

Report on the Galisteo Basin

*Before the OCC
Case 14255
OCD Exhibit 20*

Report on the Galisteo Basin

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INTRODUCTION

The Galisteo Basin contains some of New Mexico's most unique and irreplaceable archaeological, cultural, water and other natural resources. Recently proposed plans for oil and gas drilling in the Galisteo Basin sparked concerns about the impacts that such activities could have on the Basin's unique resources.

On January 24, 2008, Governor Richardson issued Executive Order 2008-004, *Imposing a Six Month Moratorium on New Oil and Gas Drilling in Santa Fe County and the Galisteo Basin*. The six-month moratorium will be in effect through July 24, 2008. As stated in the Executive Order, the Governor is committed to ensuring the health, safety, and welfare of all New Mexicans and to protecting the natural and ecological riches of the State while still supporting much-needed economic development.

The Galisteo Basin

The Galisteo Basin holds some of the nation's most dramatic archaeological evidence of indigenous life-ways and early historic contacts between indigenous peoples and European explorers and settlers. The Congress of the United States has recognized the nationally significant archaeological resources of the Galisteo Basin and identified areas to be protected under the Galisteo Basin Archaeological Sites Protection Act (Public Law 108-208). Despite the Act's intended next steps, the Bush Administration has yet to fund a comprehensive study of the archaeological sites and districts within the Galisteo Basin or to develop a management plan for them. More than 3,000 archaeological sites and about 160 historic structures are recorded in the Galisteo Basin, but these represent only a fraction of the resources expected to be present. Of these known sites, only 25 sites or districts are listed in the National Register of Historic Places or the State Register of Cultural Properties.

A number of Pueblos in the State have traced their ancestral roots to the Galisteo Basin. At least one Pueblo, Tesuque Pueblo, reports that tribal members currently visit the Galisteo Basin for traditional cultural reasons year round and are concerned their rituals will be lost. The area is important for its rich history, the signs left by our predecessors, and for its current use in Tribal practices.

The protection and preservation of significant cultural resources benefits New Mexico and the public. Oil and gas drilling has the potential to significantly affect cultural resources in the Galisteo Basin.

Water resources in the Galisteo Basin also are at risk. The Office of the State Engineer reports the Galisteo Basin is not only a major source basin for the Rio Grande, but is also the only source of domestic water for much of the recent population growth in Santa Fe County.

While the hydrology of the basin is not completely known, it is very complicated and it is susceptible to human influence. Due to the importance of this resource, not only to the citizens of Santa Fe County but to the interstate stream system through its contributions to the Rio Grande, it is extremely important to protect the quantity and quality of the surface and ground water resources in the Galisteo Basin.

Galisteo Basin is also home to a variety of native plant and animal species whose arid habitats could be impacted negatively. In addition to concerns for terrestrial wildlife that can be impacted in sensitive habitats and by travel corridor disruption, aquatic and riparian species and habitats such as those found around the springs, wetlands and drainages in Galisteo Basin must be considered.

Additionally, the area has supported grazing from the early development of the state to the present. The risk of destroying this heritage and its economic contributions, as well as those of other businesses such as film and tourism, are concerns. Clean air and water are essential to most resources and activities in the area.

Implementing Executive Order 2008-004

In order to accomplish the Executive Order's objectives, the Governor established a review period to allow each agency to prepare a thoughtful and fair analysis of all applicable laws and regulations that may affect this fragile and culturally valuable area.

The Energy, Minerals, Natural Resources Department ("EMNRD"), as the lead agency, provided an opportunity for government entities to receive and evaluate input from the public on State activity in this ecologically fragile area (the Galisteo Basin). The participating agencies conducted a careful assessment of all existing laws, regulations, policies, and planning documents to ensure that the State of New Mexico fully and appropriately exercises its police powers to ensure that no oil and gas drilling activity occurs in Santa Fe County and the Galisteo Basin that would be contrary to the interests of the State of New Mexico and its citizens.

Several state agencies met on February 29, 2008 to discuss the implementation of the Executive Order. They met again on March 27, 2008 to discuss logistics for a forum to obtain public comment. The public was invited to an open house on March 29, 2008 at the Santa Fe Community College. The agencies provided notice through local newspapers on two occasions prior to the meeting and posted the meeting notice on EMNRD's web page.

The open house format allowed the public to visit with each agency and provide comments, ask questions, and obtain general information about each agency. The following State agencies sent employees to staff the open house: Energy, Minerals and Natural Resources Department; Office of the State Engineer; New Mexico Environment Department; Department of Game & Fish; Department of Cultural Affairs; Department of Indian Affairs ("IAD"); Department of Tourism; Department of Health; and Department of Agriculture. The turnout for this event was relatively light but the interaction between

the agencies and the public was fruitful. Additionally, public comment was accepted until April 17th. A total of 671 written comments were received by all agencies. The public comments were distributed to the participating agencies on April 24, 2008, for their consideration.

Finally, in a further effort to solicit information from Tribal peoples, IAD co-hosted with the Department of Cultural Affairs, on May 2, 2008, a Tribal Information Session regarding the Executive Order and the Galisteo Basin. A number of State agencies and divisions, including the New Mexico Department of Game and Fish, the New Mexico Tourism Department, the New Mexico Environment Department, the Oil Conservation Division of EMNRD, and the New Mexico Department of Health participated in the Informational Session. Each of these agencies made a brief presentation to the attendees about how the Executive Order related to their statutory and regulatory mandates and how the moratorium on new gas and oil drilling in the Galisteo Basin affected their agencies' areas of responsibility. More importantly, each of these agencies participated in a Question and Answer panel with the Tribal participants in attendance. The Tribes that participated in the Tribal Informational Session were the Pueblo of Tesuque, the Pueblo of San Ildefonso, the Pueblo of Santa Clara, the Pueblo of Sandia, the Pueblo of Picuris, and the Navajo Nation.

As directed in the Executive Order, each participating agency prepared a report on their findings during this review process and submitted that report to the EMNRD. The agencies' reports are attached.

Report on the Galisteo Basin

By:

New Mexico
Energy, Minerals and Natural Resources Department

**REPORT AND RECOMMENDATIONS OF THE
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT**

A. Identification of Agency and its Role Under Executive Order 2008-004.

The Energy, Minerals and Natural Resources Department (EMNRD) is a cabinet-level executive agency created by the Energy, Minerals and Natural Resources Department Act, NMSA 1978, §§ 9-5A-1 through 9-5A-7.

Executive Order 2008-004 directs EMNRD to temporarily suspend the processing and granting of applications for permits to drill for oil and gas in Santa Fe County and Galisteo Basin. Executive Order 2008-004 further directs EMNRD, together with other executive agencies with relevant knowledge and expertise related to the issue, to conduct a careful assessment of all existing laws, regulations, policies and planning documents to ensure that the State of New Mexico has fully and appropriately exercised its police powers to ensure that no oil and gas drilling activity occurs in Santa Fe County and the Galisteo Basin that would be contrary to the interests of the State of New Mexico and its citizens.

EMNRD has three divisions with information relevant to the issues raised in Executive Order 2008-004:

- **The Oil Conservation Division (OCD)** of EMNRD regulates oil and gas activity in New Mexico under the authority of the Oil and Gas Act [Chapter 70, Article 2, NMSA 1978] and the Water Quality Act [Chapter 74, Article 6, NMSA 1978]. The OCD has concurrent jurisdiction with the Oil Conservation Commission (OCC), which is administratively attached to EMNRD.
- **The Energy Conservation Management Division (ECMD)** of EMNRD is responsible for planning and administering energy efficiency and renewable energy technology programs. Included are programs related to the development and use of solar, wind, geothermal and biomass resources as well as alternative fuels and transportation. See NMSA 1978, §§ 9-5A-8, 9-5A-9, and 9-5A-10(B).
- **The New Mexico Forestry Division (NMFDD)** of EMNRD includes in its duties the identification and protection of endangered plant species, pursuant to NMSA 1978, § 75-6-1.

B. Evaluation of Public Comments.

EMNRD received public comments covering a broad range of issues. Some issues fall directly within the scope of EMNRD's authority; the extent to which EMNRD can act on other issues is less clear.

The next section of EMNRD's report presents an overview of its authority and then addresses how that authority may be applied to the issues raised in the public comments.

C. Agency Laws, Regulations, Policies and Planning Documents Pertinent to Executive Order 2008-004.

1. Overview of EMNRD Authority.

EMNRD's authority over issues relevant to Executive Order 2008-004 comes from the Oil and Gas Act, the Water Quality Act, its administration of federal programs under those acts pursuant to grants of primacy from the Environmental Protection Agency and New Mexico case law.

EMNRD exercises that authority through the OCD. Note that the current statutory and regulatory structure is designed to evaluate projects as they are proposed by industry, usually in the form of applications for permits to drill individual wells, applications for projects such as waterflood projects and applications for permits for waste treatment facilities.

a. Oil and Gas Act: The OCD and OCC administer the Oil and Gas Act and the rules adopted pursuant to that Act. When the legislature adopted the Act in 1935, the OCD/OCC's statutory mandate was to prevent the waste of oil and gas resources. Laws of 1935, Ch. 72, Sec. 9. In 1949 the legislature expanded the OCD/OCC's statutory mandate to include the protection of correlative rights, *i.e.*, the opportunity of the owner of each property in a pool to produce without waste his just and equitable share of the oil or gas in the pool. Laws of 1949, Ch. 168, Sec. 9. These two mandates remain central to the OCD/OCC's function today. See NMSA 1978, § 70-2-11. In furtherance of those mandates, the legislature has empowered the OCD/OCC to enact rules and issue orders to prevent oil, gas and water from escaping from the strata in which they are found into other strata. See, for example, Laws of 1935, Ch. 72, Sec. 10, now at NMSA 1978, § 70-2-12(B). Such rules and orders not only prevent waste and protect correlative rights, they also have the effect of protecting ground water. Beginning in 1961, the statutory duties of the OCD/OCC expanded to include express references to environmental protection, specifically the regulation of the disposition of water produced or used in connection with drilling "in a manner that will afford reasonable protection against contamination of fresh water supplies designated by the state engineer," NMSA 1978, § 70-2-12(B)(15). In 1989 the legislature further expanded the duties of the OCD/OCC to include regulation of the disposition of nondomestic oil field wastes "to protect public health and the environment." NMSA 1978, § 70-2-12(B)(21) authorizes regulation of the disposition of

wastes resulting from the exploration, development, production or storage of crude oil or natural gas, and NMSA 1978, § 70-2-12(B)(22) authorizes regulation of the disposition of wastes resulting from the oil field service industry, the transportation of crude oil or natural gas, the treatment of natural gas or the refinement of crude oil. In addition, Section 70-2-12(B)(22) granted the OCD/OCC authority to administer the Water Quality Act as it applies to the oil field service industry, the transportation of crude oil or natural gas, the treatment of natural gas or the refinement of crude oil. See NMSA 1978, § 70-2-12(B)(22). In 1996, the legislature expanded the duties of the OCD/OCC in plugging abandoned wells to include the duty "to restore and remediate abandoned well sites and associated production facilities...." See NMSA 1978, § 70-2-12(B)(18). It is important to note that the OCD/OCC does not regulate pipelines, which are regulated by the Public Regulation Commission under the Pipeline Safety Act. See NMSA 1978, § 70-3-11.

In recent years the OCD and OCC have engaged in significant rulemaking under the Oil and Gas Act, and the OCD has additional rulemaking in process. In 2004 the OCC enacted special provisions for certain areas of Sierra and Otero Counties, prohibiting pits and adding more stringent requirements for injection wells. The rules were designed to protect ground water and the fragile ecosystem in Otero Mesa. See 19.15.1.21 NMAC. In 2005 the OCC enacted new rules covering enforcement and financial assurances for well plugging (see, e.g., 19.15.1.40 NMAC and 19.15.3.101 NMAC); those rules were challenged and are now before the New Mexico Supreme Court in *Marbob Energy Corporation v. New Mexico Oil Conservation Commission*, Case No. 30,710. In 2007 the OCC enacted new surface waste management rules (19.15.36 NMAC); those rules were challenged and are now before the Court of Appeals in *Burlington Resources Oil and Gas Company, LP, et al. v. Oil Conservation Commission*, Case No. 28526. In 2008 the OCC enacted a new rule on pits; industry filed a motion for rehearing challenging the OCC's order adopting the pit rule, which is the initial step in an appeal of the order. The OCD is currently conducting stakeholder meetings on proposed rules for produced water. The OCD is also planning a major review of all its rules, starting with a re-organization.

b. Water Quality Act: As a "constituent agency" under the Water Quality Act, the OCD administers that Act and the rules adopted pursuant to that Act to oil and gas activities including surface and ground water discharges at oil and natural gas production sites, oil refineries, natural gas processing plants, geothermal installations, carbon dioxide facilities, natural gas transmission lines and discharges associated with activities of the oil field service industry.

c. Primacy Over Federal Programs: The federal Environmental Protection Agency (EPA) has granted the OCD primacy over the underground injection control (UIC) program for Class II injection wells in the State of New Mexico, except for those on Indian lands. Class II injection wells are wells used to inject oil and gas production wastes and materials, including the water produced in production operations. The EPA has granted the Water Quality Control Commission, the OCD and the Environmental Improvement Division (now the New Mexico Environment Department) primacy over the UIC program for Class I, III, IV and V injection wells in the State of New Mexico,

except for those on Indian lands. These wells include wells used for disposal of other waste products, and wells used in solution mining operations. Class I, II, III, IV and V wells are regulated under the Water Quality Act.

d. New Mexico Case Law: In *Colonias Dev. Council v. Rhino Environmental Services Inc.*, 138 N.M. 133, 117 P.3d 939 (2005) (“*Rhino*”) the New Mexico Supreme Court addressed the role of public participation in the permitting process. The applicant in *Rhino* sought a landfill permit from New Mexico Environment Department (NMED) under the Solid Waste Act. That Act provides for public notice and hearing on permit applications, and requires NMED to adopt environmental regulations to assure that the relative interests of the applicant, affected property owners and the general public are considered prior to issuance of a permit. At the public hearing, the examiner allowed testimony about the adverse impact of the proposed landfill on the community’s way of life, but limited testimony on the cumulative impact of landfills and industrial sites on the community. NMED granted the landfill permit, finding that the applicant met the technical requirements for a permit as set out in NMED rules. In granting the permit, NMED wrote that the social impact of living near a disposal facility was beyond the scope of its authority for granting or denying a permit. After reviewing the Solid Waste Act and the rules adopted pursuant to that Act, the Supreme Court concluded that NMED had too narrow a view of its role. The Supreme Court held that NMED must hear and consider “quality of life” testimony in evaluating an application for a landfill. In addition, because the impact of a proliferation of landfills and industrial sites on a community is relevant to environmental protection – and NMED has statutory and regulatory authority to consider environmental issues – NMED must consider whether the cumulative impact of industrial development rose to the level of a public nuisance or potential hazard to public health, welfare and the environment.

Executive Order 2005-056, the “Environmental Justice Order,” reinforces the holding in *Rhino*, requiring cabinet level departments and commissions to provide meaningful opportunities for public involvement in decisions that may affect environmental quality and public health. Executive Order 2005-056 recognizes that the actions it requires must be “accomplished within the bounds of, and consistent with, the relevant agency’s existing statutory and regulatory authority.”

Under the OCD/OCC’s existing statutory and regulatory framework, applications for permits to drill (APDs) offer an opportunity for addressing many of the public concerns raised about oil and gas development in the Galisteo Basin – such as whether drilling should be allowed, where drilling may occur and how drilling operations should be conducted. The Oil and Gas Act does not require or even provide for public hearings prior to the issuance of an APD, and APDs are usually issued administratively. To allow for public involvement, however, the OCD director intends to set Tecton Energy LLC’s APDs for drilling in the Galisteo Basin for public hearing, as allowed by rule. See 19.15.14.1216 NMAC. The hearings will provide a forum for public input on quality of life issues and the cumulative impact of oil and gas development in the Galisteo Basin. For the OCD to consider such testimony in determining whether to grant the APDs or what conditions to impose on the APDs the testimony should be tied to the OCD’s

statutory authority to protect ground water or to its statutory authority to regulate the disposition of oil and gas related wastes in a manner that will protect public health and the environment.

2. Application of EMNRD Authority to Issues Raised in Public Comments.

a. Impact of Oil and Gas Development on Ground and Surface Water.

As described above, the OCD/OCC has authority under the Oil and Gas Act and the Water Quality Act to regulate oil and gas activity to protect ground and surface water. Its exercise of that authority through rulemaking is discussed below. The OCD has also provided the oil and gas industry with written guidance on how best to prevent environmental pollution in its *Pollution Prevention Best Management Practices* manual, *Pollution Prevention/Best Management Practices Pocket Guide* and *Environmental Handbook*. These documents are available on the OCD's website: www.emnrd.state.nm.us/oed/.

Regulations governing downhole operations.

Operators must obtain a permit (APD) prior to commencing drilling, deepening or re-entry operations, or before plugging a well back to a different pool or completing or re-completing a well in an additional pool. See 19.15.3.102 NMAC. To obtain a permit, the operator must provide information on the surface and bottom hole location of the well, additional information on the proposed well and the proposed drilling method, depth to ground water, the distance from the nearest fresh water well, the distance from the nearest surface water, whether the well will be drilled using a closed-loop system or a pit, and details of the proposed casing and cement program. See Form C-101, Application for Permit to Drill, Deepen or Plug Back. The OCD uses this information to determine if it needs to impose conditions on the approval. See 19.15.3.102.C NMAC.

