

OCD CASE NOS. 14784 AND 14785

IPANM Petition to amend Title 19, Chapter 15,
part 17 (The PIT Rule)

May 14 - 18, 2012

IPANM exhibit 2
“Energy New Mexico” a
publication of the Independent
Petroleum Association of New
Mexico

2011

Energy New Mexico

A Publication of the Independent Petroleum Association of New Mexico



Oil is the Lifeblood of the Modern World

Oil and Natural Gas: More Important Than You Know

It is almost impossible to overstate the global and national importance of oil and its powerful partner, natural gas. Society's reliance on petroleum and oil-based products is taken for granted. A world without petroleum, which produces light, power and transportation sources, would be completely different, more different than anyone could possibly imagine.

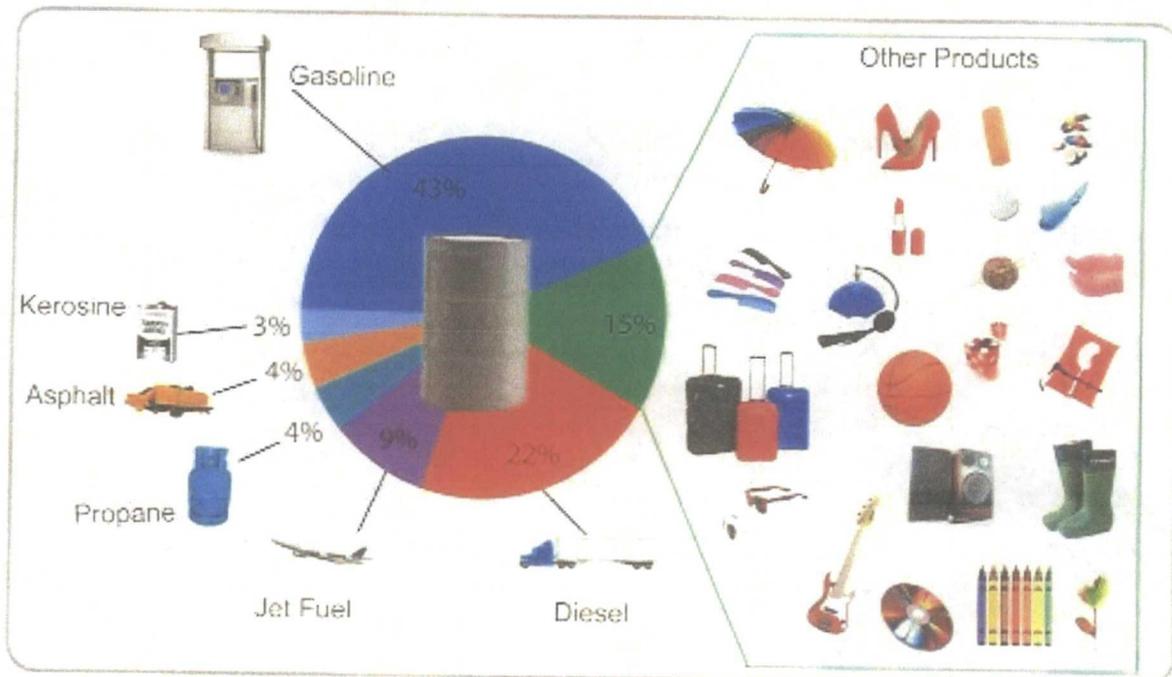
In today's society, oil and natural gas are essential to our survival and maintaining the standard of living we have come to expect. Almost all Americans have access to plentiful food supplies, a place to live that is heated or cooled by energy sources, and emergency medical devices used to save lives every minute of every day. All these "necessities" are possible because of petroleum. The wellbeing of our nation is also based on the amount of food products available to the public—the availability of abundant, available and American oil and natural gas means more food for our nation. Without petroleum products we wouldn't be able to plant, cultivate or transport food products. Oil has a direct effect on our National Defense plan. Without it, society couldn't endure, let alone prosper. Without adequate fuel supplies to operate the

many different military vehicles from fighter jets to battleships, America's position in the world would be greatly reduced, threatening the balance of power around the world. Strategic petroleum reserves are essential to counter a severe supply interruption or national emergency, which in turn helps to insure our safety.

Our lives are also filled with products made in whole or in part from petroleum: clothing, cosmetics, medicines, rubber for car tires, crayons, CDs, DVDs, contact lenses and shampoo are just a few examples. In fact, petroleum is used to make over 6,000 items used by a typical consumer, permeating our daily lives. Look around you and try to identify a single item that would still be there without oil and natural gas.

Finally, the biggest act of consumption is also one of the greatest freedoms of the modern world—personal transportation. Having the freedom to drive, fly or ride wherever you want when you want has in many ways become a "right" instead of a luxury. Whether you drive a car, ride a bus or take a train, none of these modes of transportation would be available without oil and natural gas.

What's in a Barrel of Oil?



Source: Energy Information Administration

Oil and National Defense

Author Peter Tertzakian has stated, "he who owns oil owns the world." Oil and other energy sources are directly tied to the success and survival of any country, including the United States of America. The success of two world wars has been attributed to access to petroleum and petroleum derived fuels to power the military. In fact, the millennial conflicts in the Middle East can all be traced back to control of oil. While energy resources clearly impact our domestic economy and support our standard of living, petroleum is a key ingredient which our military needs to support our freedom. Without adequate fuel supplies, America would be vulnerable to any nation that wished to take what we have, including our liberty.

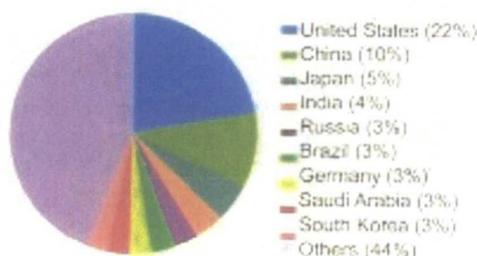
Fundamentally, no society can endure, let alone prosper, without two things: an adequate and affordable food supply and the availability of affordable energy. Because our food supply is almost completely dependent on oil, petroleum is the most important commodity we have. To maintain the stability and affordability of oil, the United States maintains the Strategic Petroleum Reserve (SPR), which is an

emergency fuel store of oil in the amount of 726 million barrels, estimated to be worth about \$85.5 billion. According to the Department of Energy, "the stockpiling of oil in the SPR reduced the nation's vulnerability to economic, national security, and foreign policy consequences of petroleum supply interruptions." The US SPR was started in 1975 after oil supplies were cut off during the 1973-74 oil embargo. The cutoff of oil flowing in the United States from many Arab nations sent economic shockwaves through our nation. The decision to withdraw from the SPR is made by the President in the event of an energy emergency which has occurred only twice, during Operation Desert Storm in 1991 and after Hurricane Katrina in 2005. The drawdown of the SPR in 1991 was the result of unstable world oil markets during the Persian Gulf War. The drawdown in 2005 occurred after Hurricane Katrina caused massive damage to oil production facilities, terminals, pipelines and refineries along the Gulf Coast.

World Oil Consumption

The World Consumes
84,400,000
Barrels of Oil each Day

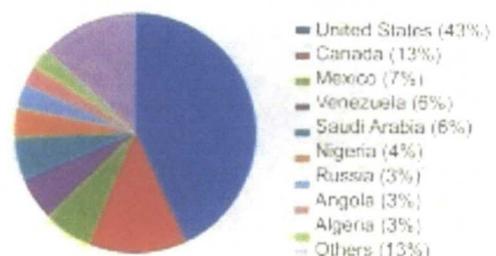
World Oil Consumption by Country



The United States Consumes
18,771,400
Barrels of Oil each Day

Of that oil, 57% is imported from foreign countries

Sources of Oil Consumed in the US



Source: Energy Information Administration: Total Primary Energy Consumption: 2009

Oil and Natural Gas: The Fuels that Power Our World

Producing oil at the pace the world is demanding is not an easy task. Nor does it come without a cost. In the United States, petroleum production takes place in 31 states and in federal offshore coastline areas. Petroleum production and distribution make up the world's largest industry, employing 1.9 million workers in the United States alone. According to the Energy Information Administration (EIA), in 2009, the daily domestic crude oil production in the US was 5.4 million barrels per day. The United States has 4.5 percent of the earth's population, yet consumes 22 percent of its petroleum annually. Our nation consumes 18.7 million barrels per day, or 13.3 million barrels per day more than we produce. In the transportation sector in 2009, Americans consumed nearly 390 million gallons of petroleum-based gasoline per day. Therefore, we must import 57 percent of the oil we consume from foreign countries, some of whom are not politically aligned with our nation's interests.

The EIA reports that in 2009, the world consumed more than 83.7 million barrels of oil per day. By comparison to the large amount of consumption in the US, the entire European Union consumed 14.1 million barrels of oil per day and China consumed 8.2 million barrels per day. But China, with its 1.3 billion citizens, or 19.6 percent of the world population, is rapidly becoming the world's largest consumer of oil. According to the Independent Petroleum Association of America, there is a direct correlation in China to vehicle ownership and personal income. It is interesting to note that in the United States for every 1,000 citizens there are 780 vehicles owned. In China the ratio is 27 vehicles to every 1,000 citizens. As the populace in countries such as China continues to grow along with the rise of income and lifestyles, the first purchase is often a car. Just imagine the

volume of gasoline that will be required to fuel the millions of new automobiles in the developing world with China's population rapidly growing past 1.3 billion.

The story on natural gas production and consumption is different than that of oil. In the US, the production of natural gas averaged 60 billion cubic feet (Bcf) per day while consumption dropped two percent from 2009 levels to 62.6 Bcf per day. The drop in consumption can be attributed to mild weather patterns and a weak economy. Net imports of natural gas hit a 15 year low in 2010, largely because of increased production on the east coast of the US. Natural gas is available, affordable and American and unlike oil, does not have the inherent geopolitical conflicts impacting national security and food production. Natural gas is currently used for heating, cooling and electric generation. In 2009, gas made up almost 24 percent of net electric generation, up ten percent from 1996. The switch from coal to natural gas for power generation comes at a time when Federal, State and International policies to reduce greenhouse gas emissions continue to slow the expansion of coal-fired generation. The availability of a clean, cheap fuel source to produce electricity has prompted the three auto dealers to build plug-in electric vehicles that run on domestic natural gas fired electricity. Likewise, the use of natural gas as a transportation fuel either as compressed natural gas (CNG) or liquefied natural gas (LNG) is becoming increasingly popular. Worldwide there were 11.4 million natural gas vehicles by 2009, led by Pakistan with 2.3 million, Argentina (1.8 million), Iran (1.7 million) and Brazil (1.6 million). By comparison, there are only 110,000 natural gas vehicles in the US. Clearly, natural gas and oil are the engines that power our world, our nation and our state.

