MAJOR OIL PLAYS IN UTAH AND VICINITY

QUARTERLY TECHNICAL PROGRESS REPORT

Reporting Period Start Date: April 1, 2006 End Date: June 30, 2006

by

Roger L. Bon and Thomas C. Chidsey, Jr., Principal Investigator Utah Geological Survey



November 2006

Contract No. DE-FC26-02NT15133

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ABSTRACT

Utah oil fields have produced over 1.2 billion barrels (191 million m³) of oil and hold 256 million barrels (40.7 million m³) of proved reserves. The 13.7 million barrels (2.2 million m³) of production in 2002 was the lowest level in over 40 years and continued the steady decline that began in the mid-1980s. However, in late 2005 production increased due to the discovery of Covenant field in the central Utah Navajo Sandstone thrust belt play. The Utah Geological Survey believes this new upward production trend can continue by providing play portfolios for the four major oil-producing provinces (Utah/Wyoming thrust belt, central Utah thrust belt - "Hingeline," Uinta Basin, and Paradox Basin) in Utah and adjacent areas in Arizona, Colorado, and Wyoming. Oil plays are geographic areas with petroleum potential caused by favorable combinations of source rock, migration paths, reservoir rock characteristics, and other factors. The play portfolios will include descriptions and maps of the major oil pipelines; identification and discussion of land-use constraints; descriptions of reservoir outcrop analogs; and summaries of the state-of-the-art drilling, completion, and secondary/tertiary recovery techniques for each play.

This report covers research activities for the sixteenth quarter of the project (April 1 through June 30, 2006). This work included (1) land classification summaries of the major oil-producing provinces, and (2) technology transfer activities.

A combination of depositional and structural events created the right conditions for oil generation and trapping in the oil plays of major oil-producing provinces. Numerous plays are found in the Utah/Wyoming thrust belt, central Utah thrust belt – Hingeline, Uinta Basin, and Paradox Basin oil-producing provinces in Utah and vicinity. Land-use constraints within the oil plays are a critical concern to current and potential operators exploring and developing petroleum resources in provinces. We have compiled locations and documented the major land and mineral ownership types in each oil-producing province; identified the federal, state, county, and other private and non-profit agencies involved in the environmental analysis, leasing, and development of oil and gas resources; and provided an overview and listing of pertinent data, documents, and research tools that might be helpful in understanding the oil and gas industry, primarily in Utah, but also in Arizona, Colorado, and Wyoming.

The major plays in the oil-producing provinces encompass nearly 15.1 million acres (6.1 million ha) and include almost all of the potential oil- and gas-bearing land in Utah. Mineral ownership and management, including leasing, is divided primarily among federal, state, and private interests. Private interests also include Native American Reservation lands and may include Native American mineral ownership outside an Indian Reservation.

We recommend additional research to summarize Wilderness Areas and Wilderness Study Areas, determine trust lands and withdrawal orders for each state, verify Military Reservation lands, and identify tribal entities and mineral acreages for each tribe.

Technology transfer activities during this quarter consisted of exhibiting a booth display of project materials at the 2006 Annual Convention and Rocky Mountain Section Meeting of the American Association of Petroleum Geologists (AAPG), technical and non-technical presentations, and publications. The project home page was updated on the Utah Geological Survey Web site.

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EXECUTIVE SUMMARY

Utah oil fields have produced over 1.2 billion barrels (191 million m³) of oil and hold 256 million barrels (40.7 million m³) of proved reserves. The 13.7 million barrels (2.2 million m³) of production in 2002 was the lowest level in over 40 years and continued the steady decline that began in the mid-1980s. However, in late 2005 production increased due to the discovery of Covenant field in the central Utah Navajo Sandstone thrust belt play. The overall objectives of this study are to (1) continue adding new discoveries, (2) increase recoverable oil from existing field reservoirs, (3) prevent premature abandonment of numerous small fields, (4) increase deliverability through identifying the latest drilling, completion, and secondary/tertiary recovery techniques, and (5) reduce development costs and risk.

To achieve these objectives, the Utah Geological Survey is producing play portfolios for the four major oil-producing provinces (Utah/Wyoming thrust belt, central Utah thrust belt -"Hingeline," Uinta Basin, and Paradox Basin) in Utah and adjacent areas in Arizona, Colorado, and Wyoming. This research is partially funded by the Preferred Upstream Management Program (PUMPII) of the U.S. Department of Energy, National Petroleum Technology Office (NPTO) in Tulsa, Oklahoma. This report covers research activities for the sixteenth quarter of the project (April 1 through June 30, 2006). This work included (1) land classification summaries of the major oil-producing provinces, and (2) technology transfer activities.

A combination of depositional and structural events created the right conditions for oil generation and trapping in the major oil-producing provinces. Oil plays are specific geographic areas having petroleum potential due to favorable source rock, migration paths, reservoir characteristics, and other factors. Numerous plays are found in the Utah/Wyoming thrust belt, central Utah thrust belt - Hingeline, Uinta Basin, and Paradox Basin oil-producing provinces of Utah and vicinity.

Land-use constraints within oil plays are a critical concern to current and potential operators exploring and developing petroleum resources in Utah and vicinity. Land classification maps and land ownership acreage summaries for the major oil-producing provinces portray multiple types of surface and/or mineral ownership. These maps and summaries will help guide petroleum companies in planning exploration and land-acquisition strategies, pipeline companies and gas processors in planning future facilities and pipeline extensions, and government agencies in decision-making processes.

Substantial land, environmental, regulatory, and mineral leasing information is available on all of the federal Web sites involved in oil and gas leasing and/or regulation. To a lesser extent similar data are available on most state Web sites. We have compiled locations and documented the major land and mineral ownership types in each oil-producing province; identified the federal, state, county, and other private and non-profit agencies involved in the environmental analysis, leasing, and development of oil and gas resources; and provided an overview and listing of pertinent data, documents, and research tools that might be helpful in understanding the oil and gas industry, primarily in Utah, but also in Arizona, Colorado, and Wyoming.

The major plays in the oil-producing provinces encompass nearly 15.1 million acres (6.1 million ha) and include almost all of the potential oil- and gas-bearing land in Utah. Mineral ownership and management, including leasing, is divided primarily among federal, state, and private interests. Private interests also include Native American Reservation lands and may include Native American mineral ownership outside an Indian Reservation. Mineral ownership

patterns vary among the provinces and dominant ownership is somewhat different in each area. Federal ownership is multifaceted in that while the mineral estate is managed by the Bureau of Land Management, the overlying surface estate might be managed by other federal agencies. The surface estate may be privately owned, creating a split estate, which is very common in the Western U.S.

We recommend additional research and mapping to (1) summarize Wilderness Areas, Wilderness Study Areas, and Bureau of Land Management lands that are within the National Forest System in oil-producing provinces, (2) determine the amount of trust lands in these provinces for each state, (3) identify withdrawal orders, (4) verify Military Reservation lands and their uses, and (5) for Native American Reservation lands, identify the tribal entity, provide contact information, determine mineral acreages for each tribe, and delineate which tribal lands are held in trust and which lands are owned in fee.

Technology transfer activities during this quarter consisted of exhibiting a booth display of project materials at the 2006 Annual Convention of the American Association of Petroleum Geologists (AAPG) in Houston, Texas, and AAPG Rocky Mountain Section (RMS) Meeting in Billings, Montana. Four technical and non-technical presentations describing Utah oil plays were given at the AAPG-RMS meeting, San Juan County (Utah) Commission monthly public hearing, Interstate Oil & Gas Compact Commission Midyear Issues Summit, and University of Utah Guy F. Atkinson Lecture Series. Project team members published an article on the central Utah thrust belt Navajo Sandstone oil play and a Quarterly Technical Progress Report detailing project work, results, and recommendations. The project home page was updated on the Utah Geological Survey Web site.

INTRODUCTION

Project Overview

Utah oil fields have produced over 1.2 billion barrels (bbls) (191 million m³) (Utah Division of Oil, Gas and Mining, 2006). The 13.7 million barrels (2.2 million m³) of production in 2002 was the lowest level in over 40 years. However, in late 2005 production increased (figure 1), due to the discovery of Covenant field in the central Utah Navajo Sandstone thrust belt play, and reversed the decline that began in the mid-1980s (Utah Division of Oil, Gas and Mining, 2006). Proven reserves are relatively high, at 256 million bbls (40.7 million m³) (Energy Information Administration, 2006). With higher oil prices now prevailing, secondary and tertiary recovery techniques should boost future production rates and ultimate recovery from known fields.



Figure 1. Oil production in Utah through 2005 showing an increase due, in part, to the discovery of Covenant field in the new central Utah thrust belt Jurassic Navajo Sandstone play. Source: Utah Division of Oil, Gas and Mining production records.

Utah's drilling history has fluctuated greatly due to discoveries, oil and gas price trends, and changing exploration targets. Utah has entered another boom period rivaling the early 1980s. In 2005, the Utah Division of Oil, Gas and Mining issued a record 1629 drilling permits and 876 wells were spudded. Sustained high petroleum prices are providing the economic climate needed to entice more high-risk exploration investments (more wildcats), resulting in new discoveries.

Utah still contains large areas that are virtually unexplored. There is also significant potential for increased recovery from existing fields by employing improved reservoir characterization and the latest drilling, completion, and secondary/tertiary recovery technologies. New exploratory targets may be identified from three-dimensional (3D) seismic surveys. Development of potential prospects is within the economic and technical capabilities of both major and independent operators.

The primary goal of this study is to increase recoverable oil reserves from existing field reservoirs and new discoveries by providing play portfolios for the four major oil-producing provinces (Utah/Wyoming thrust belt, central Utah thrust belt - "Hingeline," Uinta Basin, and Paradox Basin) in Utah and adjacent areas in Arizona, Colorado, and Wyoming (figures 2 through 5). These play portfolios will include descriptions (such as stratigraphy, diagenetic



Figure 2. Oil and gas fields, uplifts, and selected thrust systems of the Utah/Wyoming thrust belt province. Colored (light orange) area shows the maximum extent of the Jurassic Nugget Sandstone and Twin Creek Limestone plays. Modified from Chidsey (1993), and Sprinkel and Chidsey (1993).

analysis, tectonic setting, reservoir characteristics, trap type, seal, and hydrocarbon source) and maps of the major oil plays in these major oil-producing provinces by reservoir; production and reservoir data; case-study field evaluations; summaries of the state-of-the-art drilling, completion, and secondary/tertiary techniques for each play; locations of major oil pipelines; and descriptions of reservoir outcrop analogs for each play. Also included in these play portfolios (and this report) will be an analysis of land-use constraints on development, such as wilderness or roadless areas, Native American lands, and parks within oil-producing provinces.

This report covers research activities for the sixteenth quarter of the project (April 1 through June 30, 2006). This work included (1) land classification summaries of the major oil-producing provinces, and (2) technology transfer activities.

Project Benefits

The overall goal of this multi-year project is enhanced petroleum production in the Rocky Mountain region. Specific benefits expected to result from this project include the following:

(1) improved reservoir characterization to prevent premature abandonment of numerous small fields in the Paradox and Uinta Basins,











Figure 5. Oil and gas fields, igneous intrusive bodies (speckled pattern), and major uplifts in the Paradox Basin province of Utah, Colorado, and Arizona (modified from Harr, 1996). Colored (light shows orange) area the maximum extent of the Mississippian Leadville Limestone and Pennsylvanian Paradox Formation, Paradox Basin plays. Modified from Morgan (1993).