To protect ground water, it is important to ensure that fresh water-bearing zones are isolated, so the fresh water is not contaminated with hydrocarbons or with water of lesser quality. OCD rules require that wells be equipped with surface and intermediate casing strings and cement to effectively seal off and isolate all water-, oil- and gas-bearing strata and other strata encountered in the well down to the casing point. See 19.15.3.107 NMAC. In addition, OCD rules govern the plugging of inactive wells, so that they do not serve as conduits for contamination. See 19.15.4.202 NMAC.

OCD rules currently do not address the contents of drilling fluids and completion fluids, including "frac" fluids.

Regulations governing surface production facilities.

Oil field wastes at the surface can also leech to ground water, or runoff to surface water. The OCD/OCC addresses this issue in its recently-enacted "Pit Rule" governing

pits, closed-loop systems, below-grade tanks and sumps, 19.15.17 NMAC. During drilling and workover operations, wastes such as drilling fluids, drill cuttings, and completion fluids (including "frac" fluids) may be stored in temporary pits. Alternatively, operators may use a closed-loop system of above-ground steel tanks to manage drilling or workover fluids. During production activities oil, condensate and produced water may be stored in tanks at the production site, and produced water or brine may be stored in permanent pits. The Pit Rule requires operators to obtain a permit prior to constructing and operating a pit, closed-loop system, below-grade tank or proposed alternative method; that permitting process allows the OCD to review the relevant information and impose requirements to address site-specific issues. The Pit Rule also governs the siting, construction, operation and closure of pits, closed-loop systems and below-grade tanks and sumps.

As a constituent agency under the Water Quality Act, the OCD issues discharge permits to certain oil and gas facilities under 20.6.2 NMAC, including gas compressor stations, gas processing plants, oil and gas service companies, refineries, crude pump stations, oil field brine production wells, geothermal installations, carbon dioxide facilities and underground storage facilities.

Regulations governing oil field waste management.

The OCC recently enacted a new rule governing surface waste management facilities. See 19.15.36 NMAC. The rule applies to operators of landfills, landfarms, small landfarms, and evaporation, storage, treatment and skimmer ponds. Soil and drill cuttings contaminated by petroleum hydrocarbons may be bioremediated in landfarms and small landfarms. Oil field waste and contaminated media may be permanently disposed of in a landfill. The rule specifies technical performance standards that the operator must meet in order to obtain a permit to operate a surface waste management facility. Operators must submit a detailed permit application which provides OCD with the information it needs to ensure that the proposed facility is properly sited, constructed, operated, and closed in a manner that is protective of the environment.

The production of oil and gas is often accompanied by the production of large amounts of water. In some areas of New Mexico, the produced water contains large amounts of chlorides, which can be toxic to plant life and can contaminate fresh water. OCC rules address the disposal of produced water by re-injection (salt water disposal wells). See 19.15.9.701 through 19.15.9.708 NMAC. OCC rules also address the transportation and disposition of produced water and other oil field waste. See 19.15.2.51 NMAC and 19.15.2.52 NMAC.

Regulations governing abatement and remediation.

When releases do occur, OCC rules and OCD permit terms govern the notice and cleanup that is required. Operators are required to notify the OCD of any unauthorized

release greater than 5 barrels or greater than 50 mcf, or a release of any amount that results in a fire, will reach a water course, may with reasonable probability endanger public health or result in substantial damage to property or the environment. 19.15.3.116 NMAC.

OCD reviews each release on a site-by-site basis using its *Remediation of Leaks, Spills and Releases* which is part of OCD's guidance document – *Environmental Handbook* – and determines what corrective action to require. The guidance was prepared in 1993 and is scheduled to be revised. If the release is relatively small and the corrective action may be completed in less than one year, the OCD usually requires remediation pursuant to 19.15.3.116 NMAC. That rule does not require operators to provide public notice of the submittal of the written remediation plan. Releases that impact ground water or surface water must meet the Water Quality Act abatement standards for ground water and the water quality standards for surface waters. OCD does not have numerical vadose zone cleanup standards, but does generally require operators to clean up releases to OCD's proposed standards in its *Remediation of Leaks, Spills and Releases* guidance.

The OCD also has the authority to require operators to conduct investigation and remediation under 19.15.1.19 NMAC. The rule requires operators to remediate or abate ground water, surface water and vadose zone pollution. Operators must submit a Stage 1 Abatement Plan to conduct an investigation and a Stage 2 Abatement Plan to implement its approved corrective action or abatement options. The rule requires operators to provide public notice of the proposed abatement plan. The purpose of the Stage 1 Abatement Plan is to design and conduct a site investigation that will adequately define site conditions and provide the data necessary to select and design an effective abatement option. The purpose of the Stage 2 Abatement Plan is to select and design an abatement option that will result in attainment of the Water Quality Act abatement standards for ground water and the water quality standards for surface waters. The general performance standard for vadose zone contamination is that operators must remediate the vadose zone so that ground water will not be contaminated. Remediation of any ground water or vadose zone contamination at a facility permitted under the Water Quality Act may occur under the terms of the permit, but must substantively meet the requirements of 19.15.1.19 NMAC.

b. Impact of Oil and Gas Development on Other Environmental Concerns.

As discussed above, the OCD/OCC has statutory authority under the Oil and Gas Act and the Water Quality Act to regulate oil and gas activities to protect water, and statutory authority under the Oil and Gas Act to regulate the disposition of oil and gas related wastes “to protect public health and the environment.” Under existing statutes, OCD/OCC's environmental and public health regulation is tied to protection of ground water or to impacts on the environment or public health caused by the disposition of oil and gas related wastes.

Air pollution.

Air pollution - including air pollution resulting from oil and gas activities - is regulated by NMED under the Air Quality Control Act, although a county or municipality meeting certain qualifications may assume jurisdiction as a local authority by adopting an ordinance providing for the local administration and enforcement of the Act. See NMSA 1978, § 74-2-4 (A) (1995).

The OCC/OCD has not addressed air pollution in its rulemaking and permitting processes, leaving regulation of this issue to NMED. However, the regulatory definition of "oil field waste" at 19.15.1.7.O(3) NMAC is broad enough to include air pollution. If the OCC enacts rules on air pollution, the OCC would have to avoid conflicts with rules issued under the Air Quality Control Act.

Noise pollution.

Noise pollution is regulated by NMED under the Environmental Improvement Act at NMSA 1978, § 74-1-7, although noise pollution may also be the subject of municipal or county ordinances (see NMSA 1978, § 3-18-17 and NMSA 1978, Section 4-37-1). Noise pollution may also be addressed in agreements between operators and surface owners (see NMSA 1978, § 70-12-5).

Again, the OCD/OCC has not addressed noise pollution in its rulemaking or permitting activities, leaving regulation of this issue to NMED. The OCD has not traditionally considered noise pollution a "waste" generated by oil and gas activity that adversely affects the environment, although the regulatory definition of "oil field waste" is broad enough to include noise pollution. If it enacts rules on noise pollution, the OCC would have to avoid conflicts with rules issued under the Environmental Improvement Act.

Wildlife.

The OCC/OCD can and should act to protect wildlife to the extent that protection is tied to the protection of water, or to protection of the environment from the impacts of oil and gas related wastes. For example, the OCD cited the protection of wildlife as one of the justifications for enacting the special rules governing Otero Mesa. Those rules prohibited pits, which could pose a hazard to wildlife, and required additional protections for injection wells to protect ground water. See 19.15.1.21 NMAC. The OCC's recently enacted pit rule is an example of a rule specifically designed to protect wildlife from the adverse effects of oil field wastes. The rule requires fencing of pits and below-grade tanks, and allows for the imposition of additional fencing requirements for protection of wildlife in particular areas. 19.15.17.11.D(3) NMAC. In addition, the new pit rule requires netting or screening of pits and open-top tanks to render them non-hazardous to wildlife, including migratory birds. 19.15.17.11.E NMAC.

Plant life.

Again, the OCC/OCD can act to protect plant life to the extent that protection can be tied to the protection of water, or to protection of the environment from the impacts of oil and gas related wastes. And NMSA 1978, § 70-2-12(B)(18) gives the OCC/OCD specific statutory authority to restore and remediate abandoned well sites and associated production facilities.

The OCC has exercised its authority by enacting a plugging and abandonment rule that requires restoration of the surface to "a safe and clean condition." 19.15.4.202.B NMAC. The recently adopted pit rule provides for re-vegetation with native plants after closure of a pit or trench, below-grade tank or area associated with a closed-loop system, pit or below-grade tank, including access roads. 19.15.17.11.I NMAC. Provisions in the pit rule, and in many of the facility permits issued by the OCD, are designed to protect the vadose zone from leaks and spills of oil and gas related wastes. Protection of the vadose zone, the earth material below the land surface and above ground water, is essential to protecting plant life and essential to protecting ground water. The OCD cited protection of plants of the Chihuahuan Desert grasslands of Otero Mesa and the difficulty of surface restoration as part of the justification for enacting the special rules governing Otero Mesa. See 19.15.1.21 NMAC.

c. Impact of Oil and Gas Development on Human Health.

The OCD/OCC is specifically authorized to regulate the disposition on nondomestic oil field wastes "to protect public health." In addition, the protection of water is essential to the protection of public health.

As discussed above, the OCC's rules governing drilling operations are designed in large part to prevent contamination of ground water by the introduction of hydrocarbons or substances used in drilling into water-bearing zones, and to prevent the intermingling of salt water and fresh water. The new surface waste management rules and the new pit rule are designed to protect surface and ground water from oil field wastes.

Several public comments expressed concern about the chemicals used in drilling operations and fracturing of zones ("fracing"). Currently, operators are not required to disclose the chemical used, and operators regard that information as proprietary.

d. Impacts of Oil and Gas Development on Safety.

The OCD received comments expressing concern that oil and gas development in the Galisteo Basin would adversely impact public safety. The OCD/OCC has adopted some rules directed towards safe oil and gas operations under its authority to protect human health and the environment from the adverse effects of oil field waste, and in some cases, under the authority to prevent waste. See, for example, 19.15.3.109 NMAC (addressing blowout prevention); 19.15.3.114 (general safety regulations); and 19.15.3.118 (addressing hydrogen sulfide). The public comments, however, also addressed safety off the wellsite, such as the dangers posed by increased truck traffic.

e. Other Adverse Impacts of Oil and Gas Development.

The OCD received comments regarding the adverse impact of oil and gas development on tourism, home prices and the local infrastructure. As discussed above, the authority of the OCD/OCC is limited to the prevention of waste, protection of correlative rights, protection of water and the regulation of oilfield wastes to protect human health and the environment.

f. Increasing Financial Assurance Requirements.

The OCD received several public comments requesting that oil and gas operators be required to post financial assurances sufficient to cover the costs of site reclamation and abatement of water pollution. Financial assurances are currently required under the Surface Owners Protection Act (NMSA 1978, § 70-12-6) and may be required by county ordinance. The OCD currently imposes financial assurance requirements under the Oil and Gas Act and the Water Quality Act. However, these financial assurances administered by the OCD are limited, and will not normally be sufficient to cover the costs of abating water pollution.

The Oil and Gas Act requires financial assurances for well plugging and site reclamation. By statute, operators must post either a \$50,000 financial assurance to cover all the operator's wells, or single well financial assurances in amounts determined by the OCD. See NMSA 1978, § 70-2-14. The statute also provides that the OCD may require that an operator with a blanket financial assurance also post single well financial assurances for wells inactive more than two years. In 2005 the OCD revised its financial assurance rule, increasing the amounts required for single well financial assurances, and requiring all state or fee wells inactive for more than two years to be covered by a single well financial assurance. See 19.15.3.101 NMAC. Because the costs associated with well plugging have increased over the past several years, the amounts set in 2005 are already insufficient to cover the costs of plugging and basic site restoration. For example, the average cost to the state to plug wells in OCD's District II, located in the southeastern part of the state, was approximately \$49,000 per well in fiscal year 2008. The single well financial assurances posted for wells in that district average \$11,000.

The Oil and Gas Act also authorizes the OCD to require financial assurances for the reclamation of treating plant sites after cessation of operations, but is silent on the amount of financial assurance required. See NMSA 1978, § 70-2-12(B)(20). The OCC's rules for surface waste management facilities provide require a \$25,000 single-facility financial assurance, or a \$50,000 blanket financial assurance. The surface waste management rules were updated in 2007.

The Water Quality Act provides that the Water Quality Control Commission may adopt regulations for the operation and maintenance of permitted facilities, including financial responsibility for corrective actions. NMSA 1978, § 74-6-5(H). The

Commission has enacted rules requiring financial assurances for permitted facilities. See 20.6.2.3107.A(11) NMAC, 20.6.2.4104.C NMAC and 10.6.2.5210 NMAC.

g. Well Spacing and Siting Issues.

Several comments addressed the issue of well spacing, requesting that wells be located away from residences, archeological sites and waterways. In addition, several comments expressed a preference for the use of "drilling islands" and directional drilling to consolidate surface activity.

The OCD considers proximity to ground and surface water in evaluating applications for permits to drill, and will impose additional requirements if necessary to protect the water. The OCD currently has no rules regarding set-backs from residences or other buildings; such set-backs may be addressed in county or municipal ordinances. The OCD currently has no rules addressing set-backs from archeological sites. That issue is addressed in more detail below.

OCD spacing rules are designed to protect correlative rights; rules on directional drilling allow for consolidation of surface activity on "drilling islands." Directional drilling is more expensive than vertical drilling. Typically, exploratory wells are drilled vertically, unless directional drilling is required to access the target area. Once more is known about a particular location, drilling islands can be planned.

h. Protecting Archaeological Sites.

The Cultural Properties Act [NMSA 1978, § 80-6-1] provides a statutory basis for the OCD/OCC to consider the adverse effects of oil and gas operations on registered cultural properties. In addition, the Executive Department Policy Regarding Tribal Consultation on the Protection of Sacred Places and Repatriation, prepared in response to Executive Order No. 2005-003, may require consultation with potentially affected tribes, pueblos and nations.

The Cultural Properties Act requires the cultural properties review committee to identify cultural properties, based on historical, archaeological, scientific, architectural and other cultural significance, and list those properties in a register. See NMSA 1978, § 18.6.5. The Historic Preservation Division of the Office of Cultural Affairs is required to furnish copies of the register to state agencies and departments, and

[t]he head of any state agency or department having direct or indirect jurisdiction over any land or structure modification which may affect a registered cultural property shall afford the state historic preservation officer a reasonable and timely opportunity to participate in planning such undertaking so as to preserve and protect, and to avoid or minimize adverse effects on, registered cultural properties.

NMSA 1978, § 18-6-8.1. The Attorney General has interpreted this section to enable the State Historic Preservation Officer to participate in NMED's deliberation whether to license a private discharge plan when the license would affect a registered cultural property on private land. 1987 Op. Att'y Gen. No. 87-64. Presumably, this section would also apply to permitting actions taken by the OCD under the Oil and Gas Act and the Water Quality Act.

The Cultural Properties Review Committee has enacted rules governing the process mandated by Section 18-6-8.1. When any land or structure modification which may affect a registered cultural property is proposed, the agency must furnish certain information to the State Historic Preservation Officer, who will respond within 30 working days,

- 1) stating that no effect on a registered cultural property will occur, or 2) confirming that an effect on a registered cultural property will occur and requesting further information, or 3) requesting an opportunity to participate in planning.

4.10.7.9 NMAC. The agency head and the State Historic Preservation Officer shall cooperatively make a determination regarding the property or site, 4.10.7.10 NMAC, and if they cannot agree, the agency may appeal to the cultural properties review committee.

4.10.7.14 NMAC. In reviewing a proposed undertaking, the agency head and the State Historic Preservation Officer must apply standards set out in the rule, including the following standard for archaeological sites: "Historic and prehistoric archaeological sites will be avoided by designing projects so that they do not enter the site boundary as established in the state register nomination." 4.10.7.11.B.(1) NMAC.

The Executive Department Policy Regarding Tribal Consultation on the Protection of Sacred Places and Repatriation requires consultation with tribes, pueblos and nations where there is a reasonable likelihood that a major state action may affect a Native American burial or Native American human remains, cultural items, cultural property or sacred places.

i. Encouraging Oil and Gas Production and Protecting the Correlative Rights and Property Rights of Mineral Owners.

The OCD received public comments in favor of oil and gas production, citing the high cost of gasoline, a desire to reduce dependence on foreign oil and increased tax revenues from oil and gas production. In addition, the OCD received public comments supporting the rights of mineral owners to develop their mineral interests.

The protection of correlative rights - the right of each mineral interest owner in a pool to produce without waste his just and equitable share of the resource in the pool - and the prevention of waste are OCD/OCC's traditional statutory mandates. See NMSA 1978, § 70-2-11: "Waste" in this sense is defined in the Oil and Gas Act to include the inefficient, excessive or improper use or dissipation of the reservoir energy of any pool,

and the locating, spacing, drilling, equipping, operating or producing of any well or wells in a manner to reduce or tend to reduce the total quantity of crude petroleum oil or natural gas ultimately recovered from any pool. See NMSA 1978, § 70-2-3(A).