Petroleum production and distribution make up the world's largest industry, employing 1.9 million workers in the United States alone.

Historical Perspective

When New Mexico became the 47th state in the union in 1912, it was proclaimed the "Land of Enchantment" for its gorgeous mountains, expansive plains and dramatic landscapes. Little was known of the real treasure lying beneath the surface—oil and natural gas.

The vast natural resources that now bring huge economic benefits to the State of New Mexico were created hundreds of millions of years ago. Geologists estimate approximately 300 to 400 million years ago the sea covered New Mexico but withdrew during the late Paleozoic period, depositing marine plants and animals, minerals and marine sedimentary rocks. Then 175 million years ago a collision of massive tectonic plates began to force the Rocky Mountains to rise thousands of feet. Several basins with deposits of decaying organic matter were left behind and eventually became hydrocarbon source rocks.

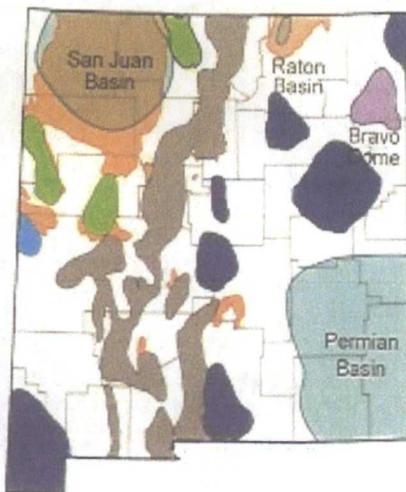
In 2009, New Mexico had more than 53,142 active oil and natural gas wells in its basins in the northwestern and southeastern sections of the state. The San Juan and Permian Basins are by far the most productive. According to the Energy Information Administration, New Mexico's oil production

is approximately three percent of the United States total production. The Permian Basin, most of which lies in West Texas, is one of the most productive areas in oil production in the United States. Similarly, New Mexico is one of the top natural gas producing states in the nation, with our production accounting for close to one-tenth of the United States total. Although production of natural gas declined in the 1980s, the rapid development of coal-bed methane in the 1990s revived the industry. Today coal bed methane, which is considered "unconventional" development, accounts for about one third of New Mexico's natural gas production. Although more than two-thirds of New Mexico's households use natural gas as their primary energy source for home heating, state natural gas consumption is low. Less than one-tenth of New Mexico's natural gas is used in the state. New Mexico delivers natural gas via pipeline to consumption markets in Arizona and to market centers in West Texas that supply the Midwest. New Mexico's Blanco Hub, located in the San Juan Basin, is a major gathering point for Rocky Mountain natural gas supplies heading to West Coast markets.

Oil & Natural Gas Production and Frontier Areas in NM

Frontier Areas:

- Chama
- Zuni
- Acoma
- Rio Grande Rift
- Dalhart
- Las Vegas
- Estancia
- Tucumcari
- Chupadera
- Tularosa/Otero
- Mesa
- Pedrogosa
- St. Johns



Existing Production Areas:

- San Juan
- Raton
- Permian
- Bravo Dome

Source: NM Bureau of Geology and Mineral Resources

Permian Basin

The Permian Basin is an ancient seabed underlying an area approximately 250 miles wide and 300 miles long that New Mexico shares with Texas.

In 1924, New Mexico hit the petroleum jackpot in the Dayton-Artesia field, about eight miles south of Artesia. Not long after its discovery, the Permian Basin quickly became one of the major oil-producing areas in the world. New Mexico's Permian Basin contains three of the 100 largest oil fields in the United States.

The Permian produces oil and natural gas from approximately 53,000 wells. According to New Mexico Oil Conservation Division, there are approximately 26,000 wells on the New Mexico side of the Permian Basin. In December 2010, there were approximately 66 drilling rigs running on the New Mexico side of the

Permian Basin. On the far western edge of the Permian Basin, there is a 760 square mile area that will provide oil and gas development revenues for New Mexico's future generations. According to a recent study completed by the New Mexico Tech Petroleum Research and Recovery Center, the development of the shale natural gas resources in this area, known as the R-111-p area, could potentially provide between \$7.5 to \$15.8 billion to New Mexico in federal royalty shares, state royalties, and various taxes during the recovery of oil and natural gas. Local taxes would provide Lee and Eddy counties a combined \$1.4 to \$3 billion during production. The most recent US Geological Survey estimated that an additional 41 trillion cubic feet (Tcf) of natural gas and 1.3 billion barrels of oil lie undiscovered in the Permian Basin.

San Juan Basin

The San Juan Basin contains one of the premier natural gas deposits in the United States, contributing more than eight percent of the nation's current natural gas supply. The first wells in the San Juan Basin were drilled in the early 1900s before commercial natural gas was discovered in the San Juan Basin in 1921, just south of Aztec, New Mexico. Natural gas flowed by pipeline to near Santa Fe and Albuquerque by 1931. Major development continued throughout the 1950s, following completion of the natural gas pipeline to California in 1951.

The San Juan Basin has produced more than 370 million barrels of oil and nearly 38 trillion cubic feet (Tcf) of natural gas from primarily five sandstone formations (Farmington,

Pictured Cliffs, Mesaverde, Gallup, and Dakota), with prolific coal bed methane production commencing in 1990 (Fruitland Coal). There are currently more than 20,000 producing wells. With reduced regulatory well spacing, the Bureau of Land Management is predicting up to 5,000 additional development wells targeting natural gas in the coming years.

For the San Juan Basin, the United States Geological Survey projects possible undiscovered resources at more than 50 Tcf of natural gas, 148 million barrels of natural gas liquids and between 7 and 35 million barrels of oil. Horizontal drilling techniques and modern completion technologies may help arrest the declining production in the basin.

Raton Basin and Bravo Dome

Long known as a coal producing region since the early 1900s, the Raton Basin, located along the New Mexico-Colorado border, began natural gas development in 1982. More than 850 producing coal bed methane wells are located at the Vermejo Park Ranch in Colfax County. These wells contribute nearly 70 million cubic feet per day to New Mexico's total natural gas production. Additional natural gas resources may be developed in the Pierre Shale formation in coming years.

Located in Union and Harding Counties, the Bravo Dome field is one of the largest CO₂ accumulations in the world. This field produces

more than 400 million cubic feet per day of commercial grade (99% pure) carbon dioxide from more than 350 producing wells. CO₂ production, from the Tubb sandstone, at depths between 1,900 and 3,000 feet, is shipped via the Kinder Morgan pipeline to West Texas, where supplies are utilized in enhanced oil recovery (EOR) projects in the Permian Basin. More than three trillion cubic feet (TCF) of carbon dioxide has been produced to date with remaining reserves estimated at 16 Tcf. Additional drilling may occur as the need for CO₂ increases.

Land Grant Permanent Fund

The Land Grant Permanent Fund (LGPF) has been in existence since 1898. It came about when the US government transferred 13.4 million acres of federal minerals and nine million surface acres to the State of New Mexico. The transferred land was put into a state trust and managed by the State Land Commissioner. They are tasked with leasing the land and the minerals and collecting royalties from the extraction of the minerals and grazing of the land. The Commissioner may also sell lands or swap with other government entities. In every instance, however, he must seek to profit from the ownership of the land. The proceeds from those leases are transferred into the LGPF.



The New Mexico Military Institute is a beneficiary of the Land Grant Permanent Fund.

Ninety-five percent of the dollars that flow into the Land Grant Permanent Fund were generated by oil and natural gas development.

The interest earnings along with royalties from oil, natural gas and minerals and the proceeds from lease sales are held in trust for the benefit of 21 public entities including public schools, universities, hospitals, capitol buildings, water reservoirs, the state penitentiary, public roads, buildings, state parks and state government. New Mexico earns interest on the fund's principal and distributes a portion of that interest every year to the beneficiaries throughout the state.

The State Land Office reports that as of September 30, 2010, the market value of the LGPF was approximately \$9,548,129,005. Approximately \$420 million flowed into the fund in fiscal year 2010, more than 95 percent of which was generated by oil and natural gas development. The total distribution to the beneficiaries in 2009 was \$566,761,018.

Severance Tax Permanent Fund

The Severance Tax Permanent Fund (STPF) is a second permanent endowment trust funded by the Oil and Gas Severance Tax. Established in 1973 by statute, and in 1976 by constitutional amendment, the STPF is an endowment trust that receives residual revenues from the Oil and Gas Severance Tax. These tax monies allow for construction of brick and mortar projects, such as public schools, state, county and municipal buildings, funded through the use and retirement of Supplemental Severance Tax Bonds.

In FY 2010, more than \$322 million in taxes will be collected for management by

the State Investment Council (SIC), allowing excess contributions to grow for future use. The value of the Fund as of September 30, 2010, was \$3,590,870,983 according to the SIC's Third Quarter 2010 Investment Performance Report. Annual collections in both the LGPF and the STPF are sensitive to the market price of oil and natural gas, while quarterly fund balances change based upon SIC investment allocations and general national economic trends. More than 99 percent of the money going into the STPF comes from oil and natural gas exploration and production.