(2) identification of the type of untapped compartments created by reservoir heterogeneity (for example, diagenesis and abrupt facies changes) to increase recoverable reserves,

(3) identification of the latest drilling, completion, and secondary/tertiary techniques to increase deliverability,

(4) identification of reservoir trends for field extension drilling and stimulating exploration in undeveloped parts of producing fairways,

(5) identification of technology used in other basins or producing trends with similar types of reservoirs that might improve production in Utah,

(6) identification of optimal well spacing/location to reduce the number of wells needed to successfully drain a reservoir, thus reducing development costs and risk, and allowing more productive use of limited energy investment dollars, and

(7) technology transfer to encourage new development and exploration efforts, and increase royalty income to the federal, state, local, Native American, and fee owners.

The Utah play portfolios produced by this project will provide an easy-to-use geologic, engineering, and geographic reference to help petroleum companies plan exploration, land-acquisition strategies, and field development. These portfolios may also help pipeline companies plan future facilities and pipelines. Other users of the portfolios will include petroleum engineers, petroleum land specialists, landowners, bankers and investors, economists, utility companies, manufacturers, county planners, and numerous government agencies.

The results of this project will be transferred to industry and other interested parties through establishment of Technical Advisory and Stake Holders Boards, an industry outreach program, and technical presentations at national and regional professional society meetings. All of this information will be made public through (1) the Utah Geological Survey (UGS) Web site, (2) an interactive, menu-driven digital product on compact disc, and (3) hard-copy publications in various technical or trade journals and UGS publications.

MAJOR OIL-PRODUCING PROVINCES IN UTAH AND VICINITY

Oil plays are geographic areas with petroleum potential caused by favorable combinations of source rock, migration paths, reservoir rock characteristics, and other factors. Numerous plays (and subplays), delineated and described in previous project reports and listed below, are found in the Utah/Wyoming thrust belt, central Utah thrust belt - Hingeline, Uinta Basin, and Paradox Basin oil-producing provinces of Utah and vicinity (figures 2 through 5). The following are general descriptions of these provinces (data sources [monthly and cumulative production, number of active wells, and number of active fields]: Wyoming Oil & Gas Conservation Commission, 2004; Colorado Oil & Gas Conservation Commission, 2006; Steve Rauzi, Arizona Geological Survey, written communication, 2006; Utah Division of Oil, Gas and Mining, 2006).

Utah/Wyoming Thrust Belt

Major oil plays:

- Jurassic Nugget Sandstone thrust belt play

Subplays:Nugget Sandstone Absaroka thrust - Mesozoic-cored
shallow structures subplay
Nugget Sandstone Absaroka thrust - Mesozoic-cored deep
structures subplay
Nugget Sandstone Absaroka thrust - Paleozoic-cored
shallow structures subplay- Jurassic Twin Creek Limestone thrust belt play
Subplays:Twin Creek Limestone Absaroka thrust - Mesozoic-cored
shallow structures subplay
Twin Creek Limestone Absaroka thrust - Mesozoic-cored
deep structures subplay

Major oil reservoirs: Jurassic Nugget Sandstone, eolian dune sandstone; Jurassic Twin Creek Limestone, shallow marine limestone.

Trapping mechanisms: anticlines in the hanging walls of detached (not involving basement rocks) thrust systems, and untested subthrust structures (beneath detached and basement-cored faults).

Source rocks: Cretaceous Mowry Shale; possibly Permian Phosphoria Formation.

First commercial discovery: Pineview field, 1975.

Number of active fields/wells: 15 fields/214 wells.

Average monthly production: 173,000 bbls (27,500 m^3) of oil, 9.5 billion cubic feet (BCF) (0.27 BCM) of gas.

Cumulative production: 303 million bbls of (48.1 million m^3) oil, 5.2 trillion cubic feet (TCF) (0.15 TCM) of gas.

Types of enhanced oil recovery projects: gas re-injection to maintain pressure, horizontal drilling.

Major pipelines: Pacific Energy Partners LP (8 inch-oil),

Rocky Mountain Pipeline Systems LLC (10 inch-, 16 inch-oil), Chevron Pipeline Co. (10 inch-oil), Pioneer Pipeline Co. (8 inch-products), Enterprise Products Partners LP (6 inch-products), Questar Pipeline Co. (10 inch-, 12 inch-, 16 inch-, 18 inch-, 20 inch-, 24 inch-gas), Kern River Gas Transmission Co. (36 inch-gas), Williams Gas Pipeline - Northwest (22 inch-gas), Anadarko Rocky Mountain Energy (10 inch-hydrogen sulfide).

Outcrop analogs in Utah: northern Wasatch Range, Crawford Mountains.

Central Utah Thrust Belt - Hingeline

Major oil plays: Jurassic Navajo Sandstone central Utah thrust belt – Hingeline play

Major oil reservoir: Jurassic Navajo Sandstone, eolian dune sandstone.

Trapping mechanisms: anticlines in the hanging walls of detached (not involving basement rocks) thrust systems created by thrust imbricates, or imbricate fans above, and antiformal stacks of horses forming duplexes below the major thrusts.

Source rocks: organic-rich marine shale within the Mississippian Manning Canyon Shale, Delle Phosphatic Member of the Deseret Limestone, Doughnut Formation, or Chainman Shale; possibly Permian Park City/Phosphoria Formation.

First commercial oil discovery: Covenant field, 2004.

Number of active fields/wells: one field/ten wells.

Average monthly production: 195,000 bbls (31,000 m³) of oil.

Cumulative production: 2,000,000 bbls (318,000 m³) of oil.

Types of enhanced oil recovery projects: possible future carbon dioxide/nitrogen injection.

Major pipelines: Questar Pipeline Co. (18 inch-, 24 inch-gas), Questar Gas Co. (8 inch- and 10 inch-gas), Kern River Gas Transmission Co. (36 inch-gas).

Outcrop analogs in Utah: San Rafael Swell, Pavant Range, southern Wasatch Range, and throughout the Colorado Plateau of southern Utah.

Uinta Basin

Major oil plays:

- Conventional Northern Uinta Basin play

Subplays: Conventional Bluebell subplay

Conventional Red Wash subplay

- Conventional Southern Uinta Basin play
- Deep Uinta Basin Overpressured Continuous play

Major oil reservoirs: Eocene Green River and Wasatch (Colton) Formations, lacustrine to alluvial channel and bar sandstone; and Pennsylvanian Weber Sandstone, coastal eolian and littoral sandstone.

Trapping mechanisms: anticlinal at Ashley and Peters Point fields, stratigraphic conventional and basin centered.

Source rocks: Cretaceous coals and shale, Eocene lacustrine shale.

First commercial oil discovery: Gas at the Ashley Valley field, 1925, and oil at Roosevelt field, 1949.

Number of active fields/wells: 51 fields/ 5279 wells.

Average monthly production: 927,000 bbls (147,000 m³) of oil, 16 BCF (0.45 BCM) of gas.

Cumulative production: 528 million bbls (84 million m³) of oil, 2.6 TCF (0.7 TCM) of gas.

Types of enhanced oil recovery projects: waterflood in the Green River Formation.

Major pipelines: Chevron Pipeline Co. (10 inch-oil [2 lines]), Colorado Interstate Gas Co. (20 inch-gas), Enterprise Products Partners (10 inch- and 16 inch-products), Questar Pipeline Co. (16 inch- and 20 inch-gas) Williams Gas Pipeline - Northwest (26 inch-gas).

Outcrop analogs in Utah: Book, Roan, and Badlands Cliffs, and Raven Ridge.

Paradox Basin

Major oil plays:

 Mississippian Leadville Limestone Paradox Basin play
 Paradox Formation, Paradox Basin play Subplays: fractured shale subplay Blanding sub-basin Desert Creek zone subplay Blanding sub-basin Ismay zone subplay Aneth platform Desert Creek zone subplay

Major oil reservoirs: Devonian McCracken Sandstone Member of the Elbert Formation, subtidal to supratidal dolomite to delta-front sandstone; Mississippian Leadville Limestone, shallow-shelf marine limestone and dolomite; Pennsylvanian Paradox Formation, shallow-shelf marine limestone and dolomite in the Desert Creek and Ismay zones, and fractured units in the Cane Creek shale.

Trapping mechanisms: stratigraphic – carbonate buildups (algal mounds, shoals, islands) sealed by anhydrite, salt, or organic-rich shale; structural – fracture zones faulted and asymmetrical anticlines; diagenetic – dolomitization and dissolution.

Source rocks: black, organic-rich marine shale within the Pennsylvanian Paradox Formation.

First commercial discovery: Boundary Butte field, 1947.

Number of active fields/wells: 97 fields/860 wells.

Average monthly production: 353,000 bbls (56,100 m³) of oil, 1.1 BCF (0.03 BCM) of gas.

Cumulative production: 575 million bbls (91.4 million m^3) of oil, 1.5 TCF (0.04 TCM) of gas.

Types of enhanced oil recovery projects: waterflood, CO_2 flood (CO_2 provided by pipeline from McElmo Dome in Colorado or locally from the Mississippian Leadville Limestone within the Utah part of the Paradox Basin), gas injection, horizontal drilling.

Major pipelines: Four Corners Pipeline Co. (12 inch-oil), Navajo Nation Oil and Gas

Co. (16 inch-oil), Encana (10 inch-oil), TransColorado Pipeline Gathering Co. (4 inchgas), Utah Gas Services Co. (4 inch-gas), Western Gas Resources, Inc. (16 inch-gas), Williams Gas Pipeline - Northwest (26 inch-gas), ExxonMobil/Resolute Natural Resources/Navajo Nation Oil and Gas Co. (8 inch-carbon dioxide), Enterprise Products Partners LP (10 inch-products).

Outcrop analogs in Utah: shallow-shelf carbonates and karst features, Mississippian Madison and Deseret Limestones, south flank of the Uinta Mountains; Ismay and Desert Creek algal mounds, Pennsylvanian Paradox Formation, exposed along the San Juan River in southeastern Utah.

LAND CLASSIFICATION SUMMARY – DISCUSSION AND RESULTS

Introduction

This summary was prepared using a tool called hypertext markup language (HTML). Hypertext markup language format is used to provide the reader with instant access to all of the Web sites and documents discussed or listed in this section of the report. The reader must have an active Internet browser to take advantage of this tool. Hypertext markup language links are encased in the following brackets < > and/or underlined, and shown in blue print. Placing the cursor over the text and left clicking your mouse button provides access to the appropriate Web sites or documents. Most of the Web sites were accessed starting in June 2006. These are mostly Bureau of Land Management-hosted (BLM) Web sites provided specifically for documentation for resource planning, and for Bureau of Indian Affairs-hosted (BIA) Web sites in which availability is related to litigation with the U.S. Department of Interior (DOI) and the BIA.

There is a substantial amount of land, environmental, regulatory, and mineral leasing information on all of the federal Web sites involved in oil and gas leasing and/or regulation. To a lesser extent similar data are available on most state Web sites. The objective of this summary is to compile locations and document the major land and mineral ownership types in each oil-producing province; identify the federal, state, county, and other private and non-profit agencies involved in the environmental analysis, leasing, and development of oil and gas resources; and to provide an overview and listing of pertinent data, documents, and research tools that might be helpful in understanding the oil and gas industry, primarily in Utah, but also in Arizona, Colorado, and Wyoming.

The oil-producing provinces encompass nearly 15.1 million acres (6.1 million ha) (figure 6, table 1) and include almost all of the potential oil- and gas-bearing land in Utah. Three of the four oil-producing provinces extend onto adjacent lands in parts of Arizona, Colorado, or Wyoming. Mineral ownership is divided primarily among federal, state, and private interests. Private interests also include Native American Reservation lands and may include Native American mineral ownership outside an Indian Reservation. Mineral ownership patterns vary among the provinces and dominant ownership is somewhat different in each area. Federal ownership is multifaceted in that while the mineral estate is managed by the BLM, the overlying surface estate might be managed by other federal agencies such as the U.S. Forest Service (FS), Bureau of Reclamation (BOR), National Park Service (NPS), or U.S. Department



Figure 6. Generalized surface and/or mineral ownership map for the major oilproducing provinces of Utah and vicinity.