In regulating oil and gas development, the OCD/OCC must balance the need to protect water and the environment with its statutory requirement to prevent waste and protect correlative rights. In practice this has often meant imposing additional requirements or restrictions on operators designed to protect the environment, while still allowing development.

j. Protecting Rights of Surface Owners.

The OCD received several public comments related to the rights of surface owners. Comments addressed the lack of information on the ownership of mineral rights, whether oil and gas development would adversely impact their surface rights and whether property values would decline.

Obviously, surface owners benefit from the statutes and rules related to site restoration and remediation, and they benefit indirectly from the OCD/OCC's enforcement of its rules on drilling, production, waste management and well plugging. The Oil and Gas Act does give the OCD and OCC the authority "to require wells to be drilled, operated and produced in such manner as to prevent injury to neighboring leases or properties." NMSA 1978, § 70-2-12(B)(7). That language appears in the original 1935 statute, Laws of 1935, Ch. 72, p. 142, which did not address environmental issues and was devoted primarily to the protection of mineral ownership and resource management.

The OCD does not track ownership of mineral rights. Property owners can obtain such information by doing a title search on their property, using public records from the county clerk's office. Typically surface owners enter into agreements with operators concerning the use of the surface, and the 2007 Surface Owner's Protection Act (SOPA), NMSA 1978, § 70-12-4, may give them a private right of action. The OCD does not administer SOPA.

k. Energy Conservation and Encouraging Development of Alternative Energy Resources.

A number of public comments suggested that New Mexico conserve energy and pursue alternative energy resources as an alternative to the further development of oil and gas resources; some comments were critical of specific types of alternative energy, such as nuclear power and biofuels. The Energy Conservation and Management Division (ECMD) of EMNRD is responsible for planning and administering energy efficiency and renewable energy technology programs. Included are programs related to the development and use of solar, wind, geothermal and biomass resources as well as alternative fuels and transportation. In addition, ECMD provides technical assistance and

information in these areas to government agencies, Indian tribe and pueblos, educational institutions and the general public.

I. The Ability of the OCD to Enforce the Oil and Gas Act and Rules Promulgated Under that Act.

Several public comments questioned the ability of the OCD/OCC to enforce the Oil and Gas Act and its related rules. The statutory provisions and rules cited above will obviously be of little use if they cannot be enforced.

The Act provides a number of enforcement mechanisms. It provides for civil and criminal penalties for violations. NMSA 1978, § 70-2-31. The Act also provides that if its provisions or any of the rules promulgated pursuant to the Act have been violated, the OCD may after notice and hearing order any well plugged and abandoned by the operator or surety or both. NMSA 1978, § 70-2-14(B). The OCD may also bring civil suits including injunctions. NMSA 1978, § 70-2-28. The Act also provides that a person or party in interest adversely affected by a violation of the Act, or a rule or order made pursuant to the Act may, after notifying the OCD in writing of such violation, bring suit. NMSA 1978, § 70-2-29. Finally, the Act vests the OCD with general enforcement powers to carry out its provisions. See NMSA 1978, § 70-2-6(A); NMSA 1978, § 70-2-11(A); and NMSA 1978, § 70-2-12.

In recent years the OCD has relied primarily upon civil penalties and plugging orders to enforce the Oil and Gas Act, and new enforcement rules designed to withhold certain privileges from non-compliant operators.

Civil Penalties.

The statute on civil penalties provides that "[a]ny person who knowingly and willfully violates any provision of the Oil and Gas Act or any provision of any rule or order issued pursuant to that act shall be subject to a civil penalty of not more than one thousand dollars (\$1000) for each violation. For purposes of this subsection, in the case of a continuing violation, each day of violation shall constitute a separate violation." NMSA 1978, § 70-2-31(A).

The OCD takes the position that penalties may be assessed administratively. Industry takes the position that penalties may be assessed only by the court in a civil lawsuit, brought where the operator is located. The distinction is crucial: replacing an administrative proceeding before OCD hearing examiners or OCC commissioners with a civil trial in district court would be time consuming and expensive, increase the procedural burdens and would fail to take advantage of agency expertise. Lawyers and witnesses would need to travel to the district court in which the violator resides for motion hearings and trial. Formal discovery would replace the informal discovery used in administrative hearings. Trials can take years, while administrative proceedings typically take months from the filing of the application to issuance of the order. Civil lawsuits require approval of the New Mexico Attorney General, so the OCD and OCC

will no longer control enforcement of the Oil and Gas Act or the rules adopted pursuant to that act. Civil trials require strict adherence to the rules of civil procedure and the rules of evidence, which are relaxed in the administrative setting. Finally, moving from the administrative forum to the courts would result in a loss of agency expertise: the Oil and Gas Act sets its own administrative process for hearing cases in front of hearing examiners and commissioners, who are required by statute and rule to have expertise in oil and gas matters. See NMSA 1978, § 70-2-5 and 19.15.14.1217 NMAC. Serious enforcement matters would be removed from examiners and commissioners knowledgeable in oil and gas matters and placed before the district court. Both industry and the OCD have proposed legislation to clarify whether penalties can be assessed administratively under the Oil and Gas Act; none of the proposals has been successful. See, HB 871 and SB 777 in the 2005 legislative session and HB 569 in the 2007 legislative session.

The \$1,000 per day penalty was set in the original 1935 act creating the Oil Conservation Commission. See Laws of 1935, Ch. 72, Section 22. In 1935, the price of oil was \$.40/barrel. In other words, the legislature originally provided that violators would be punished by the equivalent of 2,500 barrels of oil per day. At present, with the price of oil significantly over \$100/barrel, the \$1,000 per day penalty amounts to less than 10 barrels a day. The low penalty amounts create a disincentive to compliance – it may be to the operator's economic advantage to violate the statute and rules, and pay the relatively low penalty.

Comparable state agencies may assess penalties much larger than those allowed under the Oil and Gas Act in administrative proceedings, and are not required to prove that the violation was knowing and willful:

- The New Mexico Mining Act allows the director or the commission to assess civil penalties not to exceed ten thousand dollars (\$10,000) per day of non-compliance. See NMSA 1978, § 69-36-17.
- The Water Quality Act allows the agency to issue a compliance order assessing penalties not to exceed fifteen thousand (\$15,000) per day for certain violations; the penalties on lesser violations may not exceed ten thousand dollars (\$10,000) per day. If the violator fails to comply with the order, the agency may assess penalties of twenty five thousand (\$25,000) per day. See NMSA 1978, § 74-6-10.
- The Hazardous Waste Act allows the secretary to issue a compliance order and assess penalties not to exceed ten thousand dollars (\$10,000) per day; if the violator fails to take corrective action the penalties go up to twenty five thousand dollars (\$25,000) per day. NMSA 1978, § 74-4-10.

Moreover, agencies regulating the oil and gas industry in nearby states may assess penalties administratively, often in larger amounts than those allowed under the Oil and Gas Act, and do not have to prove that the violation was "knowing and willful:"

- Texas. The Texas Railroad Commission may assess administrative penalties of up to \$10,000 per violation, per day. See Tex. Res. Code Ann. Tit. 3 Section 81.0531.
- Wyoming. The commission may “fix and determine” a civil penalty of up to \$5,000 for each day of violation. See Wyo. Stat. § 30-5-119.

Plugging Orders.

The plugging statute provides that:

If any of the requirements of the Oil and Gas Act or the rules promulgated pursuant to that act have not been complied with, the oil conservation division, after notice and hearing, may order any well plugged and abandoned by the operator or surety or both in accordance with division rules. If the order is not complied with in the time period set out in the order, the financial assurance shall be forfeited.

NMSA 1978, § 70-2-14(B). The statute is clear that the OCD may take this action after an administrative hearing, a “knowing and willful” violation is not required and the consequences are serious: the plugging of the well and forfeiture of the financial assurance. The OCD has applied for orders under § 70-2-14(B) in several cases in which it was not able to achieve compliance through penalty orders. It is currently waiting for decisions in those administrative cases. It is unknown whether industry will contest application of § 70-2-14(B) to producing wells.

Enforcement Rules.

In 2005 the OCC enacted a collection of enforcement rules designed to encourage compliance by withholding certain privileges from non-compliant operators. The centerpiece of the collection is 19.15.1.40 NMAC, commonly known as “Rule 40.” An operator is in compliance with Rule 40 if he has posted the required financial assurances for well plugging, is not in violation of an order requiring corrective action, does not have unpaid penalties and does not have more than a certain number of wells out of compliance with the inactive well rule. If an operator is out of compliance with Rule 40, the OCD may deny registration by the operator or certain related entities [19.15.3.100.B NMAC], may deny applications for change of operator that would transfer wells to the operator [19.15.3.100.E.3.a NMAC], must deny applications for injection permits [19.15.9.701 NMAC], may after notice and hearing revoke previously issued injection permits [19.15.9.701 NMAC], may deny applications for permits to drill [19.15.3.102.C NMAC] and must deny allowables and authorizations to transport [19.15.13.1104.A NMAC]. The net effect is that an operator out of compliance with Rule 40 will not be able to “grow” his business by drilling, acquiring or producing new wells. The 2005 enforcement rules, including Rule 40 and its related rules, were challenged and are currently under review by the New Mexico Supreme Court in *Marbob Energy Corporation v. New Mexico Oil Conservation Commission*, Case No. 30,710.

m. The Influence of the Oil and Gas Industry on the Legislature.

Several public comments questioned the ability of the OCD to enforce the Oil and Gas Act, citing the influence of the oil and gas industry on the legislature. It is true that in recent years the OCD's budget has suffered disproportionately, and some industry representatives have taken credit publicly for the budget cuts. For example, in the 2008 legislative session, the OCD's budget did not include increases for fixed costs such as fuel and utilities – the only EMNRD division that did not receive increased funding for those costs. Such budget restrictions impact enforcement at the field level, where it can affect OCD's ability to perform the inspections that uncover violations, and at the enforcement level, where it can affect OCD's ability to bring enforcement actions to obtain compliance. During the 2008 legislative session, the Senate Finance Committee proposed to cut the budget of the OCD and remove OCD's four attorney positions, which would have required OCD to look to the Attorney General's office for legal representation in enforcement proceedings and rulemaking. The legislature later replaced the four attorney positions, and some but not all of the money it proposed to cut from the OCD budget.

D. EMNRD Recommendations.

1. Extend the Moratorium for a Minimum of 6 Months to Obtain Additional Factual Information related to the Consequences of Drilling on the Archeological and Environmental Assets in the Galisteo Basin.

While the current moratorium has enabled State agencies to assess the adequacy and fairness of existing law and policy as it relates to oil and gas drilling in Santa Fe County and the Galisteo Basin generally, more factual information is needed to fully evaluate the impact of drilling on the unique cultural, archeological and environmental assets in the region.

State agencies, particularly EMNRD, the Department of Cultural Affairs, the Office of the State Engineer, the Department of Game and Fish, the Environment Department and the Indian Affairs Department should be directed to work cooperatively to reasonably identify and inventory all known and potential cultural, archeological and natural resources in the Galisteo Basin. These efforts would enable this Administration to fully assess the impact of oil and gas drilling in the region, and would enable State agencies to implement a comprehensive and consistent policy that protects the unique and vulnerable resources in the Galisteo Basin.

2. Adopt Rules Allowing the OCD/OCC to Evaluate and Permit by Area, Rather than by Project.

OCD's existing regulatory structure, which looks at individual permit applications, makes it difficult to evaluate and address the impact of development on a particular area, and to factor in the cumulative effect of development. The OCD/OCC could adopt rules allowing review by area rather than by individual project. This could

be done several different ways. For example, the OCD/OCC could adopt rules addressing the needs of a specific area, as was done for Otero Mesa. Alternatively, the OCD/OCC could adopt rules applicable to "wildcat" or relatively undeveloped areas, requiring additional protections for those areas until enough information is gathered to ensure that existing OCC rules are sufficient. The OCD/OCC could also consider rules encouraging or requiring development to proceed through exploratory units – which would allow for review of the development project.

3. Adopt Rules Providing for Notice and Public Input on APDs for Wells to be Drilled in Wildcat Areas.

Under OCD's existing regulatory framework, the filing of an application for permit to drill (APD) is the first step in the process for oil and gas development, and the first opportunity to impose additional conditions to address concerns specific to the area in which the drilling will take place. Providing notice and public comment at this stage in the process would enable the concerns of the public to be addressed, to the extent the OCD/OCC can address those concerns under their existing statutory authority.

4. Address Needs Specific to the Galisteo Basin through Conditions Imposed on APDs or through Special Rules for the Galisteo Basin.

As shown in the report filed by the Office of the State Engineer, the water is scarce in the Galisteo Basin and the hydrology in the area is complex. To identify, delineate and protect the fresh water sources in the Galisteo Basin, EMNRD recommends considering use of the following protections during the drilling process. These protections could be imposed on APDs through the existing permitting process, or could be the subject of special rules applicable to the Galisteo Basin.

- Require closed loop systems with drying pad in order to protect fresh water sources.
- Require air drilling or fresh water mud systems in order to protect fresh water sources.
- Require resistivity and porosity logs to the surface on all casings strings to assist in defining water bearing zones and to identify and delineate fresh water sources.
- Require Mud-logger on site and daily reports to the OCD with details to identify and delineate fresh water sources.
- Require Micro-seismic (monitor well) during the fracing process in order to protect fresh water sources. This procedure provides the following: azimuth; height; length; and asymmetry of the frac.
- Require a monitor well to be installed pre-spud immediately down-gradient from the well site location, to determine depth to water and saturated thickness and obtain baseline water samples in order to protect fresh water sources.
- Require Written Spill Contingency Plan with no allowance for *de minimus* volumes in order to protect fresh water sources. Currently, spill reports are received for spills greater than 5 barrels. It is usually left to the discretion of the operator to determine the size of a spill, if it has not been observed by an OCD.

field inspector. It is the OCD's observation that those determinations are at times subject to abuse.

- Require double string across aquifers (TDS<10,000 mg/l) with cement depth to cover all pipe in order to protect fresh water sources.
- Require annual mechanical integrity testing (MITs) on all salt water disposal wells (SWDs) in order to protect fresh water sources. Currently, MITs are only required every 5 years for SWDs. Due to the reasons described above, the OCD believes it is essential that these tests occur on a more frequent basis.
- Require Temporary Abandonment while constructing pipelines in order to protect fresh water sources.

5. Improve Lines of Communication Between the OCD and Other Relevant Governmental Agencies.

The OCD should receive input from relevant governmental entities before APDs are granted, so concerns relevant to the OCD's statutory mandates can be addressed through conditions imposed on the APDs. Relevant governmental entities may include sister agencies and divisions, such as the Department of Cultural Affairs, Environment Department, Indian Affairs Department, and Department of Game and Fish; local governmental entities, such as county and municipal governments; and tribes, pueblos and nations.

These lines of communication may be established formally, through OCD/OCC rulemaking, or less formally through memoranda of understanding. At a minimum, the OCD should ensure that it is meeting the requirements of the Cultural Properties Act and the Executive Department Policy Regarding Tribal Consultation.

As noted above, the OCD's ability to address concerns raised by other governmental entities will be limited to the OCD's statutory authority.

6. Encourage Santa Fe County to Adopt Ordinances Addressing Those Issues of Public Concern Within the County's Jurisdiction.

Santa Fe County ordinances may be able to address some of the issues raised in the public comments, such as setbacks from buildings and archaeological sites, noise pollution and air pollution.

7. Long-term Strategies should Include Amending the Oil and Gas Act to Clarify OCD/OCC's Authority to Assess Penalties and Expanding OCD/OCC Statutory Authority on Environmental and Public Welfare Issues to Include Generalized Authority to Protect Surface Water and Ground Water.

It is meaningless to talk about the requirements the OCD/OCC could impose on oil and gas operations if the OCD/OCC does not have an efficient and practical way of enforcing those requirements. The penalty provision in the Oil and Gas Act should be

clarified to provide expressly for administrative assessment of penalties. In addition, penalty amounts should be raised so they are in line with penalties imposed on other industries in New Mexico for similar violations, and the OCD/OCC should not have to prove that a violation was "knowing and willful." The comments received in response to Executive Order 2008-004 demonstrate that the public's concerns reach further than the OCD/OCC's existing statutory mandates. In order to allow the OCD/OCC to take those concerns into account in its regulatory and permitting process, the statutory authority of the OCD/OCC would probably need to be expanded.

At a minimum, the OCD/OCC's statutory mandates to protect the environment should be expanded to expressly include the authority to protect surface water and ground water. Currently, the OCD/OCC finds its power to protect ground water under the Oil and Gas Act in three statutory directives: to prevent oil, gas and water from escaping from the strata in which they are found into other strata; to regulate produced water to protect against contamination of fresh water supplies; and to regulate the disposition of oil field waste to protect human health and the environment. To ensure that the OCD/OCC's authority to protect water from adverse impacts caused by the oil and gas industry is clear and complete, the OCD/OCC's statutory mandate should be expanded to recognize expressly the power to regulate oil and gas activities to protect against contamination of ground and surface water.

Note that a recent legislative attempt to expand the OCD/OCC's statutory authority failed. House Bill 248, proposed in the 2008 legislative session, would have expanded the OCD/OCC's environmental mandate to include fostering "the responsible, balanced development, production and utilization of oil and gas resources in a manner consistent with the protection of public health safety and welfare, including the protection of the environment and wildlife resources."