State Revenue

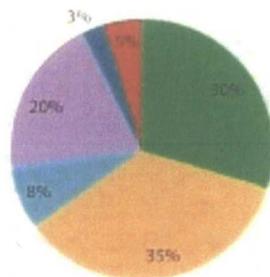
State Revenue from Oil & Natural Gas Production by Fund

	FY 2007	FY 2008	FY 2009	FY 2010*
AVERAGE PRICE OF OIL (WTI \$ per barrel)	\$ 63.36	\$ 97.03	\$ 69.70	\$ 75.17
AVERAGE PRICE OF NATURAL GAS (\$/B \$ per MCF)	\$ 5.94	\$ 6.90	\$ 4.63	\$ 3.96
State General Fund:				
Oil and Gas Emergency School Tax	\$ 426,588,546	\$ 557,668,091	\$ 370,353,954	\$ 324,543,970
Oil and Gas Conservation Tax	21,204,165	29,115,356	18,916,799	16,352,738
Natural Gas Processors Tax	35,627,328	30,617,748	40,341,003	40,436,731
Sub-total: General Fund Taxes	\$ 483,420,039	\$ 617,401,195	\$ 429,611,756	\$ 381,333,439
Federal Mineral Leasing Royalties	\$ 501,123,515	\$ 564,181,538	\$ 507,228,551	\$ 355,302,274
State Land Office Rents, Bonuses, etc.	50,409,672	46,084,845	36,442,282	67,701,590
Subtotal: Rents and Royalties	\$ 551,533,187	\$ 610,266,383	\$ 543,670,833	\$ 423,003,864
Total General Fund Revenue:	\$1,034,953,226	\$ 1,227,667,578	\$ 973,282,589	\$ 804,337,303
Other State Funds:				
Severance Tax Permanent Fund	\$ 425,403,323	\$ 567,447,973	\$ 378,141,950	\$ 390,701,713
Land Grant Permanent Fund	396,563,514	463,728,275	460,886,122	322,227,921
Subtotal: Other State Funds	\$ 821,966,837	\$ 1,031,176,248	\$ 973,282,589	\$ 712,929,634
Total State Revenue:	\$1,856,920,063	\$ 2,258,843,826	\$ 1,812,310,661	\$1,517,266,937
Local Government Revenues:				
Ad Valorem Production Tax	\$ 124,655,359	\$ 167,096,172	\$ 114,646,409	\$ 106,628,000
Production Equipment Tax	26,084,111	25,235,190	28,219,389	34,800,000
Total Local Government Revenues:	\$ 150,739,470	\$ 192,331,362	\$ 142,865,798	\$ 141,428,000
Grand Total State and Local Revenue:	\$2,007,659,533	\$ 2,451,175,188	\$ 1,955,176,459	\$1,658,694,937

Sources: NM Taxation and Revenue Department, State Land Office, UNM's Bureau of Business and Economic Research, The State of New Mexico's ONGARD Service System Website, and NM Legislative Finance Committee.

*2010 numbers are estimated values based on the NM Legislative Finance Committee and are subject to change.

State Revenue General Fund Source Comparison FY 2010*



Oil & Gas Revenue	\$ 1,428,500,000	30%
Gross Receipts Tax (including compensating tax)	\$ 1,685,300,000	35%
Personal Income Tax	\$ 956,600,000	20%
Selective Sales Tax	\$ 372,900,000	8%
Other	\$ 230,300,000	5%
Corporate Income Tax	\$ 125,100,000	3%
Total NM General Fund	\$ 4,798,700,000	

Source: NM Legislative Finance Committee. *2010 numbers are estimated values and are subject to change.

Commodity Pricing and Its Affect on State Revenue

In 2008, over \$2.4 billion was directly contributed from the oil and gas industry to our state coffers. In FY 2010, the price sensitivity analysis showed that for every \$.10 drop in natural gas, there is a \$9.2 million impact on our General Fund, a \$6.0 million impact on our Permanent Funds and a \$1.2 million impact on the local level. For every dollar the price of oil goes down, there is a \$3.9 million impact on the General Fund, a \$4.8 million impact on the state Permanent Funds and a \$0.7 million impact on the local level for a total oil impact of \$9.4 million on all funds.

The Drilling Timeline

So how did that well get there?

The main goal of any well is to ensure safe production of oil and gas, which protects groundwater by keeping hydrocarbons inside the well and isolating the productive formations from aquifers and other formations. Sound well design and drilling ensure a sealed well bore so fluids introduced at the surface or produced from the production zone will only travel inside the production casing and tubing.

Before a well can produce natural gas or oil, independent operators are hard at work on these many issues. The following is a brief overview of the processes and people involved to bring America's natural gas and oil to the surface.

Geology

In areas that have very little production, companies have 3D seismic operations performed on the surface to give them an idea of the subsurface structure. Where there has been drilling over time, like in New Mexico, geologists, using data from previously drilled wells, are able to put together structure maps giving them indications where to drill in the future. In discovered fields there are usually "pool rules" that dictate where operators need to place their wells to maximize the drainage, protect correlative rights, eliminate waste and recover the most resources.

Reservoir Engineering

Once areas have been identified as having the potential to produce oil and gas, reservoir engineers along with geologists, study the potential amount of recoverable oil and gas. They look at permitting, drilling and completion costs and stack those against the amount of oil and/or gas they think a well will produce. These factors help determine if the economics of the well will pay out. Trying to forecast the price of oil and natural gas versus the costs to get these products to market is challenging and may involve the cost of new rules or even legal challenges.

Permitting Process

Assuming that an operator has purchased or leased minerals in areas they want to drill, the next step is to acquire the appropriate surface agreements and permits. The surface owner dictates this process. In New Mexico, land not privately owned is usually controlled by State, Federal or Tribal agencies. Operators must make arrangements with the surface owner(s) and make sure they have legal access onto their property. In New Mexico the Surface Owners Protection Act (SOPA) outlines how operators must make arrangements with surface owners.

Companies must obtain a drilling permit also known as an Application Permit to Drill (APD) from the agency that oversees the minerals and/or surface. Archeologists survey the potential well location to make sure there are no cultural issues. Wildlife biologists perform field inspections to insure that any threatened or endangered species will not be impacted. If the drilling sites are on Tribal lands, even more requirements must be met. In addition, the State of New Mexico has requirements for producers to apply for pit permits that comply with Rule 17 (aka the "Pit Rule"). Add in county requirements and city special use permits and the entire process can be expensive and time consuming, often requiring over two years to obtain the APD.

Continued...

Drilling

There are several ways to drill a modern oil and gas well, but in New Mexico most wells are drilled in the same way. A drilling rig will drill holes of various sizes, reducing the hole diameter with depth, and then run casing to protect the hole. Typically, a surface hole will be drilled through the surface alluvium and deep enough to cover any fresh water aquifers. Casing, known as surface casing, will be run and then cemented in place. Once this is done, a blow-out preventer is installed to protect against any type of unexpected inflow of pressure as the well is deepened. A smaller diameter drill is run through the surface casing and utilized to drill to a deeper depth. Depending upon the formations that are penetrated, this phase can be either the intermediate hole or the production hole. Again, casing is run to protect the newly drilled open hole and cemented into place. If the well is planned to produce deeper zones, this phase is known as intermediate casing. A smaller diameter drill is run through the intermediate casing, and the well is deepened to the zone of interest. There are many sophisticated geophysical tools that can be run in conjunction with the drilling string, or on a separate wire line logging unit. This information helps the producers analyze the formation for reservoir and other geophysical properties. A final string of casing, called production casing, is run through the productive zone and cemented in place. Finally, the pipe used to drill the well is removed, a wellhead is put in place and the drilling rig is moved off the location.

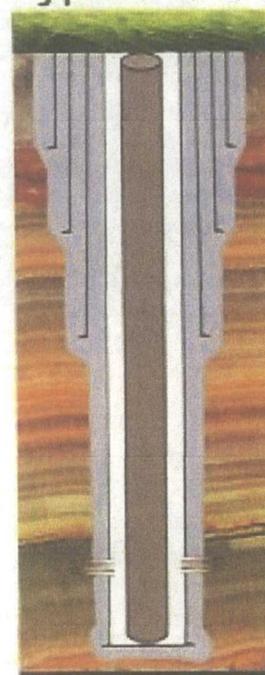
Completion

Most completions utilize a smaller rig known as a completion unit, daylight rig or pulling unit. These rigs are used to complete the well bore and prepare the well for production. During this phase, the production casing is perforated with high explosive shape charges in the productive zone and typically stimulated by a hydraulic fracturing job. Once the well is cleaned out, the rig runs smaller diameter pipe known as tubing, inside the casing. This allows the oil and gas to safely reach the surface. Many engineering and safety factors dictate the specifics of well construction. Sometimes down hole pumps and sucker rods will be run inside the production tubing to assist in "lifting" the oil, natural gas and water to the surface.

Plug and Abandon, Reclamation

After a well has reached its economic life, it will be scheduled for plug and abandon (P&A). The type of well and its original construction determines how the well is plugged. Typically, cement is pumped into the existing perforations and a series of cement plugs are placed throughout the well bore to insure surface formations are protected from the producing zones. The production tubing and any related downhole equipment are removed along with any remaining surface equipment. The wellhead is cut off and replaced with a marker, typically a short piece of pipe, cemented on top of the old well bore. The surface area is re-contoured to its original state and re-seeded with a mixture of native and natural vegetation. After several years, the location has time to rehabilitate and the only thing visible is the P&A marker denoting the location of the well bore.

Typical Well Bore



Conductor casings are cemented to prevent drilling fluids circulating outside the casing, causing surface erosion.

Surface casings are cemented to prevent hydrocarbons encroaching into fresh water zones, to anchor blow-out preventers and to support deeper casing strings.

Intermediate casing strings are recemented to isolate formations which might break down and cause a loss of circulation in the well.

Production casings are cemented to stop oil migrating to thief zones and to prevent the sloughing of formations causing a drop in productivity.

Advances in Energy Technology

New Mexico oil and natural gas producers are continually developing and implementing advanced technologies that improve both efficiency and environmental safety. Their record for the safe and clean production of energy is excellent, and the

industry strives to maintain this standard. Strict federal, state and local environmental regulations require producers to protect the environment from groundwater contamination, minimize air pollution and unnecessary surface damages.

Directional Drilling

Directional drilling allows producers to effectively turn a drill bit to drill parallel to the ground, which may result in more than one well from one location, thus disturbing less surface area. Directional or "horizontal" drilling protects environmentally sensitive areas and makes drilling more feasible in areas with multiple-use regulations.

Directional drilling has its limits, however. Even with the new directional drilling technology that has minimal surface impact,

it may not always prove to be less intrusive. A drill can deviate from vertical only so far, and it often requires more time for construction and drilling and longer-term maintenance. Additional equipment may be required to complete the task. The cost of drilling a directional well is often considerably more expensive and presents additional risks. Therefore, use of this technology is only suitable and economically viable in a limited number of cases.

