVE EXECUTED THIS MOU:

STATE OF NEW MEXICO, ENVIRONMENT DEPARTMENT

By: _____ Date: 9/6/2019
James C. Kenney, Secretary
New Mexico Environment Department

By: _____ Date: 9/9/19
Marlene Velasquez, Chief Financial Officer
New Mexico Environment Department

Approved as to Form and Legal Sufficiency:

By: _____ Date: 9/6/19
Jennifer L. Hower, General Counsel
New Mexico Environment Department

REGENTS OF THE NEW MEXICO STATE UNIVERSITY

By: _____ Date: Sept. 6, 2019
Dan E. Arvizu, Chancellor

NM Produced Water Research Consortium

BE BOLD. Shape the Future.

A Public-Private Partnership to Advance Produced Water Research

Background

Oil and natural gas production is a major contributor to New Mexico's economy, with upstream production principally occurring in the Permian Basin in the southeast and the San Juan Basin in the northwest. While technological advancements like directional drilling and hydraulic fracturing fostered additional production in the respective regions, a need exists to identify emerging conceptual frameworks for produced water management, recycling, reuse, and treatment for use outside the oil and gas industry by examining the nexus between (a) production, (b) consumption, (c) transboundary flows, (d) characterization, and (e) environmental and human health impacts of treated produced water uses. With the 2019 passage of the Produced Water Act, House Bill 546, New Mexico is poised to ensure a national leadership role in identifying emerging trans-disciplinary research to fill scientific and technological gaps to effectively aid the establishment of future regulatory and policy frameworks for produced water treatment and use outside of the oil and gas industry. This trans-disciplinary research is specifically needed to fill gaps in data availability in areas such as characterization of produced water from New Mexico oil and gas production activity, understanding removal efficiencies from certain types of treatment trains, analytic sampling methods for constituents in New Mexico produced water, understanding use of treated produced water for various purposes other than hydraulic fracturing, and ensuring surface and ground water are not adversely impacted from the use of treated produced water.

The New Mexico Environment Department (NMED) and Regents of the New Mexico State University (NMSU) entered into a Memorandum of Understanding (MOU) to establish and manage a public-private Consortium to advance produced water research and policy. Through the MOU and Scope of Work described below, NMED and NMSU will direct a collaborative research process to support NMED's implementation of House Bill 546.

Scope of Work

In coordination with NMED, NMSU, a land grant university, will create a trans-disciplinary, public-private Produced Water Research Consortium (PWRC) to advance scientific research and technology development necessary to guide statewide regulation of treated produced water uses outside the oil and gas industry. As a recognized leader in transdisciplinary water research, NMSU has extensive expertise in development and assessment of water technologies for multi-use application (e.g., energy-smart water infrastructure and produced water treatment technologies) with a vast and comprehensive infrastructure to assess embodied impacts on regional water supplies and agricultural applications. Specific NMSU expertise includes advanced methods to characterize water quality and environmental toxicity, development and utilization of smart-sensors and monitoring systems, big-data analysis, and basin-wide system-dynamic assessment of water supply and demand across a variety of uses.

The PWRC will be comprised of recognized scientific/technology researchers and practitioners from academia, industry, state and federal agencies, nongovernmental organizations, national labs, and other stakeholders appointed by NMSU in consultation with NMED. **The Consortium will focus on developing a framework for emerging science and technologies, filling the knowledge gaps necessary for regulatory agencies to then establish science-based rules related to the management and treatment of produced water (note: The Consortium itself will not develop any proposed or final rules).**

NMSU will rely on proven and highly respected models for cooperative research to ensure all work of the Consortium meets the highest standards for scientific integrity. For example, NMSU will set guidelines and procedures for the Consortium that cover pre-registration of research projects, peer review, and transparency of funding sources. To support overall reliability and integrity of the research, once the Consortium is established, NMSU will create a technical advisory council as a subset of the PWRC to help identify research gaps, prioritize demonstration and research projects, and ensure that demonstration and research projects support the needs of regulatory agencies. NMED will have one or more representatives on both the Consortium and the technical advisory council.

The PWRC will rely on the June 2019 Ground Water Protection Council's (GWPC) *Produced Water Report: Regulations, Current Practices, and Research Needs* report as a reference for development and implementation, where applicable. Based in part on Module 3 of the 2019 GWPC Report, the PWRC and technical advisory council will identify New Mexico-relevant pilot demonstration and/or research projects associated with use of treated produced water outside the oil and gas industry (e.g., for water conservation, agriculture, manufacturing, etc.). Further, the PWRC will build capacity and support advanced produced water research aimed at enhancing the contribution of "fit-for-purpose" science and technology in three strategic program areas: (1) produced water characterization: physical, chemical, microbiological, and environmental toxicity analysis; (2) technology development, deployment, and commercialization; and (3) economics, policy, and regulations.

Benefits identified and developed among the Consortium will be accrued by the State of New Mexico, New Mexico counties/cities, oil and gas industry, other industrial sectors, agriculture producers, etc. Anticipated benefits to the State include development of a technology framework to guide development of regulations and policies that ensure sustainable management and protection of water resources, protect human health, and create opportunities for economic development (e.g., technology application, technology commercialization and new business creation). Further, the State will benefit from the addition of water to the hydrologic cycle in light of water scarcity issues aggravated by climate change. New Mexico's counties and cities will benefit as a result of increased water availability leading to greater water security. Industry benefits, economically and socially, are anticipated through improved operations, lower operating costs and creation of an industry culture that embraces collaborative and sustainable approaches for water resource management. Lastly, the Consortium will strengthen the development of public-private partnerships to build and grow sustainable economic opportunities for the State.

Anticipated Funding

The PWRC will be funded with donations from private entities (including the oil and natural gas industry, water industry, financial institutions, etc.), nongovernmental organizations, state/federal agencies, etc., to specifically develop research to fill scientific and technical gaps. Such funding will augment and enhance ongoing produced water research where applicable. Specific focus will be placed on demonstration and research projects that integrate trans-disciplinary approaches focused on produced water management and treatment, as described above, and create opportunities to foster development of an accompanying workforce prepared to integrate developed technologies within the oil and gas sector and/or related industries. More specifically, the proposed funding will support: (1) PWRC and technical advisory council management of the research portfolio, (2) faculty research, postdoctoral researchers, PhD students, and undergraduate students to conduct produced water research, integrate trans-disciplinary research for reuse alternatives, and develop low cost treatment technologies, (3) enhanced laboratory facilities to ensure research is reflective and inclusive of the diverse geology in the respective producing regions (e.g., mobile lab for field testing), (4) acquisition of analytical instrumentation (e.g., inductively coupled plasma optical emission spectrometry, ICP-OES) for advanced produced water characterization, and expansion/renovation of laboratory space to expand pilot-scale water experiments, (5) travel to present research findings and develop collaborations, (6) development and implementation of an annual produced water design challenge task for university teams from across the country, and (7) one or two fulltime university fellows embedded within NMED to assist in integrating research approaches and findings into public policy decision-making related to produced water management, treatment and/or reuse.