Report on the Galisteo Basin

By:

New Mexico
Department of Indian Affairs

REPORT OF THE NEW MEXICO INDIAN AFFAIRS DEPARTMENT

REGARDING EO-2008-004

**IMPOSING A SIX MONTH MORATORIUM ON NEW OIL AND GAS
DRILLING IN SANTA FE COUNTY AND THE GALISTEO BASIN**

EXECUTIVE ORDER 2008-004 AND IAD

Governor Richardson signed Executive Order 2008-004 on January 24, 2008. That Executive Order ("EO") imposed a six month moratorium on new oil and gas drilling in Santa Fe County and the Galisteo Basin. The six month moratorium established a period of time for all affected State agencies:

to conduct a careful assessment of all existing laws, regulations, policies, and planning documents to ensure that the State of New Mexico has fully and appropriately exercised its police powers to ensure that no oil and gas drilling activity occurs in Santa Fe County and the Galisteo Basin that would be contrary to the interests of the State of New Mexico and its citizens.

An important component of the directed Study (which Study shall be forwarded to Governor Richardson) was input and information from the twenty-two (22) Tribes, Nations, and Pueblos that are located wholly or partially in the State. More specifically the EO directs:

That all such agencies work collaboratively with other governmental entities, including tribal governments if necessary, pursuant to Executive Order 2005-003, Adoption of Statewide Tribal Consultation Policy on the Protection of Sacred Places and Repatriation, to ensure that any concerns regarding activities in the Galisteo Basin are addressed.

It was determined by the various State agencies coordinating and participating in this Study that the New Mexico Indian Affairs Department ("IAD") would take the lead in seeking and gathering input from the New Mexico Tribes, Nations, and Pueblos for the final Study. Such determination was made as one of the statutory mandates of IAD is to:

Investigate, study, consider and act upon the entire subject of Indian conditions and relations within New Mexico, including problems of health, economy and education and the effect of local, state and federal legislative, executive and judicial actions. The department shall collaborate with other state departments or agencies that have an interest or stake in the subject being investigated, studied or considered. In performing its functions, the department shall provide an opportunity for the presentation and exchange of ideas in respect to Indian affairs of the state by all interested persons.

NMSA §9-21-7(B)(1). As part of the effort to gather input and information from the Tribes, Nations, and Pueblos, IAD undertook numerous approaches to inform its

constituents of the EO, and the importance of any input, information, comments, and suggestions from the Tribes for inclusion in the final Study.

METHODOLOGY AND INPUT AND COMMENT FROM THE NEW MEXICO TRIBES, NATIONS, AND PUEBLOS

Because it was so important for IAD to seek and gather meaningful comment from the twenty-two (22) Tribes regarding this "culturally rich and ecologically fragile ecosystem," varied and numerous approaches to seek comment were employed by IAD. (EO 2008-004, Page 1).

First, IAD sent written notification and invitation to all Tribal leadership of the March 29, 2008 Open House on the Galisteo Basin EO hosted by the New Mexico Energy Minerals, and Natural Resources Department ("EMNRD") (and other State Departments). Concomittally, IAD participated in that all day Open House; all written comment that was submitted on that day was forwarded by IAD to EMNRD and is included in that portion of the public comment section.

Second, IAD made available, via its website (www.iad.state.nm.us) the public comment form utilized during the Open House. Any visitor to the IAD website was provided the opportunity to further submit comment regarding the EO and the effects, if any, of new gas and oil drilling in the Galisteo Basin. Comment could be submitted electronically or via regular mail; again, all written comment submitted via this method was forwarded by IAD to EMNRD and is included in that portion of the public comment section.

Third, as part of a far reaching Tribal consultation plan, the new Secretary of Indian Affairs, Alvin Warren, and various members of his staff, personally met with the leadership of the twenty-two (22) Tribes, Nations, and Pueblos and apprised the leadership of the EO and IAD's desire to seek any comment regarding the actual EO and the impacts of new activities in the area in question. A copy of the EO and public comment form was provided at each of these meetings. From those meetings, three Pueblos publicly stated their concerns regarding new gas and oil drilling activities in the Galisteo Basin. During a **March 13, 2008** meeting, leadership from the Pueblo of Tesuque made clear their concerns regarding the need to protect cultural sites and remains such as those now located in the Galisteo Basin. Further, the Pueblo voiced concern regarding the possible negative impacts (on cultural, archaeological/historical, environmental, and on wildlife) of any industrial development in this area. The Pueblo of Tesuque voiced a desire to amend current State law to better protect the cultural patrimony such as that found in the Galisteo Basin.¹ At a **March 26, 2008** meeting, the Pueblo of Zuni identified the Galisteo Basin as a "rich cultural legacy." The Pueblo of Zuni, in voicing the cultural richness of the area, also suggested that the State make funding available to pay Tribal resource people to act as guides on various site visits to culturally sensitive areas and to be used as resources for true and meaningful

¹ The Pueblo of Tesuque, along with the Pueblos of Santa Ana and Santa Clara, also submitted further written comment which are here included and will be discussed in more detail below.

consultation. Finally, at an **April 10, 2008**, the Pueblo of Cochiti stated that they appreciated Governor Richardson recognizing the importance of the Galisteo Basin to their lifeways and asked that the Governor extend the moratorium beyond six months.

Fourth, in an attempt to further solicit information from Tribal peoples, IAD co-hosted, on May 2, 2008, a Tribal Informational Session regarding the EO and the Galisteo Basin. The Informational Session was held in Santa Fe and was co-hosted by IAD and the New Mexico Department of Cultural Affairs. A number of State agencies and divisions, including the New Mexico Department of Game and Fish, the New Mexico Tourism Department, the New Mexico Environment Department, the Oil and Gas Conservation Division of EMNRD, and the New Mexico Department of Health participated in the Informational Session. Each of the agencies made a brief presentation to the attendees as how the EO impacted their statutory and regulatory mandates and how the moratorium on new gas and oil drilling in the Galisteo Basin affected their particular agencies. More importantly, each of the agencies participated in a Question and Answer panel with the Tribal participants in attendance, answering questions as regard such activities in this area. The Tribes that participated in the Tribal Informational Session were the Pueblo of Tesuque, the Pueblo of San Ildefonso, the Pueblo of Santa Clara, the Pueblo of Sandia, the Pueblo of Picuris, and the Navajo Nation.

The range of topics discussed at the Informational Session was wide-ranging and ran from questions regarding the number of (new) proposed wells to the types of chemicals that were used in any gas or oil drilling process. The general consensus from the meeting was that the participating Tribes urged the Governor to act in a cautious and conservative manner. Caution was advised as no agency knows the potential impacts of new activities on human health, the animals and plants that occupy the area, and the vast cultural richness of the area. One item of particular interest mentioned at the Informational Session was the fact that neither the Federal nor State government has a true grasp on the number of archaeological/historical/cultural sites in the Galisteo Basin. As outlined in more detail in the Report submitted by the New Mexico Department of Cultural Affairs, only 12% of the area in question has been surveyed for archaeological or cultural resources. Further despite the fact that the United States Congress has recognized the Galisteo Basin as a significant archaeological resource (See the Galisteo Basin Archaeological Sites Protection Act, P.L. 108-208), it has not appropriated ANY funding for a comprehensive study or management plan.

Finally, as mentioned above, IAD solicited written comment from the Tribal leadership. Comments from three Pueblos was received and are here included as attachments 1-3. The Pueblo of Tesuque (Attachment 1) specifically requested that:

the State expand the moratorium for an additional six months in order to ensure that the State, affected tribes and Pueblos and the many other affected communities have sufficient time to adequately evaluate the impact of the proposed oil and gas exploration.

The Pueblo of Tesuque outlined four (4) reasons/concerns upon which their request was based. These four concerns were 1) the cultural and traditional importance [of the area] to Pueblo Tribal members; 2) the destruction of archaeological and historical resources; 3) detrimental impacts on wildlife; and 4) negative impacts to environmental and human health.

Similarly, the Pueblo of Santa Ana submitted written comment (Attachment 2) and asked that the Governor continue the moratorium stating “[w]e oppose any act that may destruct the rich cultural heritage of our ancestors.” The Pueblo’s comments state, in further part:

[t]he Pueblo of Santa Ana’s oral history dictate that our people once inhabited the Galisteo Basin during the course of our migration. The area is significant as it is part of our cultural history. To allow oil and gas exploration will only cause detriment to known archaeological sites and generate inadvertent discoveries of others. Inevitably, these particular sites hold human remains and associated funerary objects.

Similarly, the Pueblo of Santa Clara submitted written comment (Attachment 3). Similar to the other Pueblos, Santa Clara asked that the moratorium be extended, stating “[i]t is our determination that there needs to be a more rigorous analysis of the affects of the above [future generations, the ground water, aquifers, animals, and plants] and on the surrounding area.” Santa Clara, in its comments were concerned, about (among other things) the protection of the known and unknown archaeological sites, the various animals and flora that occupy the area, and that fact that numerous chemicals are used in any gas and oil activities and the impact of such chemicals on environmental health.

Finally, the Jicarilla Apache Nation stated that their oral history relayed the use of encampments in the southern portion of the Galisteo Basin. They requested that they be included in any additional consultation. (Attachment 4).

RECOMMENDATION

The New Mexico Indian Affairs Department respectfully recommends that Governor Richardson extend the current moratorium for at least an additional six months. This additional time may allow all interested parties to conduct a more comprehensive study of the archaeological/cultural/ historical sites in the Galisteo Basin. The additional time may also be used to work with the New Mexico Congressional delegation to see if there is any funding that might be available to fully study the area named in the Galisteo Basin Archaeological Sites Protection Act and to develop a comprehensive management plan.

Report on the Galisteo Basin

By:

New Mexico
Environment Department

**REPORT AND RECOMMENDATIONS OF THE
ENVIRONMENT DEPARTMENT**

A. Identification of agency and its role with regard to the E.O.

- i. Environment Department
- ii. Regulation of air quality

B. Evaluation of public comments

Public comments relevant to the Environment Department included those related to air and water quality, noise, and odors.

- i. Air quality concerns
 - 1. Degradation of expansive vistas
 - 2. Degradation of current pristine air quality
 - 3. Hydrogen sulfide impacts - smell of rotten eggs
 - 4. American Lung Association report on Santa Fe as cleanest city for particulate pollution
 - 5. Health effects of polluted air
 - 6. Dust, especially with increased road building and increased traffic on dirt roads
 - 7. NMED should aggregate drilling sites and regulate as one source
 - 8. Air monitoring - if drilling is approved, air monitoring should be done in the Galisteo Basin
 - 9. Stringency issues in Air Quality Control Act preclude state action on some of these sources
 - 10. Toxic air pollutants
- ii. Water quality concerns
 - 1. Potential water impacts (regulated by EMNRD OCD) should be regulated by NMED, not OCD
 - 2. Toxic pollutants in water
- iii. Other concerns
 - 1. Precautionary principle
 - 2. Noise
 - 3. Odors (other than hydrogen sulfide)

C. Agency laws, regulations, policies, and planning documents pertinent to the E.O. and with consideration to the following:

- i. Environment (water, air, wildlife, native plants, etc.)
 - 1. NM Environmental Improvement Act
 - 2. NM Air Quality Control Act
 - 3. NM Air Quality Control Regulations
 - 4. NM State Implementation Plan
 - 5. NMED AQB Permitting Policies
 - 6. NMED AQB Penalty Policy
- ii. Economic
- iii. Cultural
- iv. Archaeological
- v. Health

D. Agency recommendations

The New Mexico Air Quality Control Act (AQCA) authorizes the Environmental Improvement Board (Board) to adopt regulations to prevent or abate ambient (outdoor) air

quality impacts from industrial sources. The Board has adopted regulations, commonly known as the state minor source construction permit program, that require industrial sources with emissions greater than 10 pounds per hour or 25 tons per year of any regulated air pollutant get a permit before constructing or modifying the source. The Board also has adopted regulations that require industrial sources to get federally-mandated permits if their emissions (1) exceed 100 tons per year of any regulated pollutant (Title V), and (2) exceed 250 tons per year of any regulated pollutant (Prevention of Significant Deterioration, or PSD). The New Mexico Environment Department (Department) implements these permit programs in the Galisteo Basin and throughout the state (except for the City of Albuquerque/County of Bernalillo area and on tribal lands).

The U.S. Environmental Protection Agency (EPA) has adopted regulations that require specific types of equipment to achieve standards of performance and emission standards for hazardous air pollutants ("federal standards of performance"). The Board has adopted regulations accepting delegation from the EPA to enforce these federal standards of performance, and the Department implements this delegation.

The Department must exercise its authority within the scope of the AQCA and the regulations adopted by the Board. The Department currently has authority to require permits for the Galisteo Basin drilling project:

Measures achievable under existing authority

(1) The Department has existing authority to require a single state minor source construction permit for drilling operations in the same basin, and which are owned and operated by the same company. Individual wells typically fall below the threshold for air quality permits, but the aggregation of emissions from many wells and their associated equipment may be sufficient to require a permit. To issue the permit, the Department must find that the aggregate emissions do not cause or contribute to an exceedance of a state or federal ambient air quality standard and do not violate any federal standard of performance.

(2) The Board could adopt ambient air quality standards for hazardous air pollutants that might be emitted by the project. The Board currently has ambient air quality standards for hazardous air pollutants not listed in section 112 of the CAA; the Board could adopt standards for hazardous air pollutants listed in section 112 of the CAA.

(3) The Board has existing authority to adopt regulations pursuant to the New Mexico Environmental Improvement Act to regulate noise and nuisance impacts from the project.

Measures requiring new authority

(1) The Board is barred by the AQCA from adopting emission limitations for well-site equipment more stringent than the federal standards of performance. The engines to be operated at these wells are covered by such federal standards. One possible exception may be equipment whose emissions cause or contribute to the exceedance of federal ambient air quality standards, but that is unlikely to occur for this project.

(2) The Department is barred by the AQCA from applying the "precautionary principle" to deny an air quality permit for the project. The "precautionary principle" has been described as follows:

When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some

cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public, should bear the burden of proof. The process of applying the precautionary principle must be open, informed and democratic and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action.

Wingspread Statement on the Precautionary Principle, January 1998.

The AQCA section 74-2-7 prescribes the reasons that the Department may deny an air quality permit. The precautionary principle does not appear in section 74-2-7, and goes much further than allowed by the statute.

Nonetheless, it should be noted that the Department's permit program uses the best available methodologies to predict impacts to human health and the environment, and these methodologies are revised regularly to reflect current developments in the science.

(3) The Department is barred from requiring project proponents to consider environmental issues other than air quality in order to obtain a permit under the AQCA. A requirement to disclose and evaluate the environmental impacts of a proposed project could be beneficial, but is not within the scope of the Department's current authority.

Report on the Galisteo Basin

By:

New Mexico
Office of the State Engineer

REPORT AND RECOMMENDATIONS OF THE
OFFICE OF THE STATE ENGINEER
EXECUTIVE ORDER 2008-004 ASSESSMENT

Introduction

Pursuant to Executive Order 2008-004 signed by Governor Richardson on January 24, 2008, the State Engineer submits his assessment of existing laws, regulations, policies, planning documents and an overview of the hydrology of the Galisteo Basin to ensure that the State of New Mexico has fully and appropriately exercised its police powers to ensure that no oil and gas drilling activity occurs in the Galisteo Basin that would be contrary to the interests of the State of New Mexico and its citizens. The State Engineer is charged with the general supervision of waters in the state and the measurement, appropriation, and distribution thereof pursuant to NMSA 1978, § 72-2-1. Pursuant to NMSA 1978, § 70-2-12 (B)(15), the State Engineer designates fresh water supplies to assist the Oil Conservation Division in its regulation of water produced or used in oil and gas production in order to afford reasonable protection against the contamination of fresh water supplies. This report first provides an overview of the hydrology of the Galisteo Basin in order to assess the possible affects that oil and gas drilling and production may have on fresh water supplies, then provides an analysis of the existing laws and planning documents that are relevant in association with oil and gas drilling activities and the State Engineer's duty to regulate the waters of the state.

I. Hydrology of the Galisteo Basin

a. Setting

The Galisteo Basin watershed lies in the central portion of Santa Fe County about 18 miles south of Santa Fe, NM (Figure 1). The watershed covers an area of approximately 730 square miles and is a sub-basin within the Rio Grande Basin. It is also a part of the Rio Grande Underground Water Basin as administered by the Office of the State Engineer (OSE). Galisteo Creek is the primary surface water feature within the basin; it flows from the southern end of the Sangre de Cristo Mountains to the Rio Grande near Santo Domingo Pueblo. The elevation of the watershed ranges from 10,500 to 5,200 feet.

Domestic, stock, and shared household wells are the most common type of water wells within the basin. Centralized water supply systems serve the communities of Madrid, Cerrillos, Galisteo, El Dorado, and Lamy, in addition to several subdivisions. Many of these community systems, in addition to domestic wells, have experienced water supply shortages in the past.

The highest water well densities are located in the central portion of the watershed between the communities of Cerrillos and Lamy, and along the I-25 corridor west of Lamy (Figure 2). Besides the wells located along the I-25 corridor, few wells have been completed in the upper watershed. Similarly, few water wells are on record for the lower

watershed below Galisteo Dam. Most of these lands are owned by Santo Domingo Pueblo.