Hydraulic Fracturing

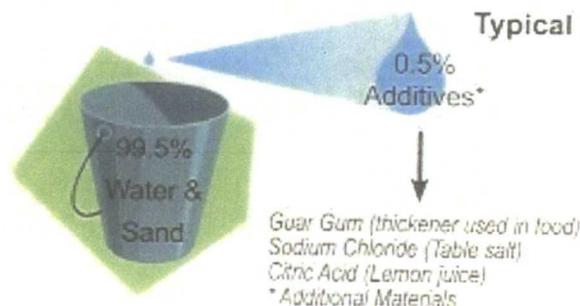
Hydraulic fracturing, also known as "fracing," is the process in which fluid is injected into a well bore at high pressures in order to either widen and deepen existing cracks or create new fractures in productive formations that contain oil and natural gas.

Hydraulic fracturing is applied to the majority of America's oil and natural gas wells to enhance well performance, minimize drilling and recover otherwise inaccessible resources. In fact, roughly 90 percent of the wells in operation today have been fractured, and the process continues to be applied in new and innovative ways to boost production of American energy in unconventional formations, such as "tight" gas sands, shale deposits and coal beds.

Types of fluid used for fracing depend upon the rock type, depth or other factors such as well bore design. Typically the

fluids used are water based and contain "proppant," which is commonly sand of various sizes. The proppant is carried into the productive formation where it remains in the newly created fracture keeping it open and allowing the oil or natural gas to flow. In general, nearly 99.5 percent of the materials used in any given frac job are water and sand. The remaining 0.5 percent is made up of chemicals that enhance the viscosity or thickness of the fluid, which helps carry the proppant.

The use of hydraulic fracturing has been estimated to contribute to 30 percent of recoverable hydrocarbon reserves in the United States. Fracing is believed to provide an additional 5,600 trillion cubic feet of natural gas and seven billion barrels of oil that would not be recoverable without this process.



99.5%

of fracturing fluids are comprised of fresh-water and sand. Compounds are injected into deep shale gas formations and are typically confined by many thousands of feet of rock layers.

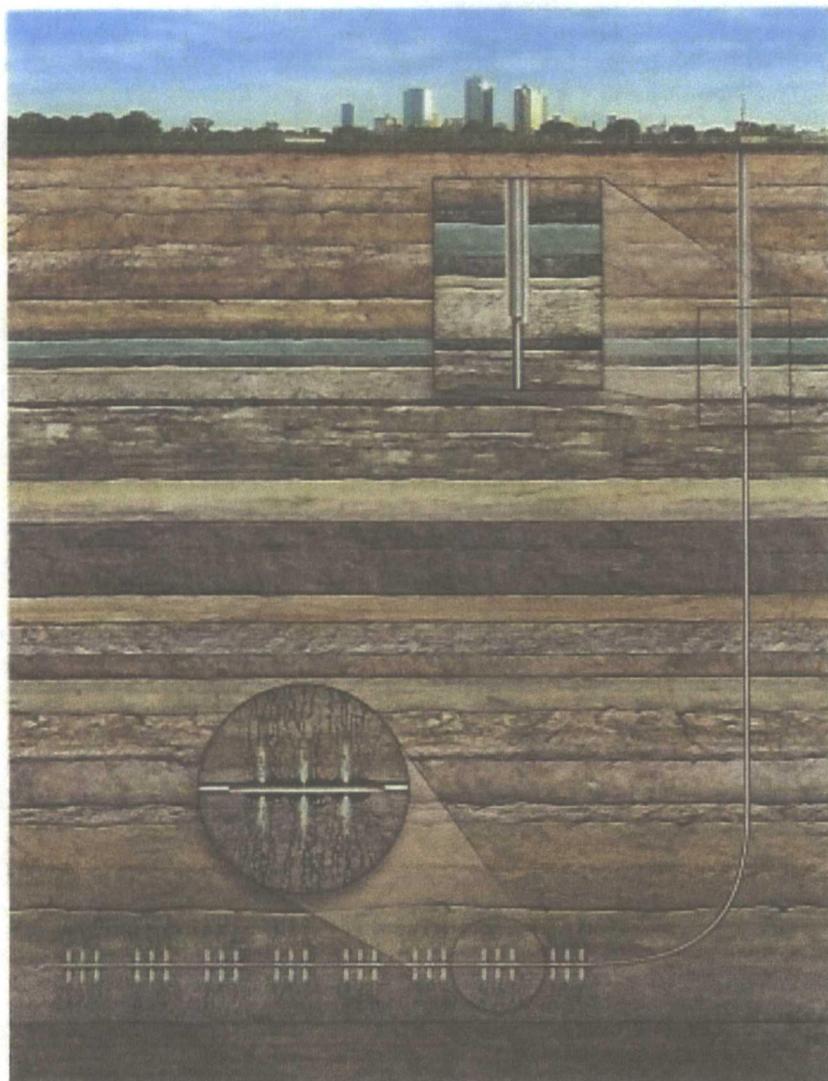
Source: DOE, EnergyInDepth

Shale Play

Combining horizontal drilling techniques and hydraulic fracturing technologies in several spots along the well bore, oil and gas companies have figured out how to unlock an entirely new source of natural gas. Certain types of tight, or difficult to drill, formations are now accessible and have proven to be quite abundant in natural gas, as well as profitable. The prolific nature of these new shale plays, also known as "unconventional" reserves, have significantly changed the United States and the entire world-wide gas market.

By drilling horizontally through thick and continuous shale formations, sometimes as much as five or six thousand feet, companies are able to perform multiple frac jobs in the horizontal productive zone, all in the same well bore. This well design is able to access a tremendous amount of what was once unrecoverable oil and gas in a manner that traditional vertical wells have never been able to do.

Recent estimates suggest that the US currently has almost 1,750 trillion cubic feet (Tcf) of technically recoverable natural gas, including over 200 Tcf of proven reserves. Technically recoverable unconventional gas, a category which includes gas derived from shale, accounts for approximately 60 percent of the onshore recoverable resources. At US annual production rates for 2007, about 19.3 Tcf, the current recoverable resource estimate provides enough natural gas to supply the US for the next 90 years. Separate estimates of the shale gas resource extend this supply to 116 years.



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Clean Natural Gas Powered Vehicles-- A Win for New Mexico

An exciting prospect for New Mexico in the next decade is the development of a new market for natural gas vehicles. New Mexico is rich in natural resources, including oil, gas, wind and solar sources. Natural gas is abundant in New Mexico. The San Juan Basin has one of the largest fields of proven natural gas reserves in the United States. Our state economy is highly dependent on natural gas. The estimated state and local revenues for FY 2011 are expected to be about \$821 million. For every 10 cent drop in price per million cubic foot (mcf) of natural gas produced in New Mexico, State Permanent Funds, Local Advalorem Revenues and the State's General Fund lose about \$16.4 million, demonstrating the importance of a healthy natural gas industry. But, according to a recent New Mexico Taxation and Revenue Department report, the trends for New Mexico natural gas volumes are falling. New Mexico gas rig counts are down by more than 60 percent since November 2008. By comparison, national rig counts have fallen by only 35 percent during the same period of a drop in the price of natural gas. This comparison means that New Mexico's share of the national market is falling.

Selling more natural gas will help New Mexico's bottom line, help the environment and will help protect our national security. Natural gas vehicles (NGVs) are the greenest cars in the United States and Europe. The Honda Civic GX has a 240-mile range



and gets 30 miles to the gallon. NGVs have 25 percent cleaner CO₂ emissions than gasoline and emit 100 percent less mercury and sulfur dioxide than the average gasoline powered car. Our demand for gasoline is increasing. In 1970 we imported 28 percent of the transportation fuels we consumed in the United States. Today, we import over 65 percent of our oil, which gets refined into

gasoline, jet fuels and petroleum products. The average American household consumes more than 1,000 gallons of gasoline annually. The Energy Information Administration (EIA) forecasts oil use to increase 44 percent in the United States (93 percent of which is caused by transportation) and 57 percent worldwide between 2000 and 2025. Developing a natural gas market for transportation will help our country reduce its dependence on foreign oil, a national priority for President Obama and Congress.

The natural gas industry is working with the state of New Mexico to support the development of a natural gas vehicles program. There have been several pieces of legislation carried by prominent representatives to give natural gas vehicle owners tax incentives. The new Governor has given her support to developing a market for natural gas, and private companies are forming coalitions to build fueling stations along the major interstate highways. Several municipalities are running their fleets on natural gas. Transit buses now account for about 66 percent of all natural gas vehicle use. Waste collection and transfer vehicles, which account for about 11 percent of total natural gas vehicular use, are the fastest growing NGV segment.

Natural gas is affordable, abundant and American, mostly from New Mexico. Creating a market for natural gas will help our economy, our environment and our national security. A win - win.



Produced Water for Bio-algae

Meeting the world's growing energy demands requires a multitude of sources. Biofuel is a fuel derived from living matter, such as sugar cane, corn, soy and palm. According to the National Biofuels Energy Laboratory, biofuel generated from algae could be a meaningful part of the future energy solution because of its potential as an economically viable, low emissions transportation fuel.

Algae has the potential to yield greater volumes of biofuel per acre of production than other biofuel sources. Algae could yield more than 2,000 gallons of fuel per acre per year of production. This is significant considering corn, used to make ethanol, only yields 250 gallons per acre per year.

Fossil Fuels Still Rule

Using the sun as an energy source has been man's dream since the beginning of time. But today, the barriers to using renewable energy sources are more insurmountable than ever. The low cost of natural gas means that a proven energy source is more affordable than ever and the tax subsidies for renewable projects are uneconomic. In a state like New Mexico that is dependent on natural gas development, low gas prices also mean that when production levels are down, the excess funding for renewable energy credits are unavailable.

We remain reliant on fossil fuels because they are available, affordable, reliable and American. In order for a renewable energy source to gain the elevated status achieved by fossil fuels, it must be readily available. Fossil fuels are self-contained energy units, that once taken out of the ground, can easily be turned into energy. They are easily and safely transported and can be used whenever and wherever needed. By contrast, renewable sources require building huge infrastructure and transmission lines that permanently scar the landscape.