Land Classification	Mineral Mgt. Agency	Acres	Percent of total
BLM	State/District office	6,568,413	43.6
Forest Service	State/District office	1,264,029	8.4
Military Reservations	Department of Defense	1631	< 0.1
National Parks/Monuments	National Park Service	678,582	4.5
National Wildlife Refuge	U.S. Fish & Wildlife	8975	0.1
Native American Reservations	BIA/Indian Tribe	1,733,795	115
Private	Individual/Corporate	3,477,769	23.1
State Lands	State	1,249,455	8.2
Wilderness Area	Federal	45,956	0.3
Water	State/Federal	41,843	0.3
Totals		15,070,488	100.0

Table 1. Land classification and acreage summary for the four oil-producing provinces combined.

of Defense (DOD) in the case of a military reservation. Where the surface estate is managed by another federal agency, the mineral estate may be withdrawn from entry or surface access is regulated by the surface management agency. This situation is common in National Forests where the FS manages the surface. In other cases, such as military reservations, Wilderness Areas, National Parks and Monuments, National Recreation Areas, and others mineral entry is withdrawn.

The surface estate may also be privately owned, creating a split estate, which is very common in the Western U.S. Where this occurs, surface access must also be acquired prior to mineral entry. Also, in the Uinta and Paradox Basins, and to a lesser extent the central Utah thrust belt province, there are lands owned by Indian tribes. These tribal lands are designated as Native American Reservation lands and include lands where the mineral estate is owned outright by the tribe and lands where the mineral estate is held in trust by the federal government and managed by the BIA. Our mapping and ownership analysis does not distinguish between split mineral estate lands and lands where both the surface and mineral estate are owned by the same entity. Those detailed records are available at each BLM state office (SO) and at each respective County Recorder's office. In addition, many counties have digital copies of Master Title or Mineral Title (MT) plats available online.

Land Ownership Data

Surface and/or mineral ownership data for each state were acquired in Geographic Information System (GIS) format from the Internet (figure 6) and have not been verified. The agency and Web site for each state is listed below.

Arizona, Arizona BLM <<u>http://www.blm.gov/az/gis/files.htm</u>>, Colorado, Colorado BLM <<u>http://www.co.blm.gov/metadata/cothemes.htm</u>>, Utah, Automated Geographic Reference Center (AGRC), <<u>http://agrc.utah.gov/agrc_sgid/sgidintro.html</u>>, and Wyoming, Wyoming BLM <<u>http://www.wy.blm.gov/gis/state/state-own.html</u>>.

Surface and/or mineral ownership and cadastral data from Arizona, Colorado, and Wyoming were spliced to the Utah land grid where appropriate.

U.S. Forest Service Lands

The FS is an agency of the U.S. Department of Agriculture <<u>http://www.fs.fed.us/</u>> that manages the surface over a large part of the federal land system. The FS has created a Minerals and Geology Management Web page <<u>http://www.fs.fed.us/geology/</u>> to help facilitate the energy, mineral, and geologic activities that take place within the National Forest system. The Web page contains a link to a Web page for Energy Leasable Minerals <<u>http://www.fs.fed.us/</u> <u>geology/mgm_leasable.html</u>>, which, in turn, provides links to all of the federal legislation (Acts), policies, regulations, planning manuals, and forms related to oil and gas development on FS lands. Additional research will be required to create GIS-based maps and summarize BLM lands that are within the National Forest system in oil-producing provinces.

Bureau of Land Management Lands

Bureau of Land Management lands, including FS lands, constitute the largest ownership entity in the four oil-producing provinces combined. The BLM is a bureau within the <u>DOI</u> that is responsible for administering approximately 261 million surface acres (106 million ha) of land and minerals in the U.S. Most of these lands are located in 12 western states including Alaska. Although the BLM has management responsibility for federal minerals beneath the National Parks, almost all NPS lands are withdrawn from mineral leasing and development. Mineral leasing occurs in a few units of the National Wildlife Refuge system, but most refuge lands are also withdrawn from mineral leasing or have no mineral potential. Additionally, as part of its trust responsibility, the BLM oversees minerals operations on 56 million acres (23 million ha) of Indian lands.

Bureau of Land Management lands are managed on a national level by federal regulations, on a state level by the statewide administration of federal regulations and state policies, and on a local level by field offices (FO), which are responsible for the day-to-day management and resource planning for federal lands within its area of responsibility. The Web site for the BLM is <<u>http://www.blm.gov/nhp/</u>>. The Web site contains a plethora of information on federal regulations, land management and planning policies, and other data affect lands within the national BLM system. All of the policies and regulations, and other data pertinent to planning web site < <u>http://www.blm.gov/planning</u>/>. The following citation was taken from the Policy section of the Planning Web site as an explanation of how federal law, policy, and regulations form the basis for oil and gas leasing and development.

The Guidance Hierarchy: Law, Regulations, Policy

"A three-tiered hierarchy of guidance directs the activities of any federal agency. At the highest level, Congress establishes *law*, which provides mandatory direction to agencies. Because laws are often very broad, agencies generate more specific direction by creating regulations and policies to further define and implement laws. *Regulations* are the second-highest level of direction. When an agency creates new or revises existing regulations, other agencies and the public must review them. Agencies publish their finalized regulations in the Code of Federal Regulations and in the Federal Register. Agencies also issue *policy*, the

third level of direction, to provide even more detail to complement laws and regulations. Policies are internal documents that have no external review requirement.

Two key laws influence BLM's planning efforts: the Federal Land Policy and Management Act of 1976 (FLPMA), and the National Environmental Policy Act of 1969 (NEPA). The BLM Land Use Planning Handbook outlines a process that meets the requirements of both NEPA and FLPMA for the development of planning decisions (new Resource Management Plans [RMPs] and RMP revisions and amendments). An interdisciplinary team established to work on planning projects ensures that the BLM is complying with other laws, regulations, and policies associated with particular resources and uses of the public lands.

Together, NEPA and FLPMA, as well as the associated regulations mentioned above, form the basis for BLM's planning process. The BLM's planning handbook is a BLM policy that encompasses the requirements of NEPA and FLPMA laws and regulations."

The chart shown on figure 7 depicts this framework. The following links are available that access laws, regulations, and policy involved in BLM land-use planning and implementation.

Laws:

Federal Land Policy and Management Act of 1976
National Environmental Policy Act of 1969Regulations:43 CFR 1600 (BLM Land Use Planning Regulations)
40 CFR 1500-1508 (CEQ guidance on implementing NEPA)Policy:BLM National Planning Manual
BLM National Planning Handbook

BLM NEPA Handbook



Figure 7. Chart depicting the BLM's planning framework encompassing NEPA and FLPMA laws, regulations, and policy. Figure obtained from document on Planning Guidance under the Policy section of BLM's Land Use Planning Web site at <http:// www.blm.gov/planning/policy. html>.

POLICY: Planning Handbook

Branch of Fluid Minerals

The Branch of Fluid Minerals is responsible for the adjudication, administration, and maintenance of oil and gas, combined hydrocarbon, and geothermal steam authorizations approved on federally owned mineral estates.

"The Utah BLM administers approximately 22.9 million acres (9.3 million ha) of public lands and another 9.7 million acres (3.9 million ha) of subsurface minerals estate lands in Utah. Revenues from Fluid Mineral Leasing operations in Utah amount to over \$87 million annually. Utah is the only state with a Combined Hydrocarbon Leasing Program (Tar Sands)."

The previous citation was taken from the Utah Branch of Fluid Minerals Web site <<u>http://www.ut.blm.gov/fluidminerals/Index.html</u>>. The Web site contains a 12-month schedule of lease sales and a contact list for personnel involved in the lease sales planning process for the state.

State BLM Web Sites

Access to each state's planning activities and schedules is available through links provided in the Web site header. For example, under the Planning tab on the BLM Web site, left click Utah on the base map, and a listing of all of the active RMPs is provided in HTML format that provides digital access to each RMP's Web site. Each RMP Web site provides documentation of the planning activity and the results of many studies, including maps that are conducted for each planning area. If a Draft or Final version of an Environmental Impact Statement (EIS), a requirement of the planning process, and Approved RMP is available, that document(s) will be posted on the Web site.

Many other resources are available on the BLM Web site such as the BLM Directory page <<u>http://www.blm.gov/nhp/directory/index.htm</u>>, which provides contact information and links to all state and other BLM offices nationwide. State BLM Web sites contain policy and regulatory information including land-use planning documents and maps (many in GIS format), schedules, and personnel contacts. State BLM Web sites for Arizona, Colorado, Utah, Wyoming, and other western states that are active in oil and gas leasing also contain environmental and regulatory data on oil and gas leasing, and a 12-month rolling list of oil and gas lease sale activity as well as the results of the two previous lease sales. All oil and gas leases in Arizona are on Navajo Indian lands, and managed by the BLM's Farmington, New Mexico FO <<u>http://www.nm.blm.gov/ffo/ffo_home.html</u>>.

Overview of Leasing on Public Lands

An overview of the Federal Onshore Oil and Gas Leasing System is provided below. The document and other supporting information is at the Federal Onshore Oil and Gas Leasing System Web site <<u>http://www.ut.blm.gov/Infocenter/infoandgleasing.html</u>>.

"The Mineral Leasing Act of 1920, as amended, and the Mineral Leasing Act for Acquired Lands of 1947, as amended, gives the BLM responsibility for oil and

gas leasing on about 570 million acres (230 million ha) of BLM, FS, and other federal lands, as well as private lands where mineral rights have been retained by the federal government (other federal agencies involved in mineral leasing activities are listed in Appendix A). The BLM works to assure that development of mineral resources is in the best interests of the nation. Regulations that govern the BLM's oil and gas leasing program may be found in Title 43, Groups 3000 and 3200, of the Code of Federal Regulations, a publication available in law libraries and most large public libraries. A copy may also be obtained from any <u>BLM State Office</u>.

Lands Available for Leasing

Public lands are available for oil and gas leasing only after they have been evaluated through the BLM's multiple-use planning process. In areas where development of oil and gas resources would conflict with the protection or management of other resources or public land uses, mitigating measures are identified and may appear on leases as either stipulations to uses or as restrictions on surface occupancy.

In the land use planning process, areas are identified as (1) open for leasing with standard lease terms, (2) open for leasing subject to controlled surface use with special stipulations, (3) open for leasing but no surface occupancy allowed, and (4) closed to leasing. The basic requirements for lease operations are outlined in Onshore Order #1. The link to this order is <u>http://</u>www.mt.blm.gov/oilgas/operations/orders/ord1.html.

Open for leasing with standard lease terms: These lands are leased subject to standard lease terms, which provide for the protection of the resource values and environmental components commonly associated with the public lands and require the lessee to take certain measures to mitigate possible impacts that might be created by oil and gas exploration and development.

These terms provide for operations under controlled conditions.

These terms also provide a broad basis for including additional requirements at the time of surface disturbance to assure proper protection of the land surface, other resources, and the environment. However, such subsequent conditions are to be reasonable and not inconsistent with the purpose of the issued lease, which is to provide for the exploration and production of oil and gas.

Open for leasing subject to controlled surface use with special stipulations: Some areas contain resource values where serious conflict with oil and gas exploration and development might occur; therefore, leasing in these areas is subject to special stipulations that provide additional protection to the watersheds, specific crucial wildlife habitat areas, unique archaeological and historical sites, and so forth. The special stipulations may limit exploration to various times of the year, prescribe special construction techniques, limit the location of developments, or require other similar special resource protections. **Open for leasing but no surface occupancy allowed:** These areas have special resource values or land uses with which oil and gas operations would not be compatible. These areas could include camping and picnic areas, research areas, scenic areas, Recreation and Public Purposes (R&PP) patents and leases, significant historical and archaeological areas, buffer zones along the boundaries of special areas such as wild and scenic river corridors, and so forth. Exploratory drilling is permitted, but is limited to drainage or directional drilling.