Along with having some of the highest water well densities in the basin, the central portion of the watershed has also been the primary area of oil and gas interests to date. The hydrogeology of this area is complex and conditions can vary significantly within a short distance. Dry holes have been drilled in close proximity to producing wells and the water quality is highly variable. Pockets of information are available for subdivided sites but these studies are generally of small scale and scattered. These investigations evaluate the water bearing zones near the land surface but fail to provide information on the formations between the shallow aquifers and deeper potential oil producing zones. A number of deep oil wells have been drilled in the central portion of the watershed but data collection efforts have been focused on the oil production potential of the deeper formations.

b. Hydrogeology

The area can be subdivided into three different geologic zones, which include the lower, central, and upper watersheds. The lower watershed extends from the Rio Grande eastward up the Galisteo Creek valley to near the gypsum mine located just east of Interstate 25. At this location, the north – south trending La Bajada Fault system marks the eastern edge of the lower watershed. The Santa Fe Group is the primary geologic formation west of the fault and is composed of a thick sequence of sands, gravels, clays and silts. The formation is the primary source of ground water along the Rio Grande corridor.

The central portion of the watershed extends from the La Bajada Fault eastward to near the community of Canoncito on I-25. The communities of Cerrillos, Galisteo, and Lamy lie within this area. The Tijeras – Canoncito fault zone trends generally southwest to northeast from the Ortiz Mountains toward the community of Lamy and has allowed volcanic rocks to intrude into the sedimentary formations deposited in the basin. The Ortiz Mountains and Cerrillos Hills are the prominent volcanic bodies in the area but numerous local features are also present.

The intrusion of the igneous rocks has altered the sedimentary formations by tilting, faulting, and fracturing these rocks to various degrees. The geology within the central watershed is complex and includes a wide variety of rock types including alluvium, sandstone, shale, siltstone, conglomerate, and limestone of various geologic ages (Figure 3).

Precambrian rocks are exposed within the portion of upper watershed draining the Sangre de Cristo Mountains. Ground water is primarily obtained from saturated fractures or from shallow alluvial zones resting upon the Precambrian rocks. Little information is available for the Glorieta Mesa portion of the upper watershed. Triassic rocks outcrop over a large portion of this area.

Available information suggests that the potential oil and gas production geologic targets within the central watershed include the Mancos Shale, Dakota Formation, Morrison Formation, and Entrada Formation. These units, in addition to the younger overlying units, are discussed below. The descriptions begin with the youngest formation and end with the oldest and deepest (Entrada Formation). Some of the formations, especially those of younger age, may not be present at a given site, as they have been removed by erosion.

Valley Alluvium

The valley alluvium is composed of unconsolidated sands, gravels, clays, and silts derived from erosion of the highlands. The valley sediments are generally confined to areas adjacent to Galisteo Creek and the arroyos. Previous investigators have reported that the sediments may be up to 100 feet thick along Galisteo Creek.

The alluvium generally yields water easily to wells along the Galisteo Creek and other arroyos if the sediments are thick and saturated. Well yields up to 110 gallons per minute (gpm) have been reported (Hagerman 1973). Ground water supplies in the fill material are influenced directly by the magnitude of surface water flows and the thickness, areal extent, porosity and permeability of the sediments. Shallow alluvial wells in the area may be prone to failure under drought conditions.

The valley alluvium is an important aquifer near Cerrillos, Galisteo and Lamy, and is particularly vulnerable to contamination from surface activity due to the shallow depths to water and relatively high permeability. Alluvial wells with a total dissolved solids (TDS) concentration of less than 2,000 mg/l have been reported along Galisteo Creek (Mourant, 1980).

Espinaso Formation

The Espinaso Formation is a light to dark grey or reddish volcanic formation composed primarily of conglomerate or andesite. The formation outcrops along the northern flanks of the Ortiz Mountains and in scattered areas north of Galisteo Creek. The thickness varies and may range up to 2,000 feet or more in the basin.

The Espinaso generally yields water from weathered zones and fractures beneath the top of the aquifer. Water availability within the formation is highly variable and dry wells are possible. Production is primarily from fractures. The TDS of water from the Espinaso has been reported to be less than 1,000 mg/l at several sites within the basin (Mourant, 1980).

Galisteo Formation

The Galisteo Formation is composed of sandstone, mudstone, and conglomerate. The coloration varies from grey, white, yellow, and pink to red. Nearly vertical sandstone beds within the formation form the Garden of the Gods along Highway 14 north of Cerrillos. The outcrop extends from Lamy to Cerrillos on both sides of Galisteo Creek.

The formation has been divided into the upper, middle, and lower units (Maynard and others, 2002) and may be more than 5,000 feet thick (Johnson, 1975). The lower unit is more consolidated compared to the upper zones.

Numerous wells produce from the Galisteo Formation but most of these are low yielding. Well yields are influenced by the degree of fracturing and dry holes may occur in the proximity to producing wells. The TDS content of water from the Galisteo Formation has been reported at one site to be less than 500 mg/l (Finch and Petronis, 2006). However, samples containing water up to 1,500 mg/l TDS are common and higher concentrations have been observed (Mourant, 1980).

Mesa Verde Group

The Mesa Verde Group is composed of alternating beds of yellowish sandstone and shale with numerous seams of coal. Wells producing from the Mesa Verde have been reported in the Madrid area. The Point Lookout Sandstone is the lowest unit in the Mesa Verde Group and is noted as one of the principle aquifers near Placitas (Read and others, 2005). When fractured, the formation may yield an adequate quantity of water for domestic and stock use (Glorieta Geoscience, 1998). Samples collected from area Mesa Verde wells have a measured TDS of less than 3,000 mg/l (Mourant, 1980).

Mancos Shale

The Mancos Shale consists of massive dark grey to black shale beds, and thin sandstone and limestone beds. The outcrop extends from south of Lamy southwestward past the village of Galisteo. A number of water wells in the basin produce from the formation and typically obtain water from fractured sandstone or shale. The Mancos is often considered a poor source of water and dry holes have been encountered. Water of less than 3,000 mg/l TDS was collected at a well just west of Galisteo (Mourant, 1980). Concentrations greater than this level are more common.

Dakota Formation

The Dakota Formation is composed of tan to yellow brown sandstone with dark shale and siltstone. It is exposed near Lamy and southeast of Galisteo. The unit is 90 to 150 feet thick (Bachman, 1975). The Dakota is listed as one of the principle aquifers south of the study area near Placitas (Johnson, 2002). No water supply wells are known to produce from the formation in the Galisteo Basin, likely due to the excessive depth of the formation in most parts of the basin.

Morrison Formation

The Morrison Formation is composed of dark red to yellowish sandstone and grey to greenish clay stone and shale (Bachman, 1975). The formation is exposed west of Waldo and in the Lamy area. (West, 1968) indicates that Keir-McGee reported two holes that encountered the Morrison Formation in the vicinity of Galisteo. One of the holes flowed initially between 200 to 300 gpm but decreased to less than 100 gpm after a few days. The formation is listed as one of the principle aquifers south of the study area near Placitas (Johnson, 2002). Water of less than 1,500 mg/l TDS was collected at a well just west of Galisteo (Mourant, 1980).

Entrada Formation

The Entrada Formation is composed of grey to yellowish sandstone and is exposed west of Waldo and in the Lamy area. The Entrada is listed as one of the principle aquifers south of the study area near Placitas (Johnson, 2002). No water supply wells are known to produce from the formation within the study area. The water quality is unknown based on the information available for this study.

c. Surface Water Hydrology

Galisteo Creek is ephemeral and occasionally conducts high peaks of flood flow of relatively small volume. About 70 percent of the annual runoff occurs during the summer months, while less than 10 percent of the annual flow occurs during spring runoff (USCOE, 2006). The mean annual flow below Galisteo Dam is 6.13 cubic feet per second but no discharge is observed at this gauging site most of the year.

Surface water irrigation has not been reported in water use reports published recently by the OSE. Galisteo Dam was completed in 1970 and was not intended to serve as a source of water supply. The dam was built for flood and sediment control purposes.

Locally, Galisteo Creek gains inflow as ground water levels rise to the land surface in the alluvial sediments. Ground water levels are directly related to precipitation. The TDS of Galisteo Creek water is similar to the quality of the valley alluvial aquifer.

A number of springs are present in the central portion of the watershed and produce water of less than 600 mg/l TDS (White and Kues, 1992). Area springs are typically derived from the saturated alluvium where it pinches out upon underlying low permeable rocks.

Available studies suggest that runoff represents a very small percentage of the precipitation that falls on the watershed. A water supply study conducted by Fleming and others (1991) provides water budget estimates for the San Marcos watershed, which enters the Galisteo Creek valley at Cerrillos. The following values were based on the Fleming study and were provided in Abeita (1997):

Assumed precipitation	14.2 inches per year
Runoff	1.2 percent of precipitation
Groundwater Recharge	3 percent of precipitation
Evapotranspiration	95.8 percent of precipitation.

d. Groundwater Flow

Available water level data indicate that ground water moves from the highlands toward Galisteo Creek. Flows then proceed down gradient toward the Rio Grande. Ground water contours from Mourant (1980) for the watershed area are provided in Figure 4.

The majority of the wells in the basin are less than 500 feet deep, so the direction of groundwater flow within the deeper formations is uncertain. It should not be concluded that there is one continuous flow system between the various geologic formations. Wells

may not encounter ground water at the elevations shown on Figure 4. The complexity of the geology makes it very difficult to predict well success. Fracturing controls water availability for the vast majority of wells within the study area. The degree of hydrologic connection both horizontally and vertically is very difficult to ascertain due to the complexity of the system and the lack of sufficient data.

II. Fresh Groundwater Resources

NMSA 1978, § 70-2-12 (B)(15) requires the Oil Conservation Commission to regulate the disposition of water produced or used in connection with the drilling for or producing of oil or gas or both, "in a manner that will provide reasonable protection against contamination of fresh water supplies designated by the state engineer". With respect to this statute, the state engineer has designated as fresh water supplies all underground water in the State of New Mexico containing 10,000 mg/l or less of dissolved solids and all of the surface waters of all streams regardless of the quality of water, except the designation shall not include water for which there is no present or reasonably foreseeable beneficial use that would be impaired by contamination. (Ltr. Reynolds 1985)

Due to the geologic complexity of the area, the formations within the basin contain ground water with a wide water quality range. All of the formations from the valley fill down to the Entrada Formation may potentially contain water with less than 10,000 mg/l TDS. The water quality for each saturated zone will vary from site to site and cannot be determined until drilling samples have been collected and analyzed. Therefore, in the absence of site specific data, all groundwater in the basin will be considered to fall within the State Engineer's designation of fresh water.

III. Use of Water in Association with Oil and Gas Activities

Water is used in association with many oil and gas activities, including use as a supplemental fluid in enhanced recovery of petroleum resources; during workover of an oil or gas well; during solution of underground salt in brine mining or hydrocarbon storage cavern creation; as hydrostatic test water for pipelines and tanks, as rig wash water; as coolant for internal combustion engines for rigs, compressors, and other equipment; for sanitary purposes. Water is also used in oil and gas stimulation. Stimulation methods include acidizing and/or fracturing. In order to be able to produce gas at volumes and rates that are economical, reservoirs with low permeability must be treated. One method of treatment to increase permeability is fracture treatment or "fracing." Conventional fracture technology increases permeability as a result of pumping frac fluid, which generally consists of a viscous gelled fluid, and which creates an increase in the available surface area by creating fractures that are "propped up" or held open by the propping agents in the frac fluid.

Hydraulic fracturing consists of pumping into the formation large volumes of water that generally has been treated with a friction reducer, surfactant and clay stabilizer, and that contains sand. Hydraulic fractures, which are held open by the sand, result in increased surface area, which further results in increases in the desorption of the gas from the shale

and increases in mobility of the gas. The result is lower completion costs and faster recovery of a larger volume of the gas-in-place. Fracing, where necessary, generally takes place immediately after drilling and sometimes during the life of the well.

Most of the water used in association with oil and gas production is "produced water." That is, water that is produced as a byproduct in the drilling for or producing of oil or gas or both. Other sources of water that supplement produced water at the drilling or production site are known as "makeup water." Makeup water can be fresh water that is either transported to the well site, or drawn from fresh water wells at the well or production site. Makeup water can also be water drawn from deep-water saline aquifers.

IV. Regulation of Water Associated with Oil and Gas Drilling and Production in the Galisteo Basin.

The western area of the Galisteo Creek drainage basin was declared as part of the Rio Grande Underground Water Basin by the State Engineer on November 29, 1956. The declared basin was extended on December 17, 1970 to include the entire drainage area of the Galisteo Creek. By declaring the basin the State Engineer assumed jurisdiction over the appropriation and use of ground water within the basin. All new water appropriators are required to apply for and receive a permit from the State Engineer. Those water users with wells existing prior to the declaration or extension of the basin may continue to use those wells for the purposes intended without having to apply for permits. Any change in the originally intended purpose, place of use or the location of the well requires a permit from the State Engineer.

a. Produced Water

No permit from the State Engineer is required for the disposition of water produced or used in connection with the drilling for or producing of oil or gas or both. NMSA 1978, §§ 70-2-12, 70-2-12.1. The disposition of such produced water is regulated by the Oil Conservation Division in accordance with its rules. The reuse of produced water is not an appropriation of water and does not create a water right. The Oil Conservation Division regulates the disposition of produced water to ensure reasonable protection against contamination of fresh water supplies designated by the State Engineer. NMSA 1978, § 70-2-12(B)(15).

b. Protection of Strata During Drilling and Production

NMSA 1978, § 70-2-12(B)(2) requires the Oil Conservation Division "to prevent crude petroleum oil, natural gas or water from escaping from strata in which it is found into other strata." The State Engineer assists the Oil Conservation Division in carrying out this mandate by providing technical information and specialized hydrologic expertise to ensure that the drilling and production of oil and gas does not contaminate a fresh water supply.

c. Deep Aquifer Nonpotable Water

A person intending to drill a well to appropriate nonpotable water from an aquifer, the top of which the aquifer is at a depth of twenty-five hundred feet or more, must file a notice of intention to drill with the Office of the State Engineer. NMSA 1978, § 72-12-26. "Nonpotable water" in this context means water containing not less than one thousand parts per million of total dissolved solids. NMSA 1978, § 72-12-25. The State Engineer may require water from the well to be metered, analyzed, and reported. NMSA 1978, § 72-12-27. Any person who claims their existing water rights are impaired by the appropriation of such deep nonpotable water may sue for damages and injunctive relief in District Court. NMSA 1978, § 72-12-28.

d. Underground Public Waters; Temporary Uses

In regards to oil and gas production, a permit under NMSA 1978, § 72-12-1.3 may be utilized for temporary drilling operations designed to discover or develop the natural mineral resources of the state. This permitted water use may not exceed three acre-feet for a definite period not to exceed one year. Upon filing of an application, the State Engineer is required to examine the facts and, if the proposed use will not permanently impair any existing rights of others, the State Engineer shall grant the application. If the State Engineer finds that the proposed use sought will permanently impair such rights, advertisement and hearing is required as provided in the case of applications made under NMSA 1978, § 72-12-3.

e. Application for Use of Underground Water

Pursuant to NMSA 1978, § 72-12-3 (A), any person, firm or corporation or any other entity desiring to appropriate for beneficial use any of the declared underground waters of the state, such as for oil and gas production, shall designate in an application:

- (1) the particular underground stream, channel, artesian basin, reservoir or lake from which water will be appropriated;
- (2) the beneficial use to which the water will be applied;
- (3) the location of the proposed well;
- (4) the name of the owner of the land on which the well will be located;
- (5) the amount of water applied for;
- (6) the place of use for which the water is desired; and

(B) If the well will be located on privately owned land and the applicant is not the owner of the land or the owner or the lessee of the mineral estate or oil and gas rights under the land, the application shall be accompanied by an acknowledged statement executed by the owner of the land that the applicant is granted access across the owner's land to the drilling site and has permission to occupy such portion of the owner's land as is necessary to drill and operate the well.... If the application is approved, the applicant shall have the permit and statement, executed by the owner of the land,

recorded in the office of the count clerk of the county in which the land is located.

Any application to appropriate the underground waters of the Galisteo Basin will require compliance with the other salient requirements of NMSA 1978, § 72-12-3.

V. Jemez y Sangre Regional Water Plan

On April 23, 2003 the Interstate Stream Commission accepted the Jemez y Sangre Water Plan. The Jemez y Sangre Water Planning Region includes Espanola, Los Alamos, Santa Fe and surrounding areas including the Galisteo Basin. Regional water planning in New Mexico began in 1987. The Jemez y Sangre region is one of sixteen regions in the State of New Mexico. The purpose of the Jemez y Sangre Regional Water Plan is to assess the available supply of clean, usable surface water and groundwater, to determine the present and future demand for water, and to identify methods for meeting the projected demand through conservation, management, and/or acquisition of water or water rights.