Renewable energy sources also have to be consistent, captured and protect the environment. Wind cannot be pumped out of the ground and refined into an energy source. A windmill must be built to harness its power, and if the wind does not blow or if it blows too hard, without natural gas to provide a consistent base-load capacity, there is no energy. Sun-

Algae's potential partnership with existing oil and gas operations offers many potential benefits. Produced water, or brackish waste water drawn up during the drilling process, can be used as the water source for the ponds the algae needs to grow. In addition to cost reductions for both algae and oil production, using a waste product from the oil and gas industry saves the use of valuable surface waters.

While still in its infancy, growing algae with produced water to produce biofuels appears to have enough positive benefits that it may eventually become another component of the very important energy industry in New Mexico.

shine can't be poured into a gas tank to fuel your car; it has to be captured by a photo voltaic cell, which has extremely limited battery capacity.

The alternative fuel source must protect the environment. Building massive structures to capture and transport the energy (wind turbines, solar panels, dams, etc.) substantially impacts the land, views, noise and multiple use requirements that the fossil fuel industry works with every day. Imagine how wildlife and domesticated animals could survive if solar panels covered their grazing fields? How would an array of wind towers that are 420 feet high impact the visual landscape or even military maneuvers for low-flying aircraft? How will those large turbines impact flying raptors? These are only a few factors that make renewable energy less efficient than fossil fuels.

Energy generation outside of fossil fuels and nuclear power is extremely expensive, requiring construction of transmission infrastructure with fields of towers or panels. These alternative energy sources are unreliable and not affordable. The world will continue to consume oil, natural gas and other fossil fuels in massive quantities daily. Technological progress has enabled the industry to continue to find more petroleum to extract more per well and to use oil and natural gas in innumerable ways. Fossil fuels will continue to be the fuel source of choice for years to come.

"Fossil fuels are available, affordable, reliable and American!"

Drilling, Workover & Production Pits-- The Pit Rule

The "Pit Rule," or NMOCD Rule 17, has been in effect since June 2008 with minor modifications most recently approved in June 2009. The rule has been discussed in the papers and has become a political hot potato. There are many questions regarding the NMOCD's motivation and the underlying reasons for this rule. There have been allegations of hundreds of contamination sites, political insiders getting financial benefits from the rule, and claims that industry is pulling operating budgets and moving to surrounding states. Recent regulatory policies in New Mexico, coupled with the drop in commodity prices, have significantly weakened the levels of drilling which considerably impact state revenues.

The Pit Rule requires significant changes in operations for oil and gas producers. Operators are now required to obtain a "pit permit." Most pit applications require more than 26 pages of documentation to obtain approval under Rule 17. In the past, earthen pits were used for the temporary storage of "drill cuttings" but now would only be allowed under very limited circumstances. In the case where an operator is allowed to construct a reserve pit, the contents, depending upon soil sampling, would need to be hauled off to a centralized disposal facility rather than reclaimed on site. In cases where reserve pits are not allowed, operators must utilize "closed loop" systems. Typically these are steel storage tanks with a series of elaborate equipment installed to separate the cuttings from the drilling mud. While not new, these systems are expensive to build or obtain. In many areas, industry drilling costs have increased by more than \$200,000 per individual well in order to comply with this rule. These rules do not exist in other oil and gas producing states, which puts independent operators at an economic disadvantage when competing for limited equipment or trying to attract investors. In Colorado drill cuttings are often sold to the transportation department as building material for roads. In Texas, the cuttings are also left in unlined earthen pits and buried on location. Both Colorado and Texas share basins with New Mexico and therefore are direct competitors for the drilling business that is so necessary for our state.

The New Mexico Oil and Gas Division (NMOCD) routinely contends in the media that the Pit Rule was created to prevent ground water contamination, and boasts, "that there has not been a single case of ground water contamination since the passage of the rule." The sad truth is that there was not a single case of ground water contamination due to a drilling reserve pit before the rule went into effect. In reality, Rule 17 applies to four different types of pits utilized in the oil and gas industry: Permanent Evaporative Pits and Production Pits used for long periods of time (years), and Emergency Pits and Drilling/Workover Pits used for short periods of time (days, weeks). When regulators, legislators, or lay personnel discuss "pits," it is important to accurately reflect the different pit type, pit usage, and pit duration.

At the Oil and Gas Commission hearing for the Pit Rule, the NMOCD presented ten cases of suspected contamination--out of the 80,000 wells drilled in New Mexico. Of those ten cases, not one has been proven to show any contamination. Finally, the NMOCD's claim that without the Pit Rule the industry would be unregulated ignores the mountain of collaborative work done under the previous NMOCD Director that was supported by both the industry and the environmental community which resulted in the creation of Rule 50 in 2005.

The Independent Petroleum Association of New Mexico (IPANM), along with other oil and gas industry associations and companies, is appealing the Pit Rule on the grounds that the NMOCD lacks the authority to regulate ground water issues and did not perform any economic analysis including how the rule would affect small businesses, in particular independent oil and gas operators. As New Mexico moves into the future with a new Administration, IPANM will be working on policies, regulations and legislation that bring a balanced science based approach to drilling and operating oil and gas wells in our state.

The Greenhouse Gas Issue--a Primer

During the waning days of the Richardson Administration, the New Mexico Environment Department passed three regulations that seek to create a cap and trade greenhouse gas (GHG) program in New Mexico. The first rule would create the cap and trade program in partnership with California. GHG emitters in the oil and gas and electricity sectors would be required to reduce emissions by 16 percent from 2010 levels by 2020. Emitters unable to reduce to the prescribed levels would need to purchase market based offsets, credits and allowances. The second rule would require costly monitoring and reporting of GHG levels emitted by oil and gas operators. The third rule is a stop gap rule requested by the environmental community that would only impact New Mexico oil and gas and electricity generators and would tax or fine operators for not meeting a 24 percent reduction level from 2010 levels by 2020. Opposition by the Independent Petroleum Association of New Mexico (IPANM) and several electric generators, including Public Service Company of New Mexico, was based on the lack of established science, and any reductions or even elimination of New Mexico's GHGs would have no impact on global emissions levels.

The greenhouse gas issue is a complex subject that has been in the national spotlight for several years. The proponents of the Climate Change theory claim there has been a marked increase in the levels of GHGs in the atmosphere since the Industrial Revolution. The opponents to the climate change debate say that although there might be a warming trend in the atmosphere of one degree Celsius, the warming is naturally occurring and can't be correlated to anthropogenic, or human caused, sources. They claim a slight warming will aid in food growth and have positive health effects as demonstrated by the increases in international food production and life expectancy over the past century. The only certainty is, because of the complexity of the climate, the debate will rage on for the foreseeable future.

In late 2009, there was an attempt by newly elected President Obama to sign the Copenhagen Accord and eventually seek a global treaty to reduce emissions levels to below 350 ppb. But the United States didn't sign the document because there wasn't a commitment by China and India, the two fastest growing economies in the world, to reduce their emissions at a rate demanded of the industrialized countries. Additionally, African nations, who are becoming larger energy users, demanded the US decrease emissions at a rate greater than other nations. The issue of wealth distribution was

hotly debated during the Copenhagen Accord meetings, which ultimately failed to gain support from most industrialized countries.

On the national stage, the climate change issue came to a head with the passage of the CLEAR Act, sponsored by Representatives Waxman and Markey. The bill, which passed the US House but failed to pass the Senate, would have created a national cap and trade system requiring GHG emitters to reduce emissions to set levels or, alternatively, purchase allowances, offsets and credits as needed. All the economic analysis of the CLEAR Act indicated that the program would have created another tax on the energy industry and would have been the most costly regulation in the history of our nation. Even though Congress failed to act, the EPA is moving forward requiring the fossil fuel industry to monitor and report GHG emissions. While the EPA doesn't have the statutory authority to create a market trading system like a cap and trade program, according to a recent US Supreme Court decision, the EPA does have the authority to monitor air contaminants, including GHGs.

In New Mexico, by a 2006 Executive Order from former Governor Richardson, the state joined the Western Climate Initiative (WCI) with seven other western states and committed New Mexico to reduce GHG emissions by 20 percent by 2020 and 50 percent by 2050. In December 2010, the New Mexico Environmental Improvement Board finalized three GHG regulations as noted above.

At the subsequent GHG hearings there was extensive testimony and evidence that the proposed programs would have a direct cost of \$1.3 billion to the businesses of New Mexico. However, the Department insisted this rule had to be passed for three reasons: (1) New Mexico had to be a leader--the economic sacrifice was needed to get the rest of the United States and world to realize that the GHG issue is important; (2) that our miniscule emissions had to be reduced to possibly avoid cataclysmic disaster; (3) a reduction of GHGs in the state would have positive impacts if complementary policies, such as clean cars, energy efficiency and obesity reductions were implemented along with this regulation.

At this time, industry advocates including IPANM along with the utility industry are appealing all three GHG regulations and working diligently with the new Administration and Legislature to implement policies that support our economy, promote development and are protective of our environment.

Species Protection

New Mexico is a land with a diverse and sometimes exotic landscape that has resulted in the development of several unique species of animals, plants and birds. As an industry that works on the land, our workers interact with wildlife every day. We, like the agricultural industry, are vested with the responsibility of caring for the land and every species that depends on that land.

In southeast New Mexico, the lesser prairie chicken and the sand dune lizard have both found an existence in the oil patch of the Permian Basin. Oil and gas operations work around these animals and their habitat to every extent possible, even moving locations and drill sites when feasible to avoid disturbing these animals. Although both animals are threatened species under the Endangered Species Act, in New Mexico there has been a resurgence of both populations to such an extent that the local BLM and US Fish and Wildlife Service are resisting environmental suits seeking to list

the species as endangered. Many oil and gas operators have signed voluntary contracts with the federal and state agencies promising to protect the chicken and lizard habitats and complete conservation and restoration projects whenever possible.

In the San Juan Basin, the restrictions on operations are more extensive than in the southeastern part of the state. According to the Western Energy Alliance, operators have limited drilling schedules (known as timing restrictions) for big game winter range restrictions, sage grouse lekking and nesting, mountain plover breeding and nesting, archeological limitations, weather restrictions and prairie dog avoidance. These timing limitations because of wildlife management concerns, can make the drilling process for oil and gas operators difficult. In many cases, there can be several overlapping species restrictions on one location that will result in significantly narrowing the window for operations.