Closed to leasing: These are areas where oil and gas leasing is undesirable pending further planning or special studies, and includes areas that are too large in size to permit slant drilling or values that cannot be adequately protected by the other lease categorizations. Examples include some areas of potential wild and scenic river corridors, and larger high-quality scenic areas where roads, pipelines, drilling activities, and so forth, are not compatible with management for these uses. As further information is obtained, and public needs are better understood, these areas many continue to be closed to leasing or made available. All leases are subject to all federal laws and regulations; including, but not limited to endangered species, cultural resources, and air and water quality.

Lessee Qualifications and Limitations

Federal oil and gas leases may be obtained and held by any adult citizen of the United States. No lease may be acquired by a minor, but a lease may be issued to a legal guardian or trustee on behalf of a minor. Associations of citizens and corporations organized under the laws of the United States or of any state also qualify.

Aliens may hold interests in leases only by stock ownership in U.S. corporations holding leases and only if the laws of their country do not deny similar privileges to citizens of the United States. They may not hold a lease interest through units in a publicly traded limited partnership.

Types of Oil and Gas Leases

The BLM issues two types of leases for oil and gas exploration and development on lands owned or controlled by the Federal Government - competitive and noncompetitive. The Congress passed the Federal Onshore Oil and Gas Leasing Reform Act of 1987 to require that all public lands that are available for oil and gas leasing be offered first by competitive leasing. Noncompetitive oil and gas leases may be issued only after the lands have been offered competitively at an oral auction and not received a bid.

The maximum competitive lease size is 2560 acres (1040 ha) in the lower 48 states and 5760 acres (2330 ha) in Alaska. The maximum noncompetitive lease size in all states is 10,240 acres (4140 ha).

Since passage of the Energy Policy Act of 1992, both competitive and noncompetitive leases are issued for a 10-year period. Both types of leases continue for as long thereafter as oil or gas is produced in paying quantities.

Competitive Oil and Gas Lease Offers

Oral auctions of all oil and gas leases are conducted by most BLM SO not less than quarterly when parcels are available. A Notice of Competitive Lease Sale, which lists lease parcels to be offered at the auction, will be published by each BLM SO at least 45 days before the auction is held. Lease stipulations applicable to each parcel are specified in the Sale Notice. Lands included in the Sale Notice come from three sources:

- (1) parcels identified by informal expressions of interest from the public,
- (2) by the BLM for management reasons, or
- (3) lands included in offers filed for <u>noncompetitive leases.</u>

All auctions are conducted with oral bidding. Bidders must attend the auction to obtain a competitive lease or provide for someone to represent them. No sealed or mailed bids are accepted.

On the day of the auction, the successful bidder must submit a properly executed lease bid form, which constitutes a legally binding lease offer, and pay a share of the sale costs (\$75 per lease); the first year's advance rental (\$1.50 per acre or fraction thereof); and not less than the \$2-per-acre minimum bonus bid. The balance of the bonus bid must be received within 10 working days of the auction. Those bidders who fail to submit the balance of the bonus on time will forfeit their entire deposit money. Remittances associated with the leasing process may be made by personal check, cashier's check, certified check, or money order, made out to DOI-BLM. VISA or MasterCard may also be used. Cash is not accepted.

Noncompetitive Oil and Gas Lease Offers

Regulations pertaining to the filing of noncompetitive lease offers (NCOs) can be found at 43 Code of Federal Regulations (CFR) 3110. Noncompetitive leases may be issued only for parcels that have been offered competitively and failed to receive a bid. The BLM will not place for sale lands under lease, or lands where mineral ownership is not federally owned or lands:

- (1) within city limits,
- (2) withdrawn from mineral leasing,
- (3) within Wilderness Study Areas or Designated Wilderness Areas (WSA/DWA),
- (4) with pending mineral entry applications,
- (5) on patented mining claims,
- (6) posted in a Notice of Competitive Lease Sale, or within the two-year window after a lease.

A noncompetitive offer must be made on Form 3100-11, Offer to Lease and Lease for Oil and Gas (6/88 or later edition). Each offer must:

- (1) be submitted on a separate lease offer form,
- (2) be filed with a \$75.00 nonrefundable filing fee and the first year's advance rental in the amount of \$1.50 per acre or fraction thereof,
- (3) not be made for less than 640.00 acres (259.01 ha) or one full section, whichever is larger,
- (4) not be made for more than 10,240 acres (4140 ha),
- (5) be within a 6-mile-square area (16 km^2) ,
- (6) be submitted in triplicate one original and two copies, typewritten or printed in ink,
- (7) be manually signed in ink and dated by the offeror or offeror's authorized agent,
- (8) not include both public domain and acquired lands in the same offer, and
- (9) not include lands which are both inside and outside a unit agreement.

Noncompetitive lease offers are not held confidential and are made part of the public record when received. If the applicant files an NCO by mail, a pink copy of the accounting advice showing the serial number assigned to the offer is sent to the applicant for his records. This number should be referred to in any correspondence regarding that offer. The different types of NCOs are referred to as presale offers and postsale offers. Postsale offers include day-after-sale offers and two-year window offers.

Noncompetitive Offer to Lease-presale: A presale NCO is a formal nomination for lands to be included in a Notice of Competitive Oil and Gas Lease sale, for an upcoming oil and gas lease sale. The offeror receives priority as of the time and date the offer is filed in the proper BLM SO. If no bid is received for the parcel in the NCO at the oral auction, a noncompetitive lease shall issue, all else being regular, to the applicant, and no further competition is required for the parcel. Since a presale NCO is a formal nomination, the offer must conform to all regulations and requirements for noncompetitive offers. However, a presale NCO cannot be filed on lands, which are in a one-year period commencing the expiration, relinquishment, termination, or cancellation of a prior lease. If during this one-year period you are interested in having the lands placed on a sale, you may file an expression of interest, which is an informal nomination of the lands. In addition, if the parcel containing the lands in your presale NCO is sold competitively at the sale, your presale NCO will be rejected, with right to appeal, and a refund of the first year's advance rental will be initiated.

Noncompetitive Offer to Lease—postsale (day-after sale): All parcels not receiving bids the day of the sale will be available for noncompetitive leasing for a period of two years following the last day of the competitive lease sale. All NCOs filed on the first business day following the oral lease sale will be considered simultaneously filed. Numerous offers can be filed by one person for the same parcel, and a drawing will be held to determine the priority for the offers. Each offer must conform to all regulations and requirements for noncompetitive offers.

Noncompetitive Offer to Lease—postsale (two-year window): NCOs for parcels not being sold at a competitive lease sale will be acceptable for a period of two years from the last day of the competitive sale. NCOs filed after the day-after-sale filing period will receive priority from the date and time filed. Each offer must conform to all regulations and requirements for noncompetitive offers.

Offers filed during month of sale: Offers filed from the first day following the end of the competitive sale until the end of that same month (parcel integrity period) must be made for the entire parcel included in the sale notice and must describe the lands by that single parcel number appearing in the sale notice. Thereafter, and until the end of the two years of noncompetitive availability, offers must use legal land descriptions and are not limited to the parcel configurations offered at the auction.

Offers filed after parcel integrity period and during remainder of two-year period: Any filing made after the end of the month in which a sale is held is not required to be filed by the parcel number, but shall be filed by the legal land description. An offer filed after the end of the parcel integrity period may include all or a portion of a parcel or may include a combination of parcels and shall be filed in accordance with 43 CFR 3110 with respect to minimum and maximum lease offer size.

Withdrawal of offer in whole or in part: A presale offer may be withdrawn by the offeror at any time prior to issuance of the noncompetitive lease. A postsale lease offer may be withdrawn by the offeror if the request to withdraw the offer is received by the proper BLM SO after 60 days from the date of filing of the offer and prior to lease issuance. If a postsale offer is withdrawn after 60 days from the date of filing, the lands would continue to be available for noncompetitive leasing for the remainder of the two-year period. If a public domain mineral offer is partially withdrawn, the lands retained in the offer must total (in the lower 48 states) 640 acres (260 ha), or one full section, or include all available lands within a section where there are no contiguous lands available.

Lease Terms and Conditions

The lease grants the lessee the right to explore and drill for, extract, remove, and dispose of oil and gas deposits, except helium, that may be found in the leased lands. Subject to special restrictions as noted above, the leases are granted on the condition that the lessee will have to obtain BLM approval before conducting any surface-disturbing activities. The oil and gas lease conveys the right to develop those resources on the leased land. The lessee or his/her operator cannot build a house on the land, cultivate the land, or remove any minerals other than oil and gas from the leased land.

Bonding: Before any surface-disturbing activities related to drilling can begin, the lessee or his/her operator must furnish a bond in the amount of at least \$10,000 to ensure compliance with all the lease terms, including protection of the environment. With the consent of the surety and principal, the operator may use the bond of another party such as the lessee. Each time there is a new operator, that operator must notify the BLM that he/she is the responsible operator, giving the particulars of the bond under which he/she will operate.

Acceptable instruments of bonding are surety bonds, or personal bonds accompanied by negotiable Treasury securities, cashier's check, certified check, certificate of deposit, or irrevocable letter of credit. The BLM may require an increase in the bond amount any time conditions warrant such an increase.

Rentals and royalties: Annual rental rates for both competitive and noncompetitive leases are \$1.50 per acre (or fraction thereof) in the first five years and \$2.00 per acre each year thereafter. After the lease is issued, rentals must be received at the DOI's Minerals Management Service (MMS) on or before the lease anniversary date to prevent statutorily required automatic termination of the lease. This requires mailing of the annual rental at least a week or 10 days in advance of the lease anniversary date to ensure timely receipt by the MMS. Royalty on production is 12.5 percent for both competitive and noncompetitive leases.

Assigning a lease: Some people who acquire an oil and gas lease will assign the lease to another party. The value of oil and gas leases varies greatly. None of the parcels offered has been evaluated by the BLM for oil and gas potential prior to the competitive auction or to being made available for noncompetitive leasing. All of the lands included in noncompetitive leases have been offered at auction and received no bids.

Leases may be transferred by assignment or sublease. The transfer must be submitted to the BLM for approval within 90 days from the date of execution by the transferor. The rights of any transferee will not be recognized by the Government, and the transferor will remain responsible for the lease, until the transfer has been approved by the BLM. An assignment either of a separate zone or deposit or of part of a legal subdivision will not be approved. An assignment of less than 640 acres (260 ha) outside of Alaska or of less than 2560 acres (1040 ha) within Alaska will be approved by the BLM only if the assignment constitutes the entire lease or is demonstrated to further the development of oil and gas.

How a lease expires or terminates: Oil and gas leases expire at the end of their primary term--the 10th year--unless diligent drilling operations are in progress on or for the benefit of the lease; the lease contains a well capable of producing oil or gas in paying quantities; or the lease is receiving or is entitled to receive an allocation of production under the terms of an approved communitization agreement or unit agreement.

Leases without a producible well automatically terminate if the lessee

fails to make full and timely payment of the annual rental. The rental must be received by the proper BLM SO on or before the anniversary date of the lease. The automatic termination is specifically prescribed by law, is not the result of BLM action, and cannot be waived.

The owner of a lease also may surrender the lease in whole or in part by filing a written relinquishment with the proper BLM SO having jurisdiction over the lands. A relinquishment takes effect on the date it is filed. However, the lessee must plug any abandoned well, perform other work as may be required by the BLM to place the leasehold in proper condition for abandonment, and bring his/her account into good standing. If the lessee fails to perform the necessary work, the lessee's bond will be used to do so, and the lessee will be prohibited from leasing any additional federal lands. A non-producing lease may be canceled for failure to comply with lease terms."