The plan divided the Galisteo Basin into two sub-basins, the North Galisteo Creek and the South Galisteo Creek. The plan analyzed the water budget of these sub-basins by comparing the available water supply and the demand on that supply. In both sub-basins current information estimates that the current total groundwater recharge in the basin is less than the current total groundwater discharges, indicating significant groundwater mining may be occurring in these sub-basins.¹ This imbalance is predicted to further grow based upon population projections indicating that the population may more than triple in the next fifty years within the Galisteo Basin. For more information on the Jemez y Sangre Regional Water Plan and other water planning around the State of New Mexico please visit : http://www.ose.state.nm.us/isc_regional_plans.html.

Conclusion

In order to ensure that no oil and gas drilling activity occurs in the Galisteo Basin that would be contrary to the interests of the State of New Mexico and its citizens, it is recommended that any oil and gas drilling operators drilling in the Galisteo Basin be required to show that doing so will not contaminate fresh water supplies. The State Engineer presumes that fresh water supplies will be encountered in oil and gas drilling in the Galisteo Basin and due to the complex hydrogeology a site specific analysis is required in order to ensure the protection of the fresh water supplies.

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¹ Note, this is a finding of the Jemez y Sangre Regional Planning Group, not the State Engineer.

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Report on the Galisteo Basin

By:

New Mexico
Department of Cultural Affairs

**REPORT AND RECOMMENDATIONS OF THE
DEPARTMENT OF CULTURAL AFFAIRS**

III. Agency Reports and Recommendations

A. Department of Cultural Affairs and Its Role

The Department of Cultural Affairs (DCA) is tasked with protecting, preserving, and enhancing public appreciation of New Mexico's diverse cultural heritage and resources. The Historic Preservation Division (HPD) and the State Historic Preservation Officer (SHPO) are the senior policy advisors to the Secretary of DCA, other state agencies, federal agencies, political subdivisions of the state, and the public on matters affecting protection and preservation of cultural resources in New Mexico. For the purposes of DCA's portion of this Report, "cultural resources" shall be used interchangeably with "cultural properties," which means, pursuant to § 18-6-3(B) NMSA 1978, structures, places, sites, or objects having historic, archaeological, scientific, architectural or other cultural significance, realizing, however, that this definition is not all inclusive. Landscapes, vistas, and viewsheds, along with the many other potential cultural resources, should be considered for inclusion in the State's definition of a cultural resource.

As recognized in the EO, the protection and preservation of significant cultural resources benefits the State of New Mexico and the public – and oil and gas drilling, along with other new developments and exploration, have the potential to significantly affect cultural resources in the Galisteo Basin.

The Galisteo Basin holds some of the nation's most dramatic archaeological evidence of indigenous lifeways and early historic contacts between indigenous peoples and European explorers and colonists. The Congress of the United States has recognized the nationally significant archaeological resources of the Galisteo Basin and identified areas to be protected under the Galisteo Basin Archaeological Sites Protection Act (Public Law 108-208). A comprehensive study of the archaeological sites and districts within the Galisteo Basin has yet to be funded and a management plan has yet to be developed by the Bush Administration.

More than 3,000 archaeological sites and about 160 historic structures have been recorded in the Galisteo Basin, but these represent only a fraction of the resources expected to be present.¹ And of these known sites, only 25 sites or districts have been nominated and then listed in the National Register of Historic Places and/or the State Register of Cultural Properties. To be listed in either register, properties must be shown, through a nomination (which entails a great deal of research and writing), that they meet specific eligibility criteria and are of importance in history (for example, associated with events that have made a significant contribution to broad patterns of history; associated

¹ Only about 12% of the Galisteo Basin has been surveyed to identify archaeological sites and historic structures and districts.

with the lives of persons significant in the past; embody distinctive characteristics of a type, period or method of construction or that represent the work of a master; have yielded or may be likely to yield information important in prehistory or history, among other criteria).

B. Evaluation of Public Comments Provided to the Department of Cultural Affairs.

DCA/HPD participated in the Public Forum on the Galisteo Basin Moratorium on Oil and Gas Drilling held March 29, 2008, at the Santa Fe Community College. HPD Director, Katherine Slick, attended the public forum and met with approximately 30 members of the public, discussing their concerns and answering their questions. While most of the attendees were residents of the Galisteo Basin, representatives of the Oil and Gas Industry and the Navajo Nation also introduced themselves. All expressed appreciation for the recognition of cultural resources as an issue affecting future development and for the opportunity for discussion. The industry representative supported the idea that identifying areas of cultural significance could assist industry in determining development.

DCA/HPD also participated in a meeting with tribal representatives on May 2, 2008, at the Santa Fe Indian School. The general consensus at this meeting was that it is highly likely that traditional cultural properties exist within the Galisteo Basin that are of great interest and significance to various tribes and pueblos. However, at that time the representatives were not able to discuss the specifics. In addition, on February 14, 2008, HPD met with Santa Fe County officials to discuss the County's moratorium on any new grading, drilling, or extraction of oil, natural gas, or geo-thermal energy in the Galisteo Basin and possible ways that HPD and the County could work together on sharing information about cultural resources within the Galisteo Basin and forming strategies for protecting, preserving and minimizing harm to those resources.

DCA received 41 written comments from individuals, families, and groups in response to the March 29th Public Forum. The comments expressed concern about impacts and adverse effects from oil and gas drilling on the significant cultural resources of the Galisteo Basin. Many called out the unique and nationally significant archaeological sites recognized in PL 108-208. Concern was consistently expressed about fragile archaeological sites and yet to be identified resources and other types of cultural and historical sites, including traditional cultural properties and sacred places present in the Galisteo Basin. Many were concerned that adverse effects from oil and gas development would be particularly acute for the cultural landscapes and viewsheds within the Galisteo Basin. Potential effects mentioned included 1) physical destruction and loss of archaeological, historical, and cultural sites; 2) fragmentation of landscapes; 3) loss of viewsheds and natural scenic features; 4) impairment of Native American and traditional community use of sites and sacred places; 5) the introduction of new infrastructure and noise; and 6) impacts on other ongoing uses of the basin for tourism, art and ranching.

Many comments included recommended actions for DCA and other state agencies that would insure appropriate protection of the Galisteo Basin's significant cultural resources. Following are some of these suggestions:

- Conduct comprehensive baseline studies to determine sensitive cultural and environmental areas that require permanent protection from oil and gas development as well as areas suitable for oil and gas development. The State was viewed as the most appropriate entity to conduct these studies and serve as an independent, impartial entity to review development applications. Santa Fe County was also mentioned as having an appropriate role to make decisions about development.
- Fully enforce existing statutes, rules, and policies that protect cultural resources and ensure that the Oil Conservation Division (OCD) consults with HPD/SHPO on potential effects to cultural resources on a case-by-case basis as part of OCD's application review process, including consultation with tribal governments as specified in Executive Order 2005-003, Adoption of Statewide Tribal Consultation Policy on the Protection of Sacred Places and Repatriation.
- Strengthen protection to cultural resources by issuing new rules and new statutes, if necessary, to put into place greater, and in some cases absolute protection, for highly sensitive and significant cultural, historical and archaeological sites and landscapes. One comment suggested that the OCD recognize the Galisteo Basin as a unique area with irreplaceable resources and adopt a site-specific rule to protect the sensitive resources, including but not limited to cultural resources, in a manner similar to that used to protect resources in Otero Mesa.
- Have OCD enter into a Memorandum of Understanding (MOU) or Joint Powers Agreement (JPA) with HPD/SHPO to outline the consultation process between HPD/SHPO and OCD and to protect and minimize harm to cultural resources prior to permits being issued. This could also be done with any other state agencies that have any decision making authority in relation to projects and/or actions taken within the Galisteo Basin (or other area, for that matter) that could potentially affect a cultural resource.
- Extend the Executive Order moratorium to allow sufficient time to work with Santa Fe County to put in place a consistent policy and procedure for oil and gas exploration and development within the Galisteo Basin including necessary baseline studies and GIS layers to identify culturally and environmentally sensitive areas where oil and gas development would be inappropriate.

C. Department of Cultural Affairs laws, regulations, policies affecting cultural and archaeological resources

DCA, HPD and/or the SHPO administer the New Mexico Cultural Properties Act (§ 18-6-1 *et seq.*, NMSA 1978), the New Mexico Prehistoric and Historic Sites Protection Act (§ 18-8-1 *et seq.*, NMSA 1978), and the New Mexico Cultural Properties Protection Act (§ 18-6A-1, *et seq.*, NMSA 1978). In addition, the SHPO, who is also the director of HPD, is tasked with the responsibility to advise federal and state agencies, local governments, and other political subdivisions of the State on ways to preserve, protect and minimize adverse effects to significant cultural resources in New Mexico, including its archaeological sites, architectural and engineering achievements, and cultural landscapes and sacred places. All government agencies, including quasi-agencies, are required under federal and state law to consult with the SHPO when they propose or make decisions about projects that may affect cultural resources.

Pursuant to **Section 106** of the National Historic Preservation Act (16 U.S.C. 470f; 36 CFR 800), federal agencies are required to take into account the effects of federal undertakings on properties listed in *or eligible* for listing in the National Register and to consult with the SHPO, Indian tribes, and the public before any such undertaking is pursued. The sale of oil and gas leases and the processing of applications to drill on federal lands are considered "federal undertakings" and are subject to SHPO, tribal, and public review under Section 106.

State Undertakings (§18-6-8.1 NMSA 1978): When a state agency or department has direct or indirect jurisdiction over any land or project that may affect a property listed in the State Register of Cultural Properties, that agency must afford the SHPO a reasonable and timely opportunity to participate in the planning to preserve, protect and minimize adverse effects to the property. Sale of oil and gas leases on state land and a state agency's deliberations relating to the issuance of a state permit to drill are state undertakings subject to review under §18-6-8.1 NMSA 1978. "Review of Proposed State Undertakings that May Affect Registered Cultural Properties," found at 4.10.72 NMAC, provides a SHPO consultation process for state agencies to follow that will afford the SHPO a reasonable opportunity to participate in the planning of any state undertaking that may modify any state land or structure. Attorney General Opinion No. 87-64 states the SHPO may participate in a state agency's deliberations when the agency is considering the issuance of a license that would affect a registered cultural property – even if that registered cultural property is on private land.

State-funded Projects or Programs (§18-8-7 NMSA 1978): State agencies and political subdivisions are prohibited from expending state funds on any program or project that may "use" any portion of or any land from a significant prehistoric or historic site unless there is no prudent or feasible alternative to the proposed use. "Significant prehistoric or historic site" means any property listed in the State Register of Cultural Properties or National Register of Historic Places. State agencies and/or political subdivisions must notify the SHPO and request a determination whether a proposed project or program constitutes a "use." Examples of a "use" include physical destruction or changes to the property, alteration of its setting, and/or introduction of

visual, audible or atmospheric elements which are out of character to the property. "Implementation of the Prehistoric and Historic Sites Preservation Act," found at 4.10.12 NMAC, outlines the SHPO consultation process for state agencies and political subdivisions to follow so that the SHPO may determine whether a project or program will constitute a "use" under the Prehistoric and Historic Sites Preservation Act and whether there is a prudent or feasible alternative to the proposed use.

Cultural Resource Surveys (§18-6A-5 NMSA 1978): The SHPO must establish a system of professional surveys, in cooperation with state agencies, to identify significant cultural properties on state lands. State agencies must cooperate with the SHPO in this endeavor and exercise due caution to avoid inadvertent damage to cultural properties. State agency means any department, agency, institution or political subdivision of the state.

Archaeological permits (§18-6-5 NMSA 1978): The Cultural Properties Review Committee (CPRC), with the concurrence of the State Archaeologist and the SHPO, issues permits to qualified entities to conduct archaeological investigations (survey, excavation/testing and monitoring) on land owned, controlled, or operated by the State of New Mexico and, in some cases, on private land. When the project is on state trust lands, the concurrence of the Commissioner of Public Lands is also required. "Permits to Conduct Archaeological Investigations on State Land," at 4.10.8 NMAC, outlines the process for qualified entities to obtain permits to conduct an archaeological survey, excavation/testing and/or monitoring. Rule 4.10.14 NMAC, "Cultural Properties on Private Land and Mechanical Excavation Permits," outlines the situations in which a permit is required to excavate an archaeological site on private land. The process for obtaining an annual or individual unmarked human burial excavation permit, if the human burial cannot be left in place, is outlined at Rule 4.10.11 NMAC, "Issuance of Permits to Excavate Unmarked Human Burials in the State of New Mexico."

In sum, state laws and rules require that state departments, agencies, institutions and political subdivisions of the state consider, *in consultation with the HPD and/or SHPO*, the potential effects to cultural resources when deliberating or making decisions on development projects including those for oil and gas exploration and drilling. The laws do not require that a state-funded or permitted project (considered an "undertaking" pursuant to §18-6-8.1 NMSA 1978) be denied because of cultural resource concerns, but they do require SHPO participation in the planning process "to preserve and protect, and to avoid or minimize adverse effects on, registered cultural properties." §18-6-8.1 NMSA 1978. In addition, Santa Fe County has authority to issue ordinances related to the protection of historic resources under the New Mexico Historic District and Landmark Act (§ 3-22-1 *et seq.*, NMSA 1978). Under this statute, counties can designate historic districts and landmarks through their power of zoning. Santa Fe County has done this.

D. Department of Cultural Affairs Recommendations

After reviewing applicable state statutes, rules, and policies and taking into consideration public comments received, DCA recommends that, in order to ensure adequate protection of significant cultural resources, the following actions be taken and/or policy determinations be made:

- DCA recommends that, at the very least, the moratorium be extended for a minimum of 12 months to allow for effective and thorough surveys and studies, so that the State may 1) determine in more depth what resources exist within the Galisteo Basin and 2) establish an appropriate and comprehensive resource-based planning process. Current studies indicate that the known archaeological, cultural, and historical sites within the Galisteo Basin represent only a small percentage of the cultural resources existing in the Basin. Undoubtedly, tens of thousands of unidentified significant cultural resources are present. Formal studies to identify cultural landscapes and areas of importance to New Mexico's traditional communities remain unstudied. It is abundantly clear that many resources (besides energy-related resources) exist within the Basin and merit protection.
- Properties worthy of listing in the National Register or State Register need to be identified and nominations prepared. The greatest protection of cultural resources afforded under state law applies to registered properties. Last year, HPD, with funding assistance from the Bureau of Land Management (BLM), issued a small preservation grant to begin this process of identifying properties eligible for listing. The initial focus of the grant has been on archaeological resources, particularly those areas listed in PL 108-208, the Galisteo Basin Archaeological Sites Protection Act, but additional resources – including properties and places of importance to traditional communities, need to be identified, surveyed, nominated, and registered. For this to happen, funding is needed. In addition, the types of resources to be identified, surveyed, nominated, and registered must be prioritized and a systematic program put into place to register cultural resources and properties within the Galisteo Basin, so as to afford them the greatest protection under existing state law.
- Development of energy resources in the Galisteo Basin needs to take into account all potential effects to all types of cultural resources, not only archaeological and historic sites and districts, but also significant cultural landscapes and sacred places. Optimal avoidance or minimization of potential adverse effects to cultural resources that could be caused by development, including the cumulative effects, is achieved when the issues are addressed during the initial stage of development, rather than when postponed until each specific project reaches the permitting stage. This requires a proactive approach – conducting the necessary archaeological, historical, and ethnographic studies needed to identify significant cultural resources, including culturally sensitive areas, so that this information is available to

developers during the earliest stages of project planning and prior to the sale of leases. Current state laws call for consultation with the SHPO at the project-specific development stage. This process is reactive and can lead to the loss of significant resources through cumulative effects and/or impacts. Furthermore, the post-project identification of significant resources and measures required to avoid or minimize any adverse impacts leads to increased industry costs. Again, funding is required to support the necessary baseline studies to identify sensitive areas requiring preservation and areas where oil and gas exploration and development are appropriate.

Report on the Galisteo Basin

By:

New Mexico
Department of Game and Fish

REPORT AND RECOMMENDATIONS OF THE
THE NEW MEXICO DEPARTMENT OF GAME AND FISH



**Assessment of Public Comments for
Galisteo Basin Oil and Gas Development
May 24, 2008**

This assessment follows the format outlined in the memo *Executive Order 2008-004 Outline for Report to the Energy, Minerals and Natural Resources Department*.

III. Agency Reports and Recommendations

A. Identification of agency and its role with regard to the E.O.

The New Mexico Department of Game and Fish (Department) was identified as one of the 11 administrative agencies responsible for addressing the objectives of Governor Richardson's Executive Order 2008-04 *Imposing a Six Month Moratorium On New Oil and Gas Drilling in Santa Fe County* (E.O.). The 3 primary objectives of the E.O. addressed by this report include:

- Provide an opportunity for government entities to receive and evaluate input from the public on State activity in this ecologically fragile area (the Galisteo Basin), a necessary and valuable part of the process of formulating public policy and government planning.
- Provide a fair and thorough evaluation of laws, regulations and policies concerning the environmental, economic, cultural, and archaeological impact of drilling within Santa Fe County and the Galisteo Basin.
- Conduct a careful assessment of all existing laws, regulations, policies, and planning documents to ensure that the State of New Mexico has fully and appropriately exercised its police powers to ensure that no oil and gas drilling activity occurs in Santa Fe County and the Galisteo Basin that would be contrary to the interests of the State of New Mexico and its citizens.