Wildlife in the Oil Field

One of the most unique aspects of the Land of Enchantment is the abundant wildlife found throughout the state—from antelope and javelinas in the south to trophy mule deer and elk in the north. Many different species of fish and waterfowl are found in the various pristine waterways throughout New Mexico including the San Juan River, a world class trout fishery.

While seeking the treasures of natural gas and oil located beneath the surface, great care is taken to protect the wildlife and their habitat on the surface. Because oil and gas operations are often located in many of the same places that wildlife call home, the individuals working in the field

often witness amazing scenes of various wildlife in and around well sites.

Most companies have stories and pictures of many of these encounters. The photo on this page is an example of one of those encounters.

So common are these interactions with wildlife that the Independent Petroleum Association of New Mexico (IPANM) created a contest for oil field workers and others to win cash prizes for the best photo or video demonstrating wildlife coexisting in the oil field.

For more information on IPANM's "Wildlife in the Oil Field" contest go to our website www.ipanm.org.



2010 "Wildlife in the Oil field" Photo Contest 1st Place Winner
"Springtime Bucks" by Bill Royce, Farmington, NM

Restore New Mexico

Thanks to a program created by the Bureau of Land Management (BLM), more than one million acres of degraded New Mexico landscapes are being restored.

In 2005, the BLM launched an aggressive program, Restore New Mexico. The program is dedicated to restoring our state's grasslands, woodlands and riparian areas to a healthy and productive condition. The focus is on large-scale restoration efforts on federal, state and private lands.

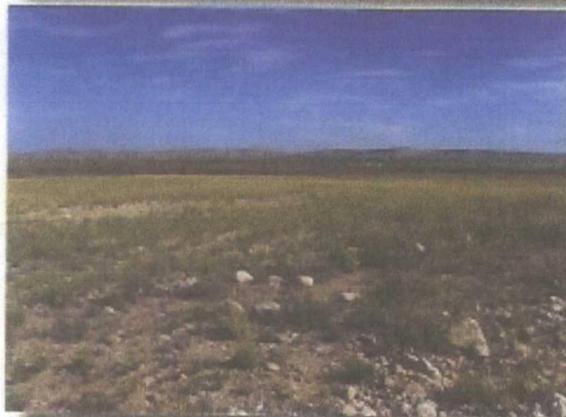
The program is a success restoring over one million acres to date, but millions are still in need.

The historic overuse of the land has changed some of New Mexico's most beautiful landscapes into virtual wastelands. These transformations have altered the land's biological productivity, resulting in degraded water quality, reduced wildlife count and decreased supplies of groundwater.

This New Mexico partnership includes state and other federal agencies, New Mexico ranchers and landowners, conservation groups, oil and natural gas companies and local governments. These partners are essential to the success of the program, providing over \$10 million to help restore public lands from these legacy issues.



A wild turkey is being transplanted to a more suitable habitat.

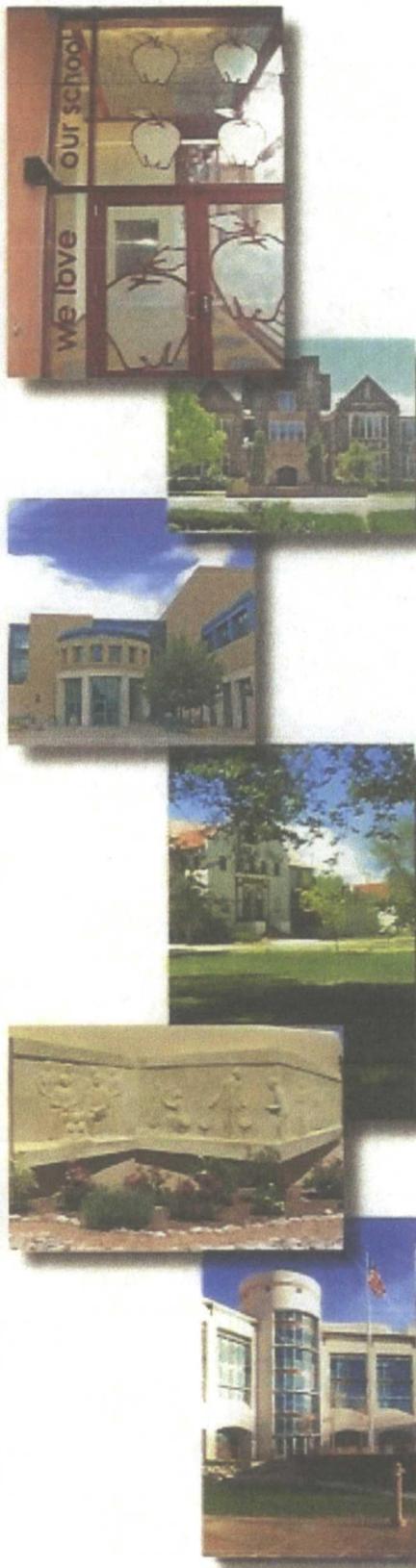


As seen in the above before and after photos, historical oil and natural gas well sites are being restored to their natural state.

Restore New Mexico and its partners are aggressively targeting invasive and exotic brush species. Creosote and mesquite deserts are being replaced with healthy grasslands to sustain larger wildlife populations. Salt cedar is being removed from streams to restore cottonwood willow forests, restoring habitats for fish and other species. Overgrown woodlands are transforming into grasslands that provide grazing areas for mule deer and elk. Surface disturbance from historic oil and gas sites, during a time when there weren't requirements for surface reclamation, are being restored to habitats to benefit prairie chickens, sand dune lizards and other grassland-dependent species.

Thanks to Restore New Mexico and its partners, all this is changing. Taken from the Restore New Mexico website, "Restore New Mexico is much greater than the sum of its parts. It's taking a vision and making it happen on the ground to restore the landscapes that lift our spirits and define our character."

Beneficiaries of the Land Grant Permanent Fund

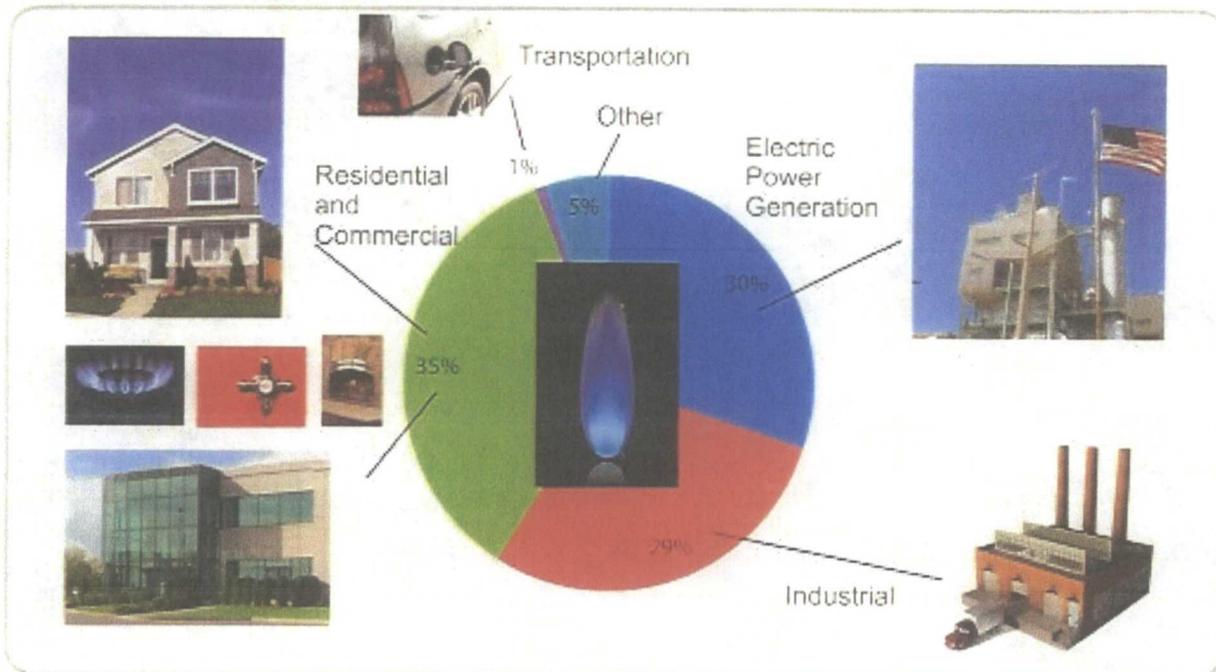


<u>Educational Beneficiaries of the LGPF</u>	<u>Total Amount Distributed in FY 2009</u>
NM Public Schools	\$ 469,939,556
University of New Mexico	\$ 9,779,535
NM State University	\$ 2,946,439
Western NM University	\$ 268,036
Eastern NM University	\$ 682,436
NM Highlands University	\$ 267,327
Northern NM College	\$ 204,250
NM Institute of Mining and Technology	\$ 1,282,183
NM Military Institute	\$ 18,811,656
NM School for the Deaf	\$ 11,009,507
NM School for the Blind	\$ 11,042,990
Other*	<u>\$ 40,527,103</u>
Total	<u>\$ 566,761,018</u>

*In addition to the above educational institutions, the Land Grant Permanent Fund also distributed \$40,527,103 to various hospitals, penitentiaries, public buildings and water resources in FY 2009.

Source: NM State Land Office 2009 Annual Report

What are the Uses of Natural Gas?



Source: Energy Information Administration

Agriculture

Oil and natural gas play a large role in creating the abundant variety of food products available to the public. Petroleum is used in the planting, cultivation and transportation of our food. Pest free plants require fertilizers and pesticides made from oil and natural gas. Gasoline and diesel fuels run the machines that annually plant, cultivate and harvest crops. Electric refrigeration, fueled by petroleum, preserves our vegetables and meats for enjoyment year round. Retailers and consumers rely daily upon low cost plastic storage containers for food safety and convenience.

The trucks, trains, planes, ships and barges that transport the food from the processing plants and warehouses then to grocery stores, are fueled with oil. In colonial days, nine out of ten working people were employed on farms. By the early 1900s tractors became available leading to major labor saving advances. Today, three percent of our labor force supplies all the food we need in the United States, allowing for the export of food to supply an additional ten percent of the world population. In 1939 the average yield per acre of corn in the United States was 20 bushels; in 2009 the corn yield was 165 bushels per acre. Soybean

yields have improved from 13 bushels per acre in 1930 to 44 bushels per acre in 2009. Low cost ammonia fertilizer, produced from abundant natural gas, has made these incredible agricultural yields possible, which has lowered every American's grocery bill. According to a report by the Congressional Research Service, "Unexpected changes in energy prices or availability can substantially alter farm net revenues, particularly for major field crop production." It is imperative that we keep energy costs low, not only to reduce food prices, but also to ensure a healthy agricultural community and protect farm jobs.