Oil and Gas Leasing Sale Notices and Sale Results

Lease sales are posted at the following link: <<u>http://www.ut.blm.gov/fluidminerals/</u>salenotices.html>. The tentative date for the next lease sale in 2006 is November 21. Additional links are also provided for the following related topics.

- (1) Sale Notices and Sale Results,
- (2) General O & G Leasing Instructions,
- (3) Non-Competitive Offers,
- (4) <u>Submitting an Expression of Interest (EOI)</u>,
- (5) Leasing FAQS for Industry,
- (6) General Oil and Gas Leasing FAQs,
- (7) 43 CFR 3100 Oil and Gas Leasing,
- (8) 43 CFR 3110 Noncompetitive Leases,
- (9) <u>43 CFR 3120 Competitive Leases</u>, and
- (10) <u>Forms</u>.

Best Management Practices for Oil and Gas Development on Public Lands

Following issuance of a lease and before exploratory drilling can begin, the leaseholder must submit an Application for Permit to Drill (APD). This application process is very rigorous and comprehensive. The application of Best Management Practices (BMPs) in oil and gas leasing is defined in the new *Gold Book*, a joint effort of the BLM and FS.

"The new BLM and FS *Gold Book* (the former *Gold Book* had not been updated in over 15 years) introduces improved practices for expediting the processing of APDs and environmental Best Management Practices to reduce the environmental effect of energy exploration and production. The revised *Gold Book* includes updated drawings, photographs, tables, and references to updated policy, orders, and regulations."

The preceding citation was taken from the Web site

<<u>http://www.blm.gov/bmp/goldbook.htm</u>>. The Web site also contains downloadable versions of the new *Gold Book* and information to order up to two free printed copies of the handbook.

Bureau of Land Management Web-based Tools

Oil and gas lease maps and surface and mineral land status maps can be created through the BLM's National Integrated Land System (NILS) <u><<u>http://www.blm.gov/nils</u>/>.</u>

"NILS is a joint project between the BLM and the FS in partnership with the states, counties, and private industry to provide business solutions for the management of cadastral records and land parcel information in a GIS environment. The NILS provides a process to collect, maintain, and store parcel-based land and survey information that meets the common, shared business needs of land title, and land resource management. The NILS project is being developed in four modules: *Survey Management* (S), *Measurement Management* (M), *Parcel Management* (P), and *GeoCommunicator* (G).

The NILS provides the user with tools to manage land records and cadastral data in a "Field-to-Fabric" manner. The user can use field survey measurement data directly from the survey measuring equipment, manipulate the data into lines and points, and create legal land and parcel descriptions to be used in mapping and land record maintenance."

The preceding citation was taken from the <u>NILS</u> Web site.

"GeoCommunicator is the publication site for NILS and provides searching, accessing, and dynamic mapping of data for federal land stewardship, land and mineral use records, and land survey information. GeoCommunicator provides spatial display for land and mineral cases from BLM's LR2000 system."

The preceding citation was taken from the <u>GeoCommunicator</u> Web site. Additional information on GIS data is available from the Land Survey Information System Web site, <<u>http://www.geocommunicator.gov/GeoComm/lsis_home/home/index.html</u>>, which is linked to GeoCommunicator. Most of these Web sites are relatively new and are being frequently updated.

Bureau of Land Management State Offices

The BLM SO serves as an information center and provides oversight and support for each of its field offices. State offices are responsible for conducting oil and gas and other mineral leasing activities on lands within each state's jurisdiction. For this study, which includes lands in Arizona, Colorado, Utah, and Wyoming, the Web sites for each BLM SO are:

Arizona <<u>http://www.blm.gov/az/</u>>, Colorado <<u>http://www.co.blm.gov/</u>>, Utah <<u>http://www.ut.blm.gov/</u>>, and Wyoming <<u>http://www.wy.blm.gov/</u>>. Each BLM FO is responsible for the day-to-day management of lands and related activities within its area of responsibility. Field offices are also responsible for conducting and updating Land Use Plans (LUPs) and RMPs that provide the basic framework on how federal lands and resources (renewable and nonrenewable) are utilized. Resource Management Plans are used to designate lands suitable for oil and gas and other mineral leasing and identify lands that are suitable for leasing, but may have some restrictions for surface occupancy. Land Use Plans and RMPs are administered under federal policies that apply system-wide, so that the same process and procedures apply to BLM lands in Utah as well as all other states. In recent years, RMPs have become the more common method for land and mineral resource planning. An explanation of the planning process and links to existing LUPs and RMPS are provided on each BLM SO's Land Use Planning Web site. These Web sites are as follows:

Arizona <<u>http://www.blm.gov/az/LUP/planning.htm</u>>, Colorado <<u>http://www.co.blm.gov/nepa/landplan.htm</u>>, Utah <<u>http://www.ut.blm.gov/landuseplanning/index.htm</u>>, and Wyoming <<u>http://www.wy.blm.gov/planning/index.htm</u>>.

Updates on BLM planning projects are also provided. The resource planning issue has become so important in recent years that each RMP that is being developed or updated has been provided its own Web site.

Overview of Utah's Bureau of Land Management Planning

Since the wide majority of land within the four oil-producing provinces described earlier in this report is in Utah, much of the following narrative is taken from the BLM Utah Web site or from various BLM Utah FO Web sites. Similar data can be found for any of the oilproducing province public lands in Arizona, Colorado, and Wyoming.

"Managing approximately 23 million surface acres of public land, BLM-Utah realizes public involvement in our management strategies is critical. Planning emphasizes a collaborative environment in which local, state, and tribal governments, the public, user groups, and industry work with the BLM to identify appropriate multiple uses of the public lands.

The land-use planning process allows for extensive public involvement and provides a blueprint of how the public land should be managed. BLM Utah's mission is to sustain the health, diversity and productivity of the public land, and land-use planning is a vital to our mission.

Currently six of our eleven field offices are conducting new planning efforts. The links below (not included) provide specific information for each of these planning efforts. BLM involves the public in the planning process right from the start. While collaborating with tribal, state, and local governments, interested parties are invited to participate so their needs can be addressed. When RMPs are ready for review and public comment, BLM Utah makes copies available to all field offices and on the Internet as well as to people who request to be on our mailing lists. We encourage you to get involved in the planning process to help determine how the public lands will be managed."

Field Offices

The BLM FO addresses are listed in the summaries for each oil-producing province. The BLM lands in Colorado are managed as follows: Mesa County - Grand Junction FO, <<u>http://www.co.blm.gov/gjra/gjra.html</u>>; Montrose County and the northeastern part of San Miguel County - Uncompander FO, <<u>http://www.co.blm.gov/ubra/index.html</u>>, and lands in the rest of San Miguel County, and Dolores and Montezuma Counties - Mancos/Dolores joint BLM/USFS office (no Web site) in Dolores, Colorado. The BLM lands in Utah are managed as follows:

Fillmore FO, <<u>http://www.ut.blm.gov/fillmore/index.html</u>> - Juab and Milliard Counties, Moab FO, <<u>http://www.blm.gov/utah/moab/index.html</u>> - Grand County, Monticello FO, <<u>http://www.blm.gov/utah/monticello/index.html</u>> - San Juan County. Price FO, <<u>http://www.blm.gov/utah/price/</u>> - Carbon and Emery Counties, Richfield FO, <<u>http://www.ut.blm.gov/richfield/index.html</u>> - Garfield, Piute, Sanpete, Sevier, and Wayne Counties, Salt Lake FO, <<u>http://www.ut.blm.gov/saltlake_fo/</u>> - Morgan, Rich, Summit, Utah, and Wasatch Counties, and Vernal FO, <<u>http://www.ut.blm.gov/vernal/index.html</u>> - Duchesne and Uintah Counties.

The lands in Arizona are within the Navajo Indian Reservation and mineral rights are administered by the BIA.

Data Availability

Documentation for each LUP and RMP is available on each BLM SO Web site and most FO Web sites. In addition, copies of all LUPs, RMPs, EISs, Environmental Assessments (EAs), and other NEPA-required documentation are available at each BLM SO through its Information Access Center (also called Public Room). In addition, many of the documents can be ordered on compact disk (CD) from the SO. Each BLM SO Web site is organized independently, but each Web site has links to, or contains, all of the pertinent data relating to environmental planning, oil and gas leasing and development, and environmental protection and/or remediation.

All NEPA documentation for Utah is available on the new Environmental Notification Bulletin Board (ENBB) Web site < <u>http://www.ut.blm.gov/ENBBTEMP/enbbtemp.html</u>>, which provides for notice of all BLM actions occurring in each of the Utah FOs that are subject to NEPA regulation. An explanation on how to use the Web site and its search features is provided on the Web site.

Resource Management Planning within the Oil-producing Provinces

"Some of Utah's RMPs that are under revision have been identified as 'Time Sensitive Resource Management Plans' to timely address energy resources studied under the Energy Policy and Conservation Act (EPCA). In Utah, these include the Price and Vernal RMPs. Under EPCA, signed into law by former President Clinton in 2000, federal agencies were tasked with developing a national inventory of all oil and gas resources and reserves beneath federal lands. This data is now being incorporated into RMPs to plan for multiple uses on the public lands, and specifically plan for the responsible development of energy resources in these areas.

The EPCA report examines oil and gas resources of five major geologic basins in the West, three of which are partially located in Utah (Uinta/Piceance, Paradox/San Juan, and the Greater Green River Basins). In the EPCA, Congress requested that the study not only provide an estimate of oil and gas resources and reserves, but also information on any constraints that may limit development of these energy resources.

Use of the EPCA study in planning for Utah's federally managed lands is crucial to meeting the rising energy demands of the state. Since the majority of the region relies on locally generated oil and natural gas to run transportation, heat homes, and provide electricity, these local resources are necessary to prevent the additional costs and environmental impacts associated with importing resources from other states. Although many of Utah's oil and gas wells only generate average production, the cumulative production meets the needs of the region and reduces future dependency on foreign supplies.

In the planning process, the EPCA inventory will be used to determine oil and gas leasing stipulations and lease restrictions. It will also be used to determine criteria for waivers, exceptions, and modifications. In some cases the review may result in strengthening stipulations or lessening stipulations dependent upon the current conditions being addressed. Reviewing the stipulation information cannot supersede any of the laws and regulations that BLM must already follow.

The planning process for mineral development has and will continue to involve the public. The BLM is working in a collaborative manner with stakeholders to ensure responsible development of mineral resources. Integrating the EPCA inventory during the planning process will lay a foundation for sound management decisions that meet the nation's rising energy demands while protecting other important resources.

In addition to oil, gas and coalbed natural gas, the RMPs will also address solid mineral development (such as coal) and renewable energy resources (geothermal, wind, and so forth). Energy development requires various types and durations of land use, from temporary staging areas used only a few days or weeks, to facilities that may be present for 30 years or more. These uses and impacts will also be addressed in the plans. Most of these areas can be restored to a near natural state after energy resources are extracted."

The preceding citation was taken from the Energy section of the Utah BLM Land Use Planning Web site <<u>http://www.ut.blm.gov/landuseplanning/energy.htm</u>>. For more information on EPCA and planning efforts see the Utah <u>RMP Web sites</u>.

In general, planning activity within the four oil-producing provinces can be accessed via each SO or FO Web site. The links for each of the provinces are listed in the following sections.