B. Evaluation of Public Comments

The Department received 55 public comments. Five respondents were supportive of drilling within the Galisteo Basin; all others were opposed. One pro-drilling commenter stated "Regarding oil and gas activity on wildlife, it is certainly not detrimental to its viability and in most cases wildlife appears to thrive in oil and gas development areas." This comment does not reflect the position of the Department and State Game Commission, both of which are concerned about the adverse effects of oil and gas drilling

and development on wildlife and important habitats throughout New Mexico.

Many of the comments did not directly address wildlife or wildlife habitat concerns, but were focused on the potential adverse effects of oil and gas drilling in the Galisteo Basin on ground water and the creation of air pollution. However, an approximately equal number of respondents did specifically reference wildlife, wildlife habitats and/or the Galisteo Basin ecosystem with regard to their concerns about potential adverse effects to these resources from oil and gas drilling. A few respondents identified specific springs and riparian areas (e.g., the Galisteo River), where wildlife is abundant and rely on surface water for their persistence, and noted that oil and gas development is already occurring nearby or is planned to occur.

Many respondents referred to the need to develop alternative energy sources in place of tapping new oil and gas reserves in environmentally- and archaeologically-sensitive locations such as Galisteo Basin. These writers usually discussed the direct effect between authorizing new drilling and petroleum development use to increased climate change effects. Other writers referred to the habitat fragmentation and noise disturbance effects to wildlife that will occur at larger scales of oil and gas development. Some respondents noted the cumulative effects to wildlife and habitats within the Basin from ongoing drought, housing developments and climate change. These writers inferred that oil and gas development in the Basin could exceed a threshold of disturbance, whereby many species could no longer persist in areas that exceed this threshold.

Several respondents referred to Department plans and publications such as the *Comprehensive Wildlife Conservation Strategy for New Mexico*, which identifies key habitats and species of greatest conservation need in New Mexico, including within the Galisteo Basin, and our *Oil and Gas Development Guidelines*, which recommends practices to industry to minimize impacts on wildlife and habitats. The Department's *Galisteo Basin Oil and Gas Development – Wildlife and Habitat Fact Sheet*, developed for the open house, was also cited by several respondents.

Several respondents submitted substantive recommendations for further action by the Department and other relevant state agencies. These include:

1. The Department should conduct comprehensive inventories of wildlife and important habitats in the Galisteo Basin.
2. The Department should assist Santa Fe County to map natural resources, including wildlife populations, key habitats and travel corridors.
3. The Department should work with the Oil Conservation Division (OCD) to develop site-specific (Galisteo Basin) regulations to protect riparian and riverine habitats, such as expanded setbacks for drill rigs and other equipment, beyond what is currently required.
4. The Department and OCD should develop a standardized consultation process whereby wildlife and wildlife habitat concerns are considered before new leases are approved.

5. The Department should be consulted by OCD on bonding requirements for individual wells based on potential adverse effects to wildlife and important habitats.

Most respondents indicated appreciation for the opportunity to comment during this unique public comment process.

C. Agency laws, regulations, policies, and planning documents pertinent to the E. O.:

i. Environment (water, air, wildlife, native plants, etc.)

The Department is mandated under Chapter 17 (NMSA 1978) to provide and maintain an adequate supply of wildlife and fish within the State of New Mexico by utilizing a flexible management system that provides for their protection, propagation, regulation, conservation, and for their use as public recreation and food supply. Chapter 17 provides the Department authority to regulate take of game animals and fishes, furbearers, and to protect songbirds, hawks, owl, vultures, horned lizards, and species listed as threatened or endangered under the Wildlife Conservation Act (17-2-37 through 17-2-46 NMSA)(WCA). The WCA states that "...species of wildlife indigenous to the state that may be found to be threatened or endangered should be managed to maintain and, to the extent possible, enhance their numbers within the carrying capacity of the habitat..."

The Department does not have authority over habitat management on public or private lands, except on State Game Commission-owned properties. However, the WCA authorizes the Department to investigate habitat needs of state-listed species, develop recovery plans, and to acquire land or aquatic habitat for conservation, management, and protection of threatened and endangered species.

Regarding aquatic habitat, Section 17-4-14 (NMSA) provides that "No person owning or controlling any reservoir, lake or body of water into which public waters flow and which furnishes the water supply in whole or in part to any stream containing game fish shall divert or lessen such water in flow or supply to an extent detrimental to the fish in such stream, reservoir, lake or body of water."

The Department's Conservation Services Division was created by the New Mexico State Legislature's Conservation Services Division Act of 1994. The Conservation Services Division's (CSD's) responsibilities were defined through this Act and subsequent promulgated regulations (17-1-5.1 NMSA). According to these regulations, CSD is responsible for (in addition to the administration of the WCA) management and conservation of public wildlife habitat; lease, purchase and management of state wildlife habitat; assisting landowners to improve habitat; education and development of publications related to conservation of wildlife and the environment; and communication and consultation with federal and other state agencies, local governments and communities, private organizations and affected interests responsible for habitat, wilderness, recreation, water quality and environmental protection to ensure comprehensive conservation services for hunters, anglers and non-consumptive wildlife users.

In 2001 the U.S. Congress passed the State and Tribal Wildlife Grants Program Act (Act), which created the nation's core initiative for conserving biological diversity, with the intent to preclude the need for additional listings under the federal Endangered Species Act. To receive funding through this Act, each state wildlife agency was required to develop a wildlife action plan that identifies species of greatest conservation need, key habitats, and conservation recommendations to protect key habitats and avoid additional listings. The *Comprehensive Wildlife Conservation Strategy for New Mexico (2006)* (CWCS), (available on the web at http://wildlife.state.nm.us/conservation/comp_wildlife_cons_strategy/index.htm) was submitted by the Department to the U.S. Fish and Wildlife Service in fulfillment of the Act. The CWCS is intended to act as a wildlife and habitat conservation blueprint for federal, state, tribal and local governments, and private entities, so that activities may be coordinated to meet shared conservation goals.

The CWCS was used to develop the Department's *Galisteo Basin Oil and Gas Development Wildlife and Habitat Fact Sheet* (Attachment 1), (available on the web at <http://wildlife.state.nm.us/conservation/documents/GalisteoBasin-3-27-08.pdf>), which identifies Species of Greatest Conservation Need (SGCN) and Key Habitat types that occur in the Galisteo Basin that could be adversely affected by oil and gas development. The CWCS specifically identifies oil and gas development, habitat fragmentation, groundwater depletion and pollution as threats to SGCN and Key Habitats.

D. Agency Recommendations

- The Western Governors' Association recently formed a stakeholder working group to develop mitigation recommendations for adoption by western states to protect wildlife crucial habitats and corridors from oil and gas development (available on the web at <http://www.westgov.org/wga/publicat/OilGas07.pdf>). New Mexico should consider implementing some or all of the recommendations provided therein.
- Department staff recently developed recommendations for oil and gas producers to adopt voluntarily to mitigate adverse effect of oil and gas development on wildlife and habitats. This document is entitled *Oil and Gas Development Guidelines: Protecting New Mexico's Wildlife Habitat and Wildlife* (Attachment 2), and is available on the web at <http://wildlife.state.nm.us/documents/oilandgasguidelines.pdf>. Text boxes throughout the document provide specific, but reasonable, recommendations to oil and gas producers to offset negative environmental impacts. The state should consider implementing some or all of these recommendations, depending on development activities planned and site specific conditions.
- The State should consider enacting more restrictive setbacks for wells from important aquatic and riparian habitats such as springs, wetlands and drainages such as the Galisteo River. The Bureau of Land Management generally uses 0.25 miles, but further distances such as 0.5 miles would be more protective of wildlife from noise

and visual disturbance and more protective of surface water sources from contamination.

- For conservation planning purposes, the Department should assist Santa Fe County in the identification of distributions of Species of Greatest Conservation Need and Key Habitats (as identified in the CWCS) and wildlife crucial habitats and corridors (as identified in the ongoing Western Governors' Association Wildlife Corridors Initiative).
- Recently, Colorado enacted new legislation (House Bill 07-1298; the Colorado Habitat Stewardship Act of 2007). This act requires the establishment of a timely and efficient procedure for consultation with Colorado Wildlife Commission and Division of Wildlife on oil and gas development decision-making that impacts wildlife resources. Development of a similar consultation protocol for review of oil and gas permits and stipulations between the New Mexico Oil Conservation Division and the Department may be necessary to avoid, reduce and mitigate adverse effect to wildlife and habitats.

Report on the Galisteo Basin

By:

New Mexico
Department of Health

**REPORT AND RECOMMENDATIONS OF THE
DEPARTMENT OF HEALTH**

A. Identification of agency and its role with regard to the E.O.

- i. Department of Health (DOH), Environmental Health Epidemiology Bureau (EHEB)
- ii. Protection of public health

B. Evaluation of public comments

Public comments relevant to the NM DOH included those related to air and water quality, and subsequently, how such qualities may negatively influence human health. These comments represent valid concerns and are shared by DOH.

i. water quality concerns

1. Drilling ultimately contaminates our water supply. How will our water be replaced?
2. cancers, lung disease, etc. caused by inevitable pollution of water and air
3. new cancer and respiratory diseases
4. NMO&G lawyers showed "no concern" for the regard for the quality of human life (*i.e.* open waste pits located 10 feet above groundwater, hydraulic fracturing methods known to cause cancer, etc.)
5. other industries must show documentation of community health effects, and O&G should not be exempt from this scrutiny.
6. NM DOH should do everything it can to document public health risks associated with oil and gas operations.
7. surface waters, such as Arroyo Los Angelitos and Galisteo Creek, may become contaminated
8. toxic air pollutants

ii. air quality concerns

1. health effects of polluted air
2. dust
3. toxic pollutants in air
4. air monitoring - if drilling is approved, air monitoring should be conducted in the Galisteo Basin

iii. other concerns

1. precautionary principle

C. Agency laws, regulations, policies, and planning documents pertinent to the E.O. and with consideration to the following:

i. Health

1. Public Health Act, 1978, NMSA § 24-1-1
2. Emergency Planning and Community Right to Know Act, 1986, U.S. Code, Title 42, Chapter 116
3. Precautionary Principle, 2004, New Mexico Senate Joint Memorial 71

D. Agency recommendations

Pursuant to the New Mexico Public Health Act, 1978, NMSA § 24-1-1 the DOH has the authority to "investigate, control and abate the causes of disease ... sources of mortality and other conditions of public health." 1978, NMSA § 24-13(C). To apply the Public Health Act in this manner, it may be preferable to amend it to better establish the language, authority, and mandate

of pre-emptive action against environmental hazards highly likely to cause adverse health effects. Moreover, DOH should examine the feasibility of requiring oil and gas drillers to disclose the additives and chemicals that would be used during the drilling process.

Another possible avenue for evaluation of proposed actions that may be hazardous to public health is to require public health impact analyses of proposed actions in New Mexico that have the potential to adversely affect public health and prevent such actions or require mitigation measures, if applicable.

Summary of potential human health issues from oil and gas drilling

The DOH is concerned with protecting public health from the impacts of the proposed oil and gas drilling in the Galisteo Basin. The DOH EHEB evaluates health issues surrounding water quality, outdoor and indoor air quality, and exposure to toxic chemicals, and determines ways to reduce these exposures and their associated health effects. Environmental health studies that EHEB has conducted in existing oil and gas development areas of northwest and southeast New Mexico indicate significantly elevated rates of asthma, respiratory illness, and cardiovascular disease.

Air, soil and water contamination may occur during different stages of drilling, and subsequently, such contamination could affect human health. A comprehensive review of the epidemiological and toxicological literature regarding potential adverse health effects from chemicals which may be used in oil and gas development has already been conducted by The Endocrine Disruption Exchange (TEDEX), which found that approximately 80% of the chemicals used in oil and gas development may possess inherent adverse health effects (TEDX 2007). Moreover, there are only a few published studies regarding adverse health effects resulting from oil and gas development, (Mall *et. al.*, 2007).

The potential adverse human health effects associated with each stage of the drilling process include the following:

1. drilling: During the drilling process, "drilling mud" is circulated into the borehole to keep the drill bit cool and lubricated. These "muds" may contain chemical additives, salts, metals, hydrocarbons, radioactive materials and undisclosed proprietary chemicals. These contaminants may leach into the soil or spill out of the storage pits contaminating both underground and surface water. Exhaust fumes from drilling equipment are released into the air and may include: benzene, toluene, formaldehyde, methane, hydrogen sulfide, nitrogen oxides, hydrocarbons, sulfur dioxide and particulate matter.

2. stimulation and hydraulic fracturing: To obtain gas from the underground geology, it is often necessary to "fracture" the rock. This fracturing involves pumping high-pressure fluids into the rock formation, thereby allowing the gas and oil to flow into the well casing. Fracturing fluids that flow into the well casing are then pumped to the surface, as materials are pumped into the structure to keep the drilled area open. Surface spills of the fracturing fluid are not uncommon. Also, fracturing fluids may be inadvertently injected into or come in contact with fresh water aquifers.

There are no guidelines regarding the selection of fracture fluid chemical additives, and it is not known what will be used in the proposed Galisteo drilling operations. Fracturing fluids may include biocides, diesel fuel, acids, metals, ethylene glycol, and corrosion inhibitors.

Below are commonly-used additives in the fracturing process according to EPA:

type of additive	function performed	typical products
biocide	kills bacteria	gluteraldehyde carbonate
breaker	Reduces fluid viscosity	acid, oxidizer, enzyme breaker
buffer	Controls the pH	sodium bicarbonate, fumaric acid
clay stabilizer	prevents clay swelling	KCl, NHCL, KCl substitutes
diverting agent	diverts flow of fluid	ball sealers, rock salt, flake boric-acid
fluid loss additive	improves fluid efficiency	diesel, particulates, fine sand
friction reducer	Reduces friction	anionic copolymer
iron controller	keeps iron in solution	acetic & citric acid
surfactant	lowers surface tension	fluorocarbon, nonionic
gel stabilizer	Reduces thermal degradation	methanol, sodium thiosulfate

3. produced water: For some drilling operations, millions of gallons of water must be removed from the aquifer. If stored in open pits, hydrocarbons (e.g. benzene) volatilize. The depletion of shallow aquifers may result in the migration of methane and hydrogen sulfide from the soil into the air. Salts, metals, hydrocarbons and other chemical additives in the produced water will contaminate soil if spilled on the surface. The same pollutants can escape and contaminate waters through pipeline breakages, leaks or movement of produced waters into the freshwater aquifer. Lastly, exhaust containing toxic hydrocarbons is created from water pumps powered by diesel fuel.

4. separation and dehydration: Once gas and oil are brought to the surface, they must be separated from each other as well as from the water encountered during the drilling process. Dehydrators and separators vent huge amounts of methane and other volatile organic compounds. Wastewater often contains dissolved hydrocarbons, sands, salts, metals and other toxins that may contaminate surface and groundwater.

5. gas compression: Gas is transported in a pressurized pipeline. Compression can occur at the well site or at a central compression facility, and a diesel or natural gas fired engine typically powers this compression. This compression results in engine exhaust, venting of unused gas, spills, and leaks.

Below is a list of chemicals and their associated health risks:

hydrogen sulfide (H₂S): Hydrogen sulfide is typically associated with natural gas and coal-bed methane formations. H₂S aggravates existing respiratory conditions, causes central nervous system problems, spontaneous abortions, and cardiovascular system difficulties and can seriously and permanently damage neurological functions.

BTEX (benzene, toluene, ethyl benzene and xylenes): Benzene is a known carcinogen. Toluene may affect the reproductive (*i.e. via* endocrine disruption) and central nervous systems, and ethylbenzene and xylene may affect respiratory and neurological systems.

heavy metals: e.g. arsenic, barium, cadmium, chromium, lead, mercury, etc.: These metals may be present in the drilling muds, vented gas fumes and fracturing fluids. These heavy metals possess a number of different health consequences such as neurological damage at very low levels of exposure, skin problems, hair loss, kidney damage, high blood pressure, and increased cancer.

nitrogen oxides: NO_x typically react with volatile organic compounds (VOCs) to form ground level ozone and smog which can trigger asthma and other respiratory problems. Also, nitrogen oxides can react with other chemicals to create particulate pollution, which can damage lungs and cause respiratory illness, heart conditions and premature death.

sulfur dioxide: SO₂, which typically comes from engine exhaust, reacts with other chemicals used in the drilling process such as particulate pollution. Sulfur dioxide can damage lungs and may cause respiratory illness, heart conditions and premature death.

Summary of legal authority and deficiencies

The New Mexico Public Health Act

Pursuant to the New Mexico Public Health Act, 1978, NMSA § 24-1-1 the DOH has the authority to "investigate, control and abate the causes of disease ...sources of mortality and other conditions of public health." 1978, NMSA § 24-13(C).

The DOH may exercise its authority under the Public Health Act (PHA) to conduct comprehensive epidemiological studies to determine: a) human health effects of oil and gas development in New Mexico, including cumulative and synergistic effects; b) exposure pathways that lead to adverse health effects; and c) health effects of oil and gas operations on particularly sensitive populations, such as those persons living within relatively close proximity to the proposed drilling sites.

The DOH may examine oil and gas operations currently in operation within New Mexico to determine if there exist public health threats significant enough to warrant intervention. Given PHA regulations, the DOH "may take such measures on the advice of its medical officer or officers as are deemed necessary and proper for the protection of the public health." NMAC § 7.4.3.9.A.

Emergency Planning and Community Right to Know Act

The purpose Emergency Planning and Community Right to Know Act (EPCRA) is to encourage and support emergency planning efforts at the state and local levels and to provide public and local governments with information concerning potential chemical hazards present in their communities. EPCRA does not place limits regarding which chemicals may be stored, used, released, disposed, or transferred at a facility, rather the Act requires a facility to document, notify, and report chemical information.

The oil and gas industry has been largely exempt from numerous Federal environmental and public health laws, including the Emergency Planning and Community Right to Know Act (Mall *et. al.*, 2007). Because there is evidence that many of the chemicals used in oil and gas development are public health threats, the DOH may exercise its authority under § 24-13(C) to require all New Mexico oil and gas operations to fully disclose all chemicals used in oil and gas production. Disclosure must include individual chemicals "proprietary" chemical compounds. Should an oil and gas operator refuse to disclose all chemicals used in an operation, the DOH should use its authority to "control and abate" the causes of disease and mortality and, subsequently, prohibit use of such "proprietary" chemicals in any oil and gas operation in New Mexico.

Precautionary Principle

Senate Joint Memorial 71 encourages implementation of the precautionary principle in public and environmental health assessment in New Mexico. The principle holds that when an activity raises threats of harm to human health or the environment, even if some cause and effect relationships are not fully and scientifically established, mitigation or abatement measures should nonetheless be employed. The premise of the bill is that all New Mexicans have an equal right to live in a safe and health environment, and implementation of the precautionary principle promotes this premise as well as reduces potential effects on public health resulting from exposure to environmental toxins.

The principle of precautionary action holds that persons or organizations, in response to proposed technological innovations, have a duty to take anticipatory action to prevent harm, an obligation to examine alternatives, and the right to stop the implementation of technological innovations in an open democratic process. Thus, the burden of proof of harmlessness for any proposed technological innovation must lie with the proponent of the innovation, not the general public. The principle is a controversial paradigm shift in the societal approach to decisions to allow, implement, monitor and assess the impact of technological innovations, and, as such, has the potential to influence a wide range of public regulatory and legal procedures.

The memorial further requests that assessments involve testimony from members of the public, organizations and agencies, such as NMED and the DOH, both of whom are concerned about environmental public health and the effects of implementing the precautionary principle. While the mission of the DOH is to protect and promote the public health, implementation of the precautionary principle may result in noteworthy changes in policies and regulations.

References

The Endocrine Disruption Exchange (2007) Chemicals used in oil and natural gas development and delivery in New Mexico.

Pollack, A, J Russell, *et al.* (2006) Ozone precursors emission inventory for San Juan and Rio Arriba Counties, New Mexico," final report Prepared for New Mexico Environment Department

Mall, A, Buccino, S, Nichols, J (2007) Protecting western communities from the health and environmental effects of oil and gas production. *Natural Resources Defense Council*

Report on the Galisteo Basin

By:

New Mexico
Tourism Department

REPORT AND RECOMMENDATIONS OF THE
TOURISM DEPARTMENT



**Report to the Governor on the Economic
Impact on Tourism by Oil and Gas
Drilling and Exploration in Santa Fe
County and the Galisteo Basin.**

**New Mexico Tourism Dept.
Michael Cerletti – Cabinet Secretary**

Prepared by - Richard Eeds – Advertising Director

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Tourism Dept. Report and Recommendations

Identification of Agency

The New Mexico State Tourism Department is a cabinet level department in the executive branch. The department consists of six divisions under the Secretary of Tourism. The prescribed purpose of the Tourism Department is:

- A - provide a coordinated statewide perspective with regard to tourism activities;
- B - provide a database for local and regional tourism groups and serve as a comprehensive source of information and assistance to tourism-related businesses wishing to locate, expand or do business in New Mexico; and
- C - monitor the progress of state-supported tourism activities and prepare annual reports of such activities, their status and impact.

Overview of Report

As indicated in Executive Order 2008-004, the Tourism Department is required to submit a report on how oil and gas drilling would affect tourism in the Galisteo Basin and Santa Fe County.

The Tourism Dept. conducted numerous interviews in the potentially affected areas, including the Turquoise Trail, the communities of Madrid, Cerrillos, Galisteo, and Santa Fe. The department also collected and reviewed numerous public comments received at public meetings or submitted to the department through the mail or via a form on the Tourism Department website.

The findings of the department suggest that exploration and drilling for gas and oil is not supported by those living in or doing tourism related business in these areas. There were virtually no interviews or comments that supported oil and gas exploration in the Galisteo Basin or Santa Fe County.

Though there are no exact dollar amounts available as to what economic impact tourism has in either the Turquoise Trail, the village of Galisteo or in large part, Santa Fe County, the impact is known to be in the hundreds of millions of dollars. The total

economic impact for 2008 in Santa Fe alone has been estimated by the City of Santa Fe's 2008-2009 Marketing Plan at over \$625,000,000 and could reach \$650,000,000 by 2009.

Tourism in this area includes many diverse activities, including:

- Casual site-seeing.
- Recreation like hiking, bicycling, horseback riding, exploration of archaeological ruins, motorcycle touring, skiing, rafting, and many other outdoor activities.
- Cultural activities such as visiting art galleries, studios and museums.
- The hospitality industry is heavily reliant on tourism and numerous events involving food, wine, and art occur in the areas included in this report.

From the interviews and comments, as well as the city of Santa Fe's 2008-2009 Marketing Plan, one overall characteristic of the Galisteo Basin and Santa Fe County emerges as the top ranked descriptor and that is *scenic beauty*. It is difficult to surmise how oil and gas exploration and production would benefit the scenic beauty of these two areas. The Tourism Department's own research always lists the beauty and unique cultural qualities of this area as a prime motivator for tourists and well as the businesses that serve them.

Tourists traveling the National Scenic Byway of Highway 14, also known as the Turquoise Trail, experience vast open spaces and vistas now unmarked by overdevelopment or industrial pollution. The residents and business owners along Highway 14 have expressed strong concerns about truck traffic that would be generated by the oil and gas exploration and that the infrastructure does not exist for these trucks.

Residents of Madrid repeatedly stressed that they have developed a "sustainable" economy based upon art, crafts, film, and serving the tourists that visit Madrid and that they see no benefit to that economy if oil and gas exploration and production is allowed. The resulting air, water, noise and scenic pollution would eliminate the travel and tourist trade in a very short period, in the opinion of the Madrid residents. Those residents and business owners that the Tourism Department met with were unanimous in their opposition to drilling. They stated that they know of no Madrid residents who support the proposed drilling. This proved equally true in Cerrillos and Galisteo. Residents of those towns and surrounding rural areas that we interviewed are adamantly opposed to the proposed drilling because it would immediately damage the tourist economy that they have built over the years. Any decision to allow the exploration for or production of oil and gas in this area would have to determine if that activity could offset the loss of travel and tourist revenue that the communities affected already enjoy.

The residents of Galisteo that we met with at the Galisteo Inn on March 20th, believe that if the oil and gas exploration is permitted, not only will the tourists not visit the area, but the artists who live in the Galisteo area will move away, thus further depriving the Galisteo area of revenue. The Santa Fe art galleries would also suffer if these artists left the Galisteo Basin and Santa Fe region. Furthermore, these residents also opposed the proposed drilling because of transportation problems. They feel that the existing roads and bridges are not adequate to handle the truck and heavy equipment that would be necessary for the drilling industry and that any damage to the Galisteo Village

Church would be devastating to the residents and to the local economy. This church is the center of the village and attracts thousands of visitors every year.

The town of Cerrillos also lies along the Turquoise Trail and Highway 14 and is the site of the Cerrillos Hills Historic Park, which includes 1100 acres of hills that are used for horseback riding, hiking and mountain biking. This is an area that is heavily used for outdoor recreation and geological and archaeological exploration. There are countless Native American ruins and burial sites. Most of these sites have never been catalogued or even disturbed. Many residents of this area fear that these Native American sites would be permanently damaged by oil and gas exploration.

Another issue that concerns members of the Cerrillos community that we met with, is real estate value and the possible effect that drilling would have on the real estate market. An economic impact study on real estate values was done by Craig Wingate in January of 2008 and this study is included as an appendix to this report. In brief, Mr. Wingate's study concludes that land values would significantly decrease if oil wells and well-sites were on them. His study and those of realty companies make clear that sales of land in the Galisteo Basin and parts of Santa Fe County have already almost zeroed out just with the possibility of oil and gas drilling. Since the lease and permitting of oil wells was announced, some properties that are for sale have not received a single offer to buy. Many of the residents in the Cerrillos area were once tourists visiting New Mexico, who bought land and stayed.

Oil and gas exploration would most likely make the Galisteo Basin and Santa Fe County less attractive to potential real estate investors and those looking for homes to buy in a scenic area.

Tourism is a very significant factor in the economic health of Santa Fe County. If the overall impact of tourism includes all of the hospitality industry, all of the art studios, galleries, and museums, the ski resort, and countless other businesses affected directly and indirectly by the travel and tourist dollar, then one can see how anything that negatively impacts tourism would hurt the economy of Santa Fe County.

The tourism industry in the areas covered in this report is a sustainable industry that has taken many decades to grow. If the proposed oil and gas exploration created a negative perception of this area and made the area less marketable and attractive to tourists, the economic impact would be felt throughout the community and would be long lasting.

Final Summary

After reviewing all of the public comment and available information on the potential impact of oil and gas exploration on tourism in the Galisteo Basin and Santa Fe County, the Tourism Department concludes that:

1. There is no positive impact that this exploration would have on tourism. Scenic beauty is the greatest attraction in this area and in our estimation, oil and gas

exploration could have a significant negative affect on the landscapes and communities in this area.

2. Businesses in the Galisteo Basin and Santa Fe County that directly or indirectly derive their income from travel and tourism dollars, would be negatively impacted by the proposed drilling and this negative impact would be long term.
3. The communities of Madrid, Cerrillos and Galisteo all rely heavily on the tourists who visit their towns for the art, crafts, food and outdoor recreation and these towns have developed sustainable economies based on tourism. The residents of these towns and the rural areas along the Turquoise Trail strongly oppose this proposed drilling.
4. The loss of tourism revenue and the total negative economic impact of the proposed drilling would not be offset by any other revenue generator in the foreseeable future.
5. Public comment is overwhelmingly against oil and gas exploration as currently proposed by Tecton in the Galisteo Basin and Santa Fe County.

The environment, customs, cultures, scenic beauty and way of life for the residents of the Galisteo Basin and Santa Fe County are not consistent with the severe impact that oil and gas exploration would have on the land and the infrastructure of the area. The potential short term benefit to the oil and gas industry compared to the possibility of a long term disruption to the tourism economy would require the New Mexico Tourism Department to recommend against allowing the exploration to proceed.

Attachments and Appendix:



New Mexico Tourism Department and Proposed Oil and Gas Drilling in the Galisteo Basin and Santa Fe County:

Fact Sheet

The Tourism Department's mission is to market New Mexico as an enchanting destination to the world.

The New Mexico Tourism Department (NMTD) creates, promotes and develops tourism opportunities. We love showing our beautiful and intriguing home to the world. Sharing New Mexico's rich heritage, tri-cultural people, exciting outdoor activities, great food, world-renowned art, wonderful festivals, and gorgeous climate is a responsibility that we take seriously.

The Department works with local communities to promote their attractions and events so that visitors have a chance to see the amazing variety New Mexico has to offer. The NMTD takes care of potential and current visitors by fulfilling requests for information (primarily our annual Vacation Guide), by offering statewide visitor information centers and through the efforts of the marketing, advertising and media relations departments.

Department Divisions, Programs, Personnel & Information

To better help you contact the correct persons please choose from the list below.

ADMINISTRATION & ADMINISTRATIVE SERVICES

- *Administration*
- *Tourism Commission*
- *ASD Director and Financial Bureau*
- *Human Resources Bureau*

ADVERTISING DIVISION

- *Director & Staff*
- *Regional Marketing Program*
- *Website*

MARKETING & PROMOTION

- *Director*
- *Promotion - U.S., Mexico & Canada*
- *Public Information*
- *Visitor Information Centers*
- *Fulfillment Center*

TOURISM DEVELOPMENT

- *Director and Staff, Administrative contacts for Indian Tourism and Scenic Byways*
- *Cooperative Marketing Grants*
- *New Mexico Clean & Beautiful*
- *Off Highway Vehicles*

Report on the Galisteo Basin

By:

New Mexico
Department of Agriculture

REPORT AND RECOMMENDATIONS OF THE
NEW MEXICO DEPARTMENT OF AGRICULTURE



New Mexico Department of Agriculture

Agricultural Programs and Resources Division, MSC APR

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1. Agency Reports and Recommendations

New Mexico Department of Agriculture Report

Executive Order 2008-004 (E.O. 2008-004)

Moratorium on New Oil and Gas Drilling in Santa Fe County and the Galisteo Basin

A. Identification of agency and its role with regard to the E.O.

New Mexico Department of Agriculture (NMDA) participated in the process regarding E.O. 2008-004 at the request of Governor Richardson through the lead agency, New Mexico Energy, Minerals and Natural Resources Department (EMNRD). NMDA staff attended and participated in meetings to discuss implementation of E.O. 2008-004 and potential agricultural, environmental justice, and property rights issues pertaining to this issue. NMDA hosted the public comment form on its website. On March 29, 2008, NMDA staff participated in a public forum to solicit comments on the question of new oil and gas drilling in the Galisteo Basin. NMDA staff prepared fact sheets and maps for this event.

Approximately fifteen individuals visited the open house in the room occupied by NMDA. Comments and concerns were heard. Generally, all participants listed similar concerns as follows:

- 15 people visited NMDA's room from 10:00 a.m. – 3:00 p.m. Most of those people lived in the Galisteo Basin. Some of them, however, reside in Santa Fe and were just concerned citizens.
- The large majority of the people were concerned about the possible contamination of ground water by the fracturing fluid used by the drilling company. All of these visitors expressed concern regarding the human health aspects of ground water contamination.
- Another prevalent concern was the reclamation of well head pads, roads, and other land disturbances after extraction was complete.

- Other issues discussed included the potential spread of noxious weeds due to oil production activities and land use changes.

B. Evaluation of written public comments

NMDA staff reviewed the public comments submitted regarding new oil and gas drilling in the Galisteo Basin. Safe drinking water was a primary concern raised by the public. Fears of ground water contamination, pollution caused by poor or careless fracturing techniques, and contaminated run-off from drilling operations were cited as potential causes of ground and surface water pollution. The public expressed distress over the limited water resources in the basin and indicated that drilling operations use precious and limited clean water resources in the process of mining oil and gas. The public also indicated anxiety regarding the contamination of well sites. Comments point out the fact that the oil and gas industry is exempt from federal safe drinking water act requirements. Also mentioned by the public was the deficiency within the Surface Owner's Protection Act for protecting landowners from drilling operations.

Other issues raised include pollution from routine cleaning and degreasing of oil rigs and exploration platforms using solvents. Pollution, including water, air, and surface disturbance from these routine activities was consistently cited in the public comments along with possible noise pollution. Most, if not all comments, included remarks about the significant nature of the Galisteo Basin environmentally, ecologically, historically, and archaeologically. Other concerns included decreased property values, negative affects on tourism due to degraded natural features, public health concerns, and both direct and indirect economic consequences from drilling.

Impacts to grazing and other agricultural operations were raised in conjunction with other comments. It can be noted that oil and gas drilling operations can produce many negative effects in terms of the overall health of the affected landscape. Decreased forage for livestock grazing, obstructions to grazing animals, increased invasive plants which affects prime forage, and poor reclamation practices contribute to concerns the public raised with respect to ongoing agriculture.

C. Agency laws, regulations, policies, and planning documents pertinent to the E.O. and with consideration to the following:

NMDA does not have direct legal or regulatory authority governing any aspect of the oil and gas industry. NMDA does have authority for the following statutes that might come into play with respect to oil and gas drilling operations under the correct conditions:

- Harmful Plant Act (76-7A-1 through 76-7A-11)
- Pest Control Act (76-6-1 through 76-6-9)
- Noxious Weed Act (76-7-23 through 76-7-30)
- Noxious Weed Management Act (76-7D-1 through 76-7D-6)
- Rangeland Protection Act (76-7B-1 through 76-7B-7)

These above mentioned statutes generally deal with protection of the environment and that protection may have positive economic and public health effects.

- i. **Environment (water, air, wildlife, native plants, etc.)**
- ii. **Economic**
- iii. **Cultural**
- iv. **Archaeological**
- v. **Health**

D. Agency recommendations

The issues under analysis as related to E.O. 2008-004 have complex underpinnings in private property rights law, environmental concerns, economic outcomes for both the public and the oil and gas company (Tecton) requesting the drilling permit, potential cultural and archaeological impacts due to the significance of the area as well as possible public health concerns. NMDA's fact sheets speak to the land use and ownership, agricultural production in Santa Fe County, possible negative impacts from drilling operations, and possible solutions to problems that arise as a result of drilling. The nexus of public policy and private property rights requires that all the facts and issues under consideration provide the best possible information to the Governor and his staff in order to make a sound decision regarding the future of oil and gas drilling in the Galisteo Basin. NMDA has provided but one small level of analysis to the overall process.