Imagine how difficult it would be to provide an adequate food supply if there was no oil and farmers had to work their fields with horses and oxen instead of modern labor-saving machines, efficient seed and fertilizers. The oil and gas industry, through its ability to help improve agricultural technologies and productive yields, has allowed farmers to provide an abundant variety of food products to people all over the world. Oil and natural gas resources are required at nearly every step of world food production. Without petroleum, it would be difficult, if not impossible, to provide fresh and reasonably priced foods to your local grocery store.

Oil & Gas Day at the Capitol

Every other year, the Independent Petroleum Association (IPANM) organizes "Oil & Gas Day at the Capitol" in celebration of our industry and in honor of the children of New Mexico. The goal of the event is to showcase for the public, legislators and the media the positive impacts our industry brings to our state and to the major educational institutions in New Mexico. Several months before the event, college students are selected from an essay contest to become a "Young Ambassador" and earn the opportunity to be a "junior lobbyist" on Oil and Gas Day. The students are invited to the Capitol to meet with industry and political leaders and are encouraged to testify on energy legislation. The Oil and Gas Day events include a press conference with state and industry leaders, a speech by the winner of the essay contest and exhibits by organizations positively impacted by the oil and natural gas industry. The day is capped off with a reception in honor of our Governor and Legislators.



2009 Young Ambassador Cody Whitfield speaks to New Mexico Legislators.

Education for Careers in Energy

Providing a strong work-force to the oil and gas industry in northwest New Mexico, the San Juan College School of Energy offers an excellent two year training program to students in the most current industry-required technologies. The goal of the program is to provide individuals with hands on opportunities to learn skills that will support them at both an entry level and advanced positions in the energy industry. The school consistently revises and improves programs and class offerings to meet both industry and student

needs. Students are finding success and stable careers through programs offered at the college.

For students interested in four year engineering programs, New Mexico Institute of Mining and Technology offers a world class education in Socorro, New Mexico. Tech also supports the Petroleum Research Recovery Center and the Petroleum Technology Transfer Center which have produced world class software and mapping in collaboration with industry.



Students at San Juan College's School of Energy receive hands-on training.

Energy Week

Once a year, every 8th grader in the Farmington area has the opportunity to attend Energy Week. The Farmington Museum, in conjunction with local oil and gas companies, hosts the event at the museum's "Dinosaurs to Drill Bits" exhibit. Students learn how oil and natural gas have been formed over millions of years to become the main energy source that fuels our modern world.

They learn how raw oil and gas products are refined so they can run their furnaces, the gasoline in the cars they can't wait to drive and the lipstick and hair gel that makes them look so cool! In addition,

students get to try on safety gear, see some real world demonstrations of how compressors, separators and pumps work and try their hand at driving San Juan College's truck simulator.

The goal of the program is to tie the day in with the science curriculum in the schools, and show the students how science is being applied in their own backyards. In reviewing past programs, middle school teachers have rated Energy Week as one of the highlights of their "science curriculum," and a number of students have expressed interest in a career in the oil and gas industry.



T. Greg Merrion, former Independent Petroleum Association of New Mexico President, conducts classroom learning at Energy Week.

NEED--National Energy Education Development

In 1980 the NEED (National Energy Education Development) Project began as a one-day event celebrating energy education. Thirty years later, it continues to make an impact on the energy knowledge of students, teachers and the public. The Independent Petroleum Association of New Mexico (IPANM) has had a strong working and funding relationship with NEED since 1997. NEED works with teachers, students, government and community leaders to design multi-faceted energy education programs for every classroom in the nation. With industry support in New Mexico, NEED is continuing to make a strong impact on the energy education of middle school students, teachers and the public. NEED has had several interactive and exciting exhibits at IPANM's Oil and Gas Day at the Capitol, including a student powered light-bulb.



Roswell teachers receive training on an enhanced oil recovery activity using carbon capture.

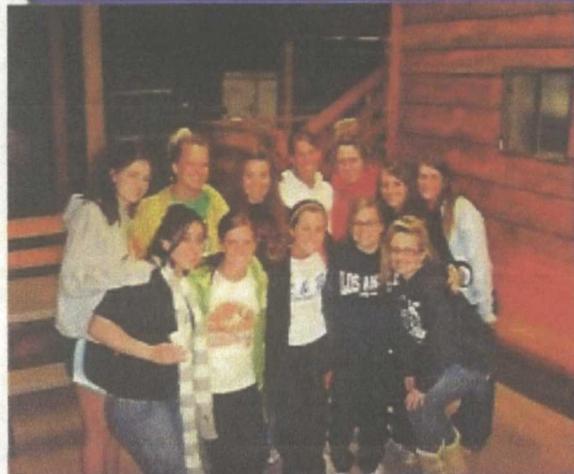
Mack Energy Foundation

Mack C. Chase formed Mack Energy Corporation, an oil and gas production operating company, in 1992. Beginning in 2000, Mack established an Artesia High School (AHS) athletic scholarship by personally selecting a male and female AHS athlete based on academics and athletics. He gave each of them a four year scholarship to a higher education institution.

In late 2006, Mack and his wife, Marilyn, formed the Chase Foundation to help serve the community of Artesia and nonprofit organizations throughout Southeastern New Mexico. Beginning in 2007, Mack and Marilyn and members of the Chase family began a scholarship program for Artesia High School students pledging \$1.3 million dollars over a four year period to help students get a college degree. Over the next three years the family pledged an additional \$5.3 million dollars in scholarship funds for the AHS Class of 2008, 2009 and 2010.

The Chase family recognizes the importance of education to our youth and provides opportunities to improve the quality of life for future generations. Through this recognition Mack's

"Mack's goal through the Scholarship Program is to have all Artesia High School students graduate from college and become future leaders."



New Mexico's Future!



goal is to award between 110 and 125 scholarships each year to Artesia High School Students, giving them the opportunity to attend college, graduate with a degree and become the future leaders in our communities. The ongoing mission of the Chase scholarship program is to increase student graduation rates, establish partnership programs with higher educational institutions and provide families with affordable college opportunities for their children.

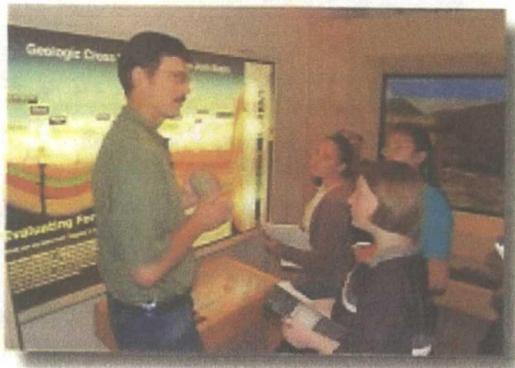
The Chase family is resolved in their desire to see youth expand their educational opportunities and graduate with a college degree. The youth of Artesia are special to Mack, and he wants them to have more opportunities than he had growing up. Through the years, Mack has been recognized by many organizations for his generosity in supporting worthwhile projects, including receiving the Artesia Public Schools Lifetime Achievement award for his support and generosity to the school district. It takes caring people to make things happen and Mack C. Chase is certainly recognized as one of those caring people.

Gateway Park Farmington Museum

Community leaders and industry professionals opened the interactive "Dinosaurs to Drill Bits" exhibit at the Gateway Park Farmington Museum in 2004. Coordinated by museum personnel, exhibits were designed and donated by more than 50 service companies and producing oil and natural gas operators in the San Juan Basin. Industry support and local independent producer commitments have created this unique informational treasure. Visitors are educated about burial and geologic history of oil and natural gas formations in New Mexico, modern refining operations which create the fuels and plastics we use daily, horizontal drilling technology, and the historical development timeline of pipelines which supplied Santa Fe and Albuquerque with natural gas by 1930 and California by 1951. The Geovator simulates the drilling, hydraulic fracture and completion operations used by independent operators.

Industry funding commitments will allow the City of Farmington to build a new "Energy Wing" at the museum. The new exhibit

will include displays on electric power generation from fossil fuels and comparisons with renewable energy resources. The exhibits will be transportable, allowing for direct use in area classrooms. Through the "Dinosaurs to Drill Bits" exhibit, New Mexico independent producers can demonstrate their commitment to environmental stewardship, while celebrating the important development of our natural resources.



Museum visitors tour the "Dinosaur to Drill Bits" Exhibit

Western Heritage Museum

The Western Heritage Museum Complex in Hobbs, New Mexico, "where oil, water and cowboys mix," is a strong partner with the oil and gas industry in southeast New Mexico. The Museum devotes approximately one third of its exhibit space to the history of the oil and gas industry in the Permian Basin, and frequently rotates its exhibits to highlight all aspects of the industry. The museum's most recent exhibit displays historic stock certificates from the collection of Heinrich Wenning of Cedar Crest, New Mexico. In December 2010, the museum displayed lanterns to educate kids on the history of energy sources to light the way. Because of the generous support of a local independent producer, a 1930s derrick and pumping jack have recently been relocated to the front of the museum. Several oil and gas producers located in southeast New Mexico are participating in an upcoming remodeling project of the South Gallery at the Heritage Museum. The updated exhibits will include the development of modules that will tell the story of the search for, discovery of and production of oil and gas in New

Mexico. Future plans include recreating an authentic cable tool outfit and a "Shotgun House." There will also be a major exhibit on oil company camps and a family tree of past and present companies active in the region, including mergers and their current operations. According to the museum's website, "The Complex is most fortunate to have this kind of generous support as it establishes the petroleum industry as a major part of our interpretations and presentations at the Western Heritage Museum."