Utah/Wyoming thrust belt: There is no new planning activity within the Utah/Wyoming thrust belt province. For the Utah portion of the area, public lands are managed by the Salt Lake FO, <<u>http://www.ut.blm.gov/saltlake_fo/</u> > under two Management Framework Plans (MFPs). The first is the Randolph MFP that was approved in 1980. The link to that document is <<u>http://www.ut.blm.gov/planning/RANDOLPHMFP.PDF</u>>. The second is the Park City MFP that was approved in 1974. A summary of the decisions relative to that plan is found in a document titled Park City Land Use Decisions and Highlights. The link to that document is <<u>http://www.ut.blm.gov/planning/PARKCITYSUM.PDF</u>>. Thrust belt lands in Wyoming are managed by the Kemmerer FO, <<u>http://www.wy.blm.gov/kfo/index.htm</u>>. The Kemmerer RMP is being revised and according to the RMP's Web site, <<u>http://www.blm.gov/rmp/kemmerer</u>>, the new plan will be completed in 2008.

Central Utah thrust belt - Hingeline: All of the lands in the central Utah thrust belt province are in Utah and public lands are managed by several BLM FOs. Public lands in most of the play area (Piute, Sanpete, and Sevier Counties) including the newly discovered Covenant field are managed by the Richfield FO, <<u>http://www.ut.blm.gov/richfield/index.html</u> >. Public lands in Utah County are managed by the Salt Lake FO, <http://www.ut.blm.gov/saltlake_fo/>, and public lands in Juab and Millard Counties are managed by the Fillmore FO, http://www.ut. blm.gov/fillmore fo/>. A relatively small part of the play area in Beaver County is managed by the Cedar City FO, <<u>http://www.ut.blm.gov/cedarcity_fo/</u>>. The Richfield FO is in the process of developing a new RMP, < http://www.blm.gov/rmp/ut/richfield/>, which is scheduled for completion in spring 2007. The RMP Web site contains the schedule for completion of the RMP, and numerous maps and documents related to the many environmental studies involved in the planning process. No new RMPs are being developed for play area lands managed by the Salt Lake and Fillmore FOs. The current LUP for lands managed by the Salt Lake FO is the Bear River East Plan Amendment EA, 1994. The document is not available online, but can be viewed at the BLM SO or at the Salt Lake FO. The current RMP for lands managed by the Fillmore FO is the House Range Resource Area Amended Resource Management Plan < House Range RA ARMP/ROD & RPS; 1987 >. In addition to the House Range Amended RMP, the House Range Resource Management Plan Oil and Gas Lease Implementation Environmental Assessment was approved in 1988. This document is not available online, but is available for review at the BLM SO or the Fillmore FO.

Uinta Basin: There is a substantial amount of planning activity in Utah and Colorado. The majority of the Uinta Basin province is in Utah and is managed by the Vernal FO, <<u>http://www.ut.blm.gov/vernal/index.html</u>>. A new RMP, covering Daggett, Duchesne, and Uintah Counties has been in the planning process since March 2001, and is scheduled for completion in 2007. The link to the Vernal RMP is <<u>http://www.blm.gov/rmp/ut/vernal/</u>>. Uinta Basin public lands in Colorado are managed by the White River FO. The link to the White River office is <<u>http://www.co.blm.gov/wrra/index.htm</u>>. Planning activity to amend the White River FO Oil and Gas Resource RMP is located at <<u>http://www.co.blm.gov/wrra/WrOilGasRMPAmendment.htm</u>>. The planning process began in June 2006 and is scheduled

for completion in September 2007.

Paradox Basin: The Paradox Basin province is largely in southeastern Utah, but also includes a significant amount of land in southwestern Colorado, and, to a lesser extent, Navajo Indian lands in Arizona. Oil and gas leasing activity on reservation lands in Arizona is administered by the BLM Farmington, New Mexico FO, <<u>http://www.nm.blm.gov/ffo/ffo_home.html</u>>. The Farmington FO is responsible for managing oil and gas activity in the Four Corners area, which includes BIA-administered tribal lands in Arizona and public lands in the San Juan Basin of New Mexico.

Paradox Basin province lands in Utah are managed by several BLM FOs, including Moab, Monticello, Price, and Richfield. A revised RMP for the Moab FO has been ongoing since 2003. Planning documentation and a Preliminary Alternatives Overview is available on the Moab RMP Web site http://www.blm.gov/rmp/ut/moab/. The current RMP for the Monticello FO was completed in 1991. Planning for a revised RMP was initiated in June 2003, and planning documentation for the revised Monticello RMP is available on the RMP's Web site <<u>http://www.blm.gov/rmp/ut/monticello/></u>. A planning document titled "Reasonable Foreseeable Development Scenario for Oil and Gas" was released July 1, 2005, and is available at <http://www.blm.gov/utah/monticello/RFD1.htm>. The Price FO released its Draft RMP/ Draft Environmental Impact Statement (EIS) in July 2004 and public review of the document ended in November 2004. The FO is currently considering and responding to the comments submitted, in preparation of the Proposed Plan/Final EIS. Planning documentation for the Price RMP is available at http://www.blm.gov/rmp/ut/price/. The Executive Summary for the RMP available <http://www.ut.blm.gov/landuseplanning/pricermp/ Draft is at pfodrmpexecutivesummary7-04.pdf>. The Richfield FO is also developing a new RMP. Planning was initiated in 2001 and the Draft RMP has been completed and is undergoing legal review. No schedule is available for the release of the Draft RMP. The Web site for the Richfield RMP is <<u>http://www.blm.gov/rmp/ut/richfield/</u>>. The Web site contains a link to a Preliminary Alternatives Summary that was released in January 2005.

Wilderness Area and Wilderness Study Area Lands

There is one Wilderness Area (WA) and several Wilderness Study Areas (WSA) in the four oil-producing provinces. These lands are identified within each oil province where they occur and are all withdrawn from mineral entry. Withdrawal orders are identified on MT plats, which are available at each BLM SO and local county courthouse. Some counties are posting digital images of MT plats on their Web sites. Additional research is ongoing at the UGS to map and summarize the lands involved in each province.

State-Owned Lands

State-owned lands are regulated by the individual states of Arizona, Colorado, Utah, and Wyoming. Oil-producing province lands in Arizona are all within the Navajo Indian Reservation thus no Arizona state-owned lands are involved in this analysis. Each state has its own leasing and development regulations that generally follow the federal guidelines. Links are provided to state-owned land administrators for Arizona, Colorado, Utah, and Wyoming.

Arizona State-owned Lands

As previously noted, all Arizona land in the Paradox Basin province is within the Navajo Indian Reservation. Oil and gas leases are administered by the BLM Farmington FO. Contact information for Arizona State-owned land is provided for convenience and continuity. State-owned land in Arizona is managed by the <u>Arizona State Land Board</u>. The Land Board's Web site provides links to all of the Land Board's rules and regulations, and sales notices and results. Oil and gas drilling and production are regulated by the <u>Arizona Oil and Gas Conservation Commission</u> (AOGCC). The AOGCC consists of five members appointed by the Governor and one ex-officio member, the State Land Commissioner. The Arizona Geological Survey (AZGS) provides administrative and staff support. The AOGCC's Web site provides all of the rules and regulations pertaining to oil and gas development and reporting.

Colorado State-owned Lands

Colorado state lands are referred to as State Trust Lands and are administered by the Colorado State Land Board. The Land Board is governed by a five-member commission appointed by the Governor and approved by the state Senate. The Colorado State Land Board Web site is <<u>http://trustlands.state.co.us</u> >. Parts of the Web site are under construction and may not be available. The street address is 1313 Sherman St., Room 621, Denver, CO 80203. The Web site contains all of the rules and regulations pertaining to oil and gas leasing. The Land Board has monthly meetings and the schedule is posted on its Web site. Lands in Mesa and Montrose Counties are managed by the Northwest District office in Craig, and lands in San Miguel, Dolores, and Montezuma Counties are managed by the South District office in Alamosa. District boundary maps and contact information are listed for each District at the following Web site - <<u>http://www.lands.state.co.us/Personnel/Districts.asp</u>>.

Oil and gas development in Colorado is regulated by the <u>Colorado Oil and Gas</u> <u>Conservation Commission</u>. The Commission's Web site contains all of the rules and regulations for oil and gas development as well as production and well-log data. The address and contact information is Colorado Oil and Gas Conservation Commission, 1120 Lincoln St., Room 801, Denver, CO 80203. Personnel listings and phone numbers are available on the Web site.

Wyoming State-owned Lands

State-owned lands in Wyoming are administered by the Wyoming Office of State Lands and Investments, $< \frac{\text{http://slf-web.state.wy.us}}{}$. The state of Wyoming owns approximately 3.6 million surfaces acres (1.5 million ha) and 4.2 million mineral acres (1.7 million ha). Approximately 86 percent of the surface acres and 84 percent of the mineral acres are managed for the benefit of the public schools. In addition, there are approximately 9000 acres (3640 ha) of non-trust acquired land within the state allocated to various state agencies that benefit specific institutions and the public. The Office of State Lands and Investments is governed by an elected five-member Board of Land Commissioners. The office address is 122 West 25th St. – Herschler Building. 3W, Cheyenne, WY 82002. The Web site has links to all of the rules and regulations pertaining to the leasing of mineral rights, and a listing of personnel and contact information. Drilling and production of oil and gas is regulated by the Wyoming Oil and Gas Conservation Commission (WYOGCC), < <u>http://wogcc.state.wy.us</u>>. Parts of the Web site are under construction, but when completed will provide a substantial amount of information pertaining to Wyoming's oil and gas resources. In addition to regulatory and statistical data, the Web site provides geological and geophysical log data and a multi-layered mapping function that is designed to map well locations, federal lease ownership and federal unit boundaries, as well as several other parameters. The WYOGCC office address is 2211 King Blvd., P.O. Box 2640, Casper, WY 82602.

Utah State-owned Lands

Overview: State-owned lands in Utah are divided into two groups. In general, the Utah School and Institutional Trust Lands Administration (SITLA) manages lands that were deeded to the state at the time of statehood for the benefit of schools and education. Lands that were subsequently deemed state-owned or Sovereign after statehood are those lands associated with navigable rivers, waterways, and lands underlying Great Salt Lake. The Utah Division of Forestry, Fire and State Lands (FFSL) manages these Sovereign lands. Each organization has its own rules and regulations, and issues oil and gas leases both on a competitive and non-competitive basis. The majority of state-owned lands in Utah are identified as trust lands.

Trust Lands: In general, Trust Lands are those lands that were deeded to the state at the time of Statehood. The following citations were taken from the SITLA Web site to explain how Trust Lands are managed.

"The Utah School and Institutional Trust Lands Administration (SITLA), <<u>http://www.utahtrustlands.com</u>>, was created in 1994 to manage 12 real estate trusts granted to the state of Utah by the United States at statehood. At that time, 1/9 of the total land in the state was designated school trust land, with added acreage for 11 other beneficiaries. Trust land totaled 7,475,297 acres (3,025,253 ha) at statehood. Since then, about half of what was originally granted to the state has been sold to private owners. More than 30 percent of what is now private land in Utah was originally trust land. The cash from the sale of those trust lands was deposited into the permanent funds of the beneficiaries."

"The SITLA manages a 3.5 million-acre (1.4 million ha) real estate portfolio for the financial benefit of the 12 beneficiaries. Trust lands include both surface lands and mineral lands. The 3.5 million acres discussed so far refer to surface lands in the trust. Most of these lands also have subsurface, or mineral lands, with them. In addition, there are about a million more acres (0.4 million ha) of mineral-only lands in the trust — for a total of 4.5 million acres (1.8 million ha) of mineral lands. Even though there are 12 trust beneficiaries, the Common Schools Trust owns 95 percent of all Utah trust land. Some areas of the state have large amounts of trust land, while others do not. For example, there are only 32 acres (13 ha) of trust land in Salt Lake County, while Millard County contains almost 403,000 acres (163,000 ha). Rural areas have a larger number of trust-land acres." The SITLA address is 675 East 500 South, Ste. 500, Salt Lake City, UT 84102. The Minerals Group, <<u>http://www.utahtrustlands.com/minerals</u>/>, manages the mineral and subsurface resources of the lands managed by the trust. The following general overview of oil and gas leasing on SITLA lands was provided by SITLA.

I. How to lease trust lands -

A. Competitive bidding process

1. Lands are nominated by outside parties or selected by SITLA staff.

2. Quarterly sales are held in January, April, July, November.

3. Sealed bid format opened on the last day of the month in which the sale is posted.

4. Winner is highest bidder who is qualified to do business in Utah and submits application on an appropriate form.

B. Non-competitive bidding process

1. Suspended in May 2000 – reinstated in limited form under new oil and gas rules in April 2005.

2. Selected parcels which receive no bids at the sealed bid auction, will be available "over the counter" from 8:00 AM the day after the sale for 90 days.

3. If not leased during that time, the lands must go through a competitive bid sale again.

II. What are the lease terms -

A. Basic terms

1. 1/8 (12.5 percent) landowner's royalty to SITLA

2. 10 year lease term

B. Terms may be modified at the discretion of the Director

III. Process for acquiring drilling permit -

A. Company puts location on drilling schedule and begins to check on rig availability.

B. Company stakes location and contracts for archeological study.

C. Application for Permit to Drill (APD) is filed with Division of Oil, Gas and Mining (DOGM) and simultaneously with SITLA.

D. Application for Permit to Drill to SITLA must include an Archeological Survey.

E. School and Institutional Trust Lands Administration forwards Archeology Study to State Historic Preservation Office (SHPO) for a 10-day review period.

F. Company verifies that it has adequate bonding for plugging, reclamation, and lease obligations under state guidelines with both DOGM and SITLA.

G. On-site is scheduled by DOGM. Any additional concerns by other state agencies are discussed at this meeting.

H. At the end of the 10-day SHPO review, if there are no concerns, SITLA notifies DOGM that it has released the APD for approval.

I. DOGM proceeds with their approval process.

The SITLA does not consult with the BLM on its lands but rather works with state agencies such as DOGM and the Division of Wildlife Resources to maintain standards on thrust lands.

The Minerals Group Web site provides links to Current Competitive Leasing, Over-The-Counter Leasing, Withdrawals and Special Notices, Fee Schedule, Forms and Applications, Rules, Rockhounding Information, and Contacts. Geographic Information System data is available online at $< \frac{ftp://lands-ftp.state.ut.us/pub/index.htm}{2}$. This Web page provides access to downloadable GIS data on BLM and Trust Lands mineral ownership, and links to several federal GIS-based Web sites.

Sovereign Lands: Sovereign lands are those lands that lie below the navigable waters within the state. There are approximately 1.5 million acres (0.6 million ha) of Sovereign lands in Utah; however, there are only about 5200 acres (2100 ha) within the Paradox Basin province and none have been identified in the other three oil-producing provinces. The following explanation of Sovereign lands is taken from the Sovereign lands Web page - <<u>http://www.ffsl.utah.gov/mmsovlands.htm</u>>:

"The state of Utah recognizes and declares that the beds of navigable waters within the state are owned by the state and are among the basic resources of the state, and that there exists, and has existed since statehood, a public trust over and upon the beds of these waters. It is also recognized that the public health, interest, safety, and welfare require that all uses on, beneath or above the beds of navigable lakes and streams of the state be regulated, so that the protection of navigation, fish and wildlife habitat, aquatic beauty, public recreation, and water quality will be given due consideration and balanced against the navigational or economic necessity or justification for, or benefit to be derived from, any proposed use."

The FFSL conducts competitive oil and gas lease sales and notices are published well in advance of sales. Administrative rules and Lease Application forms are posted on the S o v e r e i g n L a n d s L e a s e I n f o r m a t i o n W e b p a g e - $\frac{\text{http://www.ffsl.utah.gov/Lease/leaseinfo.php}}{\text{Map data in GIS format is also available online at }$.

Privately Owned Lands

Privately owned lands are also known as fee lands. Where the surface and mineral rights are owned by the same entity, the term is referred to as "fee simple." Where the mineral estate is owned in fee and the surface is owned by another entity, this is known as a split-estate. These lands can be owned by an individual; a non-government legal entity such as a company, partnership, or corporation; or a sovereignty in the case of an Indian tribe. In any case, oil and gas leases are negotiated with the mineral estate owner. Surface access may also have to be negotiated with the surface owner. Where an Indian tribe owns the mineral estate, leases are usually negotiated with the tribal business committee. There are numerous royalty owners associations that have been formed to pool information and lease management among groups of individual royalty owners, but none of these operate in Utah.

One of the largest non-profit nationwide organizations is the National Association of Royalty Owners (NARO), < <u>http://naro-us.org/about/</u>>. The NARO recently formed the Rocky Mountain chapter, <<u>http://naro-us.org/resources/rockiesnaro.htm</u>>, to represent the interests of mineral owners in the Rocky Mountain region of the United States. The Web site has a link to a free brochure that contains information on the lease process, negotiations, surface damages, spacing units, force pooling, division orders, and royalties.

Native American Reservation Lands

Native American Reservation or tribal lands include lands within an established Indian Reservation and held in trust by the U.S. government. Where tribal lands are held in trust, the BIA, <<u>http://www.doi.gov/bureau-indian-affairs.html</u>>, in association with the tribe administers the mineral estate. Where tribal lands are owned in fee, the tribe has sole authority for leasing its mineral rights. In the past several years the BIA has attempted to make the administrative effort more responsive to individual tribal interests. The BIA Office of Indian Energy and Economic Development has published a Notice of Proposed Rulemaking regarding Tribal Energy Resource Agreements (TERAs) designated under Title V, Section 503, of the Energy Policy Act of 2005 in the August 21, 2006, issue of the Federal Register. Tribal Energy Resource Agreements offer federally recognized tribes a new alternative for overseeing and managing energy and mineral resource development on their lands: the authority to enter into energy-related business agreements and leases, and for granting rights-of-way for pipelines, electric transmission, and distribution lines.

The proposed rule is intended to provide a process under which the Secretary, DOI would grant authority to a tribe through an approved TERA to review and approve leases, business agreements, and rights-of-way for specific energy development activities on tribal lands. Currently, tribes must first seek Secretarial approval of such actions through the BIA. All of the rules and regulations pertaining to oil and gas development on BIA-administered tribal lands are posted on the BIA Web site. The BIA Web site is currently unavailable due to litigation and there is no estimate to when the Web site will be restored.

Tribal lands in the Uinta Basin province are owned or controlled by several entities and some are held in trust and administered by the BIA. The Ute Indian Tribe Web site, <<u>http://www.utetribe.com/</u>>, contains a listing of the entities and links to personnel contacts. Additional information on the Uinta & Ouray Indian Reservation is provided in the Uinta Basin Land Classification Summary.

Tribal lands in the Paradox Basin province of Utah are Navajo Nation, <<u>http://www.navajo.org/</u>>, lands within the Navajo Indian Reservation. Paradox Basin tribal lands in Colorado are owned by the Southern Ute Indian Tribe, <<u>http://www.southern-ute.nsn.us/</u>>, and the Ute Mountain Ute Indian Tribe, < <u>http://www.utemountainute.com/</u> >. The Ute Mountain Ute Tribe's reservation lies in southwest Colorado, southeast Utah, and northern New Mexico. There are two communities on the Ute Reservation: the tribal headquarters in Towaoc, Colorado, and the small community at White Mesa, Utah. Oil and gas leasing activity on reservation lands is administered by the BLM Farmington, New Mexico FO, <<u>http://www.nm.</u><u>blm.gov/ffo/ffo_home.html</u>>. The Farmington FO is responsible for monitoring oil and gas activity in the Four Corners area, which includes BIA-administered tribal lands in Arizona and Colorado, and public lands in the San Juan Basin, New Mexico and Colorado.

The addresses and contact information to the Native American tribes and BIA agencies

are listed in Appendix D.

Utah/Wyoming Thrust Belt Land Classification Summary

Major oil plays in the Utah/Wyoming thrust belt province lie in a 70-mile-long by 18mile-wide (110 km x 29 km) elongate lobe containing approximately 708,417 acres (286,696 ha) of land in north-central Utah and southwestern Wyoming (figure 8). The lands are located in parts of Morgan, Rich, and Summit Counties, Utah, and Lincoln and Uinta Counties, Wyoming. Mineral ownership and management in the area are divided among BLM, private, and state ownership. Table 2 shows the land classification by major ownership or management entity. The majority of lands are privately owned (81.4 percent), although BLM and stateowned lands are dominant in Wyoming. The classification of lands underlying waterways, lakes, and reservoirs are classified as "Water" and are not subdivided by ownership. In Utah, these lands are primarily state-owned and administered by the FFSL. The mineral estate on these lands has likely been withdrawn from leasing or development.

Bureau of Land Management Lands

Bureau of Land Management lands in the Utah/Wyoming thrust belt province encompass 94,797 acres (38,364 ha), including 83,414 acres (33,758 ha) of land in Wyoming and 11,384 acres (4607 ha) of land in Utah. There are no Wilderness Area or Wilderness Study Area lands in the play area of the Utah/Wyoming thrust belt province. However, a minor amount of land (50 acres [20 ha]) has been designated as BOR. Bureau of Reclamation lands are, presumably, those lands adjacent to or near federally-owned or managed dams, reservoirs, and or other federal water or water-related projects. Most, if not all, of these BOR-classified lands likely have withdrawal orders that would prohibit or limit access to mineral entry or surface occupancy. Withdrawal orders have not been researched for any public lands identified in play areas in the Utah/Wyoming thrust belt province.

Mineral ownership and lands affected by withdrawal orders are identified on MT plats for each township; these plats can be accessed in BLM SOs in Salt Lake City, Utah, and Cheyenne, Wyoming, and local BLM FOs. Mineral Title plats are also available by county in county courthouses located in each county seat. For the Utah/Wyoming thrust belt province, BLM FOs are listed in Appendix B, and county courthouses are listed in Appendix C. Utah and Wyoming state lands and regulatory offices are listed earlier in this summary.

The Utah BLM SO is located in Salt Lake City. All of the planning documents, regulations, and maps related to oil and gas can be viewed at the Information Access Center. The Access Center is open daily from 7:45 AM to 4:30 PM. The BLM Utah SO Web site is <<u>http://www.ut.blm.gov/</u>>. The Salt Lake FO is responsible for planning and management activities for the area within the Utah portion of the thrust belt province. The Salt Lake FO Web site is <<u>http://www.ut.blm.gov/</u>>.

The BLM Wyoming SO is located in Cheyenne. The BLM Wyoming SO Web site can be accessed at <<u>http://www.wy.blm.gov/</u>>. The phone number for the Public Desk is (307) 775-6256, Fax: (307) 775-6082. The Kemmerer FO is responsible for the planning and management of lands within the Wyoming portion of the thrust belt province. The Web site for the Kemmerer FO is <<u>http://www.wy.blm.gov/kfo/</u>>.



Figure 8. Surface and/or mineral ownership map for the Utah/Wyoming thrust belt oilproducing province.

Land Classification	Mineral Mgt. Agency	Acres	Percent of Play Area
BLM	State/District office	94,797	13.4
Private	Private/Corporate	576,701	81.4
State Lands	State	23,009	3.3
State Parks/Wildlife Reserves	State	10,210	1.4
Water	State/Federal	3702	0.5
Totals		708,419	100.00

 Table 2. Utah/Wyoming thrust belt land classification summary.

Privately Owned Lands

There are approximately 577,000 acres (234,000 ha) of privately owned lands in the play areas of the Utah/Wyoming thrust belt province, including about 384,000 acres (155,000 ha) in Utah, and about 192,000 acres (77,700 ha) in Wyoming. Some of these lands have splitmineral estate and are subject to withdrawal, including some privately owned lands within the NF system. An examination of MT plats is necessary to determine which lands are owned in fee and which have split-mineral estate. Master Title plats are available at BLM SOs, and at local county courthouses. Lease terms, royalty rates, and surface access are negotiated with each mineral estate or surface owner if required.

State Lands

There are approximately 23,000 acres (9300 ha) of state-owned lands in the play areas of the Utah/Wyoming thrust belt province, including 20,457 acres (8279 ha) in Wyoming, and 2541 acres (1028 ha) in Utah. In addition, there are 10,210 acres (4132 ha) of Utah state lands that are within state parks and wildlife reserves. State-owned lands in Utah are managed by SITLA. The SITLA Web site is <<u>http://www.utahtrustlands.com/</u>>. An explanation of how SITLA manages the mineral estate of its trust lands is provided in an earlier section of this summary.

State-owned lands in Wyoming are administered by the Wyoming Office of State Lands and Investments < <u>http://slf-web.state.wy.us</u>>. Please refer to State Lands Web site for mineral leasing policies, rules, and regulations.

State Parks and State Wildlife Reserves

There are approximately 10,210 acres (4132 ha) of Utah state lands in the play areas that are within state parks and wildlife reserves of the Utah/Wyoming thrust belt province. Most of the lands are north and west of Interstate Highway 80. It is assumed that these lands have been withdrawn from mineral entry, but additional research will be required to verify this. There are several tracts of Wyoming state lands near Evanston, Wyoming, that may also be withdrawn from mineral entry. See the above section on State Lands for Web site access to state land agencies in Utah and Wyoming.

Central Utah Thrust Belt - Hingeline Land Classification Summary

There is only one play in the central Utah thrust belt – Hingeline province: the Navajo Sandstone play. The play area covers approximately 1.19 million acres (482,000 ha) (figure 9, table 3), all of which is in Utah.



Figure 9. Surface and/or mineral ownership map for the central Utah thrust belt – Hingeline oil-producing province.

Land Classification	Mineral Mgt. Agency	Acres	Percent of Play Area
BLM	State/District office	200,256	16.7
Forest Service	State/District office	301,487	25.2
Military Reservations	Department of Defense	692	0.1
Native American Reservations	BIA/Indian Tribe	544	0.1
Private	Individual/Corporate	554,396	46.3
State Lands	State	130,821	10.9
Water	State/Federal	4812	0.4
Totals		1,193,008	100.0

 Table 3. Central Utah thrust belt – Hingeline land classification summary.

Bureau of Land Management Lands

Bureau of Land Management lands in the Navajo Sandstone play area of the central Utah thrust belt – Hingeline province include 117,271 acres (47,460 ha) of unrestricted lands and 82,985 acres (33,584 ha) of restricted or withdrawal lands. These restricted or withdrawal lands may be open to oil and gas leasing. Contact the BLM SO or local FO for specific withdrawal orders. Bureau of Land Management lands in most of the play area (Piute, Sanpete, and Sevier Counties), including the newly discovered Covenant field, are managed by the Richfield FO, <<u>http://www.ut.blm.gov/richfield/index.html</u> >. Public lands in Utah County are managed by the Salt Lake FO, <<u>http://www.ut.blm.gov/saltlake_fo/</u>>, and public lands in Juab and Millard Counties are managed by the Fillmore FO, <<u>http://www.ut.blm.gov/fillmore_fo/</u>>. A relatively small part of the play area in Beaver County is managed by the Cedar City FO, <<u>http://www.ut.blm.gov/cedarcity_fo/</u>>. The addresses for the BLM FOs are listed in Appendix B. A discussion of planning activity within each FO is discussed earlier in this summary.

U.S. Forest Service Lands

There are more than 300,000 acres (121,000 ha) of FS-classified lands in the Navajo Sandstone play area of the central Utah thrust belt – Hingeline province that are part of the National Forest System. These lands lie primarily within the Fish Lake, Manti-LaSal, and Uinta National Forests. Links to the Web sites for these FS offices are: Fishlake, Manti-LaSal, and Uinta National Forests. Links to the FS Web site and subsequent links to the policies, regulations, and rules pertaining to oil and gas drilling and development have been presented in a previous section of this summary.

Military Reservation Lands

There are 692 acres (280 ha) of Military Reservation land in the Navajo Sandstone play area. The land is in one tract and is located northeast of Gunnison. Research is in progress by the UGS to verify the land classification and to identify its use.

Native American Reservation Lands

There are 544 acres (220 ha) in the Navajo Sandstone play area of the central Utah thrust belt – Hingeline province that are classified as Native American Reservation lands. We

have identified this land (figure 9), but additional research needs to be done by the UGS to identify the tribal entity and provide contact information.

Privately Owned Lands

Nearly one-half of the Navajo Sandstone play area of the central Utah thrust belt – Hingeline province is classified as privately owned lands. This includes 512,206 acres (207,290 ha) of unrestricted lands, 21,359 acres (8644 ha) of lands within the National Forest system, and 20,830 acres (8430 ha) of lands that are subject to protective withdrawal. Privately owned lands within the National Forest system and those lands subject to protective withdrawal are likely split-estate lands where the mineral rights are reserved by the federal government and the surface is privately owned. Lands that are subject to protective withdrawal may or may not be leaseable, and an examination of the MT plats is required to determine the nature of the protective withdrawal order. Master Title plats are available at the BLM SO, local FO, and at the local county courthouses.

State Lands

There are 130,821 acres (52,943 ha) of state-owned lands in the Navajo Sandstone play area including 57,514 acres (23,276 ha) of SITLA-managed lands, 48 acres (19 ha) within State Parks, 28,000 acres (11,300 ha) in State Wildlife Reserves, and 1136 acres (460 ha) that are subject to protective withdrawal orders. A discussion on SITLA lands has been presented earlier in this summary. The SITLA Web site is <<u>http://www.utahtrustlands.com/default.asp</u>>.

Uinta Basin Land Classification Summary

The Uinta Basin province is primarily located in northeastern Utah, although a minor part of the basin overlaps into northwestern Colorado (figure 10). The province covers approximately 5.39 million acres (2.18 million ha) (table 4); 5.26 million acres (2.13 million ha) (97.6 percent) are in Utah, and 0.129 million acres (0.052 million ha) (2.4 percent) are in Colorado.

Bureau of Land Management Lands

Bureau of Land Management lands include the following subgroups: non-classified lands in Utah (1,210,121 acres [489,736 ha]), non-classified lands in Colorado (100,596 acres [40,711 ha]), acquired lands (4263 acres [1725 ha]), BOR lands (7203 acres [2915 ha]), DOD lands (2718 acres [1100 ha]), Power Withdrawal and classified lands (35,776 acres [14,479 ha]), Protective Withdrawal lands (663,239 acres [268,413 ha]), and Public Water Reserve lands (2446 acres [990 ha]). For the most part, non-classified lands are open for oil and gas leasing with standard lease terms. Acquired lands, BOR lands, DOD lands, and Power Withdrawal lands are likely withdrawn from mineral entry. Protective Withdrawal lands may be available for oil and gas development if the withdrawal order is for other minerals. An examination of the MT plats will provide clarification for lands that are subject to withdrawal orders. The plats are available at each BLM SO and FO (Appendix B), and at each county courthouse (Appendix C).



Figure 10. Surface and/or mineral ownership map for the Uinta Basin oil-producing province.

Table 4. Uinta Basin land classification summary.

Land Classification	Mineral Mgt. Agency	Acres	Percent of Play Area
BLM	State/District office	2,026,363	37.6
Forest Service	State/District office	482,576	8.9
Native American Reservations	BIA/Indian Tribe	1,058,240	19.6
Private	Private/Corporate	1,200,348	22.3
State Lands	State	591,718	11.0
USFWS (U.S. Wildlife Refuge)	USFWS	8975	0.2
Water	State/Federal	23,874	0.4
Totals		5,392,094	100.00

There are 482,576 acres (195,299 ha) of mostly BLM lands whose surface is managed by the FS. These lands are mostly within the National Forest system and are subject to oil and gas leasing with some surface occupancy restrictions. These restrictions are outlined in the RMP, LUP, or other planning documents. The local BLM FO has specific occupancy stipulations or restrictions.

Wilderness Study Area Lands have been withdrawn from mineral entry or are under protective withdrawal, but are still managed by the BLM. Additional research by the UGS is in progress to compile locations and document the Wilderness Study Area lands in the Uinta Basin province play area.

U.S. Forest Service Lands

Forest Service lands in Duchesne and Uintah Counties lie within the Ashley National Forest, and FS lands in Utah and Wasatch Counties lie within the Uinta National Forest. Rules and regulations for oil and gas drilling and development on National Forest lands are outlined on the FS Minerals and Geology Management Web page - <<u>http://www.fs.fed.us/geology/</u>>. The Web page contains a link to a Web page for Energy Leasable Minerals, <<u>http://www.fs.fed.us/geology/</u>>. The Web page contains a link to a Web page for Energy Leasable Minerals, <<u>http://www.fs.fed.us/geology/</u>>, which, in turn, provides links to all of the federal legislation (Acts), policies, regulations, planning manuals, and forms related to oil and gas development on FS lands. The FS Web site <<u>http://www.fs.fed.us/</u>> provides links to all of the regional offices within the FS system and contains all of the legislation, policies, regulations, and rules pertaining to surface use and mineral development on FS lands.

Native American Lands

Native American Lands in the Uinta Basin generally lie within the Uintah & Ouray Reservation and consist of several different types of ownership. The following explanation and contact information for the staff of the below-listed agencies and organizations is provided in a document titled <u>How to do Business on the Uintah and Ouray Reservation</u>. The document is available on the Ute Indian Tribe's Energy and Minerals Department Web page, <<u>http://www.utetribe.com/mineralResourcesDevelopment/energyMinerals.html</u>>.

"The Uintah & Ouray Reservation in the Uinta Basin province has a checkerboard ownership pattern containing Ute Indian Tribe, Ute Indian Allotted, and Ute Distribution Corporation jointly managed Indian trust minerals, along with privately owned and federally owned minerals. Indian properties cover approximately 1.2 million surfaced-owned acres (0.49 million ha) and 400,000 mineral-owned acres (162,000 ha) within the 4-million-acre (1.6 million ha) jurisdictional reservation boundary. Both surface and mineral properties are owned by the Ute Indian Tribe, Ute Indian Allottees, and Ute Distribution Corporation in joint management."

The Ute Indian Tribe has formed its own energy development company, Ute Energy, LLC. The following introduction was taken from the <u>Ute Energy, LLC</u> Web site.

"The Ute Indian Tribe as part of its financial plan has formed an integrated

energy company (Ute Energy, LLC), with plans to develop 300,000 acres (121,000 ha) of undeveloped lands on the Uintah & Ouray Reservation. Four distinct areas are in the process of development with partnerships already in place with Salt Lake City, Utah-based Questar Corp.; Boston, Massachusetts-based Fidelity Investors Management; Denver, Colorado-based Bill Barrett Corp.; and Bakersfield, California-based Berry Petroleum."

The addresses and telephone numbers, and Web sites, if available, for the Ute Indian Tribe, Ute Energy, LLC, BIA Uintah & Ouray Agency, and Ute Distribution Corp. are provided in Appendix D.

Privately Owned Lands

There are 1.2 million acres (4.9 million ha) of privately owned lands in the Uinta Basin province including approximately 28,000 acres (11,000 ha) in Colorado. Some of these lands have split-mineral estate and are subject to withdrawal, including some privately owned lands within the NF system. An examination of MT plats is required to determine which lands are owned in fee and which have split-mineral estate. Master Title plats are available at BLM SOs, and at local county courthouses.

State Lands

There are 591,718 acres (239,468 ha) of state-owned lands in the Uinta Basin province. These lands primarily include SITLA lands