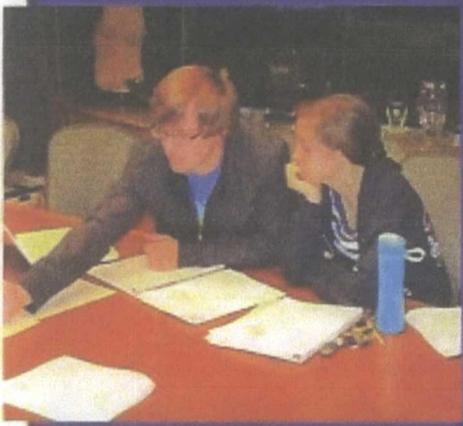
An exhibit at the Western Heritage Museum

Merrion Oil & Gas Engineering Mentorship

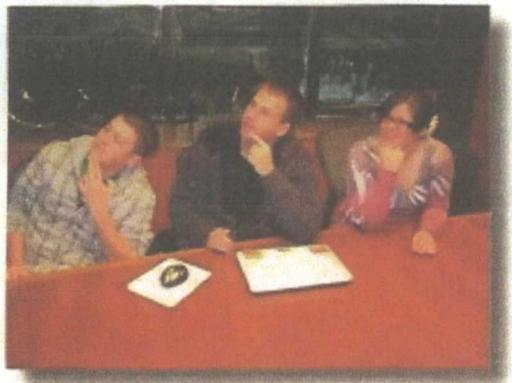
Starting in 1994 with just one student, over 200 students in the Farmington area have now completed the Merrion Oil and Gas Engineering Mentorship program in the past 16 years. A record 26 high school seniors participated in the 2010 class. Students who complete the program realize that when you stretch your mind while solving a problem, it gets your mind in shape, to help solve other unrelated problems. Therefore, even the students who do not pursue engineering in college are better off for the experience. The program is open to any interested high school senior or student at San Juan College.

The Merrion Oil & Gas Engineering Mentorship program gives students a real life immersion in engineering principals. The program links common-sense physical principals learned in the classroom to actual scenarios like forecasting the performance of an oil or gas well. Working in small teams, students analyze an actual property that is for sale in an oil and natural gas auction. The students create a spreadsheet based on their analysis of the location to build future predictions and determine an economic value for the well. The groups make formal presentations to Merrion's management and recommend a bid on the property the group studied. Based on a consensus bid price, Merrion Oil & Gas then tries to buy or

"Students who complete the program realize that when you stretch your mind while solving a problem, it gets your mind in shape, to help solve other unrelated problems."



Sharp Minds at Work!



lease the recommended property at auction. Although most of the time they have been outbid, Merrion has had a handful of successes on properties recommended by their mentees, the most notable being the purchase of a Fruitland Coal well for \$1.5 million.

While the basis of the program is petroleum engineering, the Merrion Mentorship course emphasizes broader principles that apply to disciplines beyond engineering. First and foremost, engineers apply knowledge to solve problems. Most problems are simple and common sense and do not take rocket science to figure out. Every day, engineers in the oil and gas industry must use multiple approaches to fully understand and solve a problem and to make sure the answer passes the "smell test." And finally, none of it matters if it doesn't make economic sense. The Merrion Mentorship program is a great example of how member companies of IPANM give back to the community and provide opportunities to the school children of New Mexico.

Fast Energy Facts

Production:

- Rankings (2009)
 - 6th in natural gas production (3,828 billion cubic feet per day)
 - 6th in natural gas proven reserves (15.6 trillion cubic feet)
 - 5th in oil production (167,658 barrels per day)
 - 5th in oil proven reserves (700 million barrels)
- The 50 largest operators in New Mexico produced 55.0 million barrels of oil in the year 2009, or about 150,896 barrels per day.
- The 50 largest operators in New Mexico produced 1.322 trillion cubic feet of natural gas in the year 2009, or about 3.6 billion cubic feet per day.
- There were 1,234 new well completions in 2009, more than 3 new wells per day.

Economic:

- Land Grant Permanent Fund:
 - \$9.548 billion balance as of September 30, 2010
 - FY 2009 payout to 21 public entities of \$566 million
 - Oil and natural gas make up 95% of revenue going into the fund.
- Severance Tax Permanent Fund:
 - \$3.590 billion balance as of September 30, 2010
- New Mexico receives 48% of the 12.5% Federal Mineral Royalty from oil & gas production on the Federal lands, totaling more than \$355 million in FY 2010.
- New Mexico has a 36.4 cent per gallon gasoline tax and a 43.4 cent per gallon diesel fuel tax.

Miscellaneous:

- The Oil and Gas Conservation Rule Book contains 184 sections of nearly 2,000 rules, regulations and procedures.
- The Bureau of Land Management (BLM) manages 13.4 million acres of surface and 26 million acres of sub-surface (31% of New Mexico).

- The New Mexico State Land Office manages state trust lands, including 8.8 million acres of surface and 13.4 million acres of sub-surface.
- Capacity of New Mexico's two refineries: 125,800 barrels of crude oil per day
- The basic definition of an "independent" producer is a non-integrated company which receives nearly all of its revenues from production at the wellhead. They are principally in the exploration and production segment of the industry.

Jobs:

- The industry provides more than 13,000 direct jobs with an average salary of \$64,292 compared to the state average of \$38,532 (2009)

Electricity Supply:

- 66% Coal Fired, 29% Natural Gas Fired (95% Fossil Fuel)
- 3.6% Hydro/Wind/Solar/Bio-Fuel/Geothermal

Home Heating Supply:

- 68% Natural Gas; 15% Propane/LPG (83% Direct Fossil Fuel)
- 12% Electric & 5% Other/None

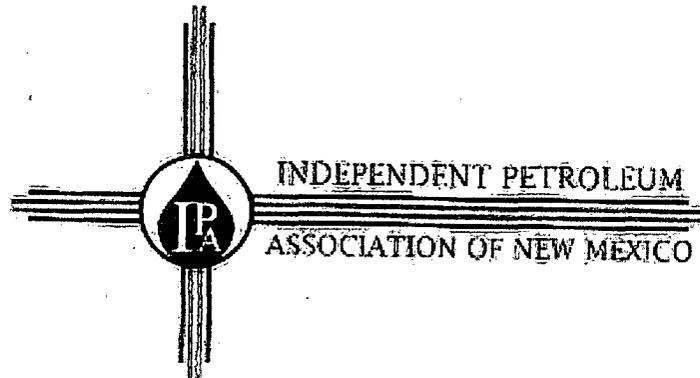
Regulatory Agencies:

- Bureau of Land Management (BLM)
- Environmental Protection Agency (EPA)
- Federal Aviation Administration (FAA)
- Department of the Interior (DOI)
- New Mexico Environmental Department (NMED)
- New Mexico Department of Game & Fish (NMDGF)
- New Mexico Oil Conservation Division (NMOCD)
- New Mexico State Land Office (NMSLO)
- State Historic Preservation Office (SHPO)
- United States Army Corps of Engineers (USACE)
- United States Department of Agriculture (USDA)
- United States Fish & Wildlife Service (USFWS)
- United States Forest Service (USFS)

Fun Facts

State Symbols:

- **State Aircraft** - New Mexico's state aircraft is the **hot air balloon**. The nine day Albuquerque International Balloon Fiesta is the largest hot air balloon festival in the world.
- **State Amphibian** - The New Mexico **spadefoot toad** (*Spea multiplicata*) is nocturnal and secretive.
- **State Bird** - The **roadrunner** has been New Mexico's state bird since 1949. It prefers running to flying and has been clocked at speeds of 15 miles per hour.
- **State Tie** - The **bolo tie** is a necktie consisting of a piece of cord or braided leather with decorative metal tips secured with an ornamental clasp or slide.
- **State Butterfly** - The **Sandia hairstreak** (*Callophrys macfarlandi*) was discovered in 1959 at La Cueva Canyon in Albuquerque.
- **State Capitol** - Called the "**Roundhouse**," the state capitol building in Santa Fe is the only round state capitol in the U.S. It was designed to resemble the Zia Sun Symbol when viewed from above.
- **State Cookie** - The **biscochito** is a small anise flavored, shortbread cookie used during special celebrations. It was handed down through the generations since it was brought over by the first Spanish colonists to New Mexico.
- **State Fish** - The **New Mexico Cutthroat Trout** is native to the cold mountain streams and lakes of northern New Mexico. Anglers like the small fish for its fighting spirit.
- The **State Flag** has a yellow field and red symbol--the colors of Spain, brought here by explorers in 1540. The ancient red sun symbol is from a Native American people called the Zia.
- **State Fossil** - The best specimens of the small **theropod dinosaur**, *Coelophysis bauri*, are found at the quarry at Ghost Ranch, near Abiquiu, New Mexico.
- **State Flower** - A member of the lily family, the **yucca** is sturdy as well as beautiful and grows as tall as a small tree.
- **State Gem** - Probably one of the oldest gemstones known, **turquoise** was designated New Mexico's state gem in 1967.
- **State Grass** - **Blue gramma grass** is valued as forage and for landscaping and erosion control. It is also used in dried flower arrangements.
- **State Insect** - The **Tarantula Hawk Wasp** has a blue-black body and bright rust-colored wings. Its sting is rated among the most painful in the insect world.
- **State Mammal** - The **Black bear** can stand and walk on its hind legs, but prefers all fours. Its shuffling gait results from their hind legs being slightly longer than the forelegs.
- **State Nickname** - The "**Land of Enchantment**" describes New Mexico's scenic beauty and its rich history. This legend was placed on New Mexico license plates in 1941. It was designated as the official State Nickname in 1999.
- **State Seal** - New Mexico's **Great Seal** has its origins in the 1851 formation of the Territory of New Mexico. The territorial seal featured an American eagle and the words, "Great Seal of the Territory NM." The motto "Crescit Eundo," or "It grows as it goes," was added in 1882, and displays on a banner below the eagle.
- **State Song** - "**O Fair New Mexico**" was officially selected in 1917. The author, Elizabeth Garrett, was the daughter of former Lincoln County Sheriff Pat Garrett, the man who killed Billy the Kid.
- **State Tree** - The **pinon** is the official State Tree. This sturdy, slow-growing little evergreen flourishes over a vast area of the state. Its tiny, tasty nuts are a treat for New Mexicans.
- **State Vegetable** - **Chile** is a unique part of the New Mexican diet. Chile is a pungent pepper that is harvested in the early fall, toasted, peeled and served as a delicious stew, stuffed with cheese or made into a favorite recipe. Chile comes in red and green, together New Mexicans call it "Christmas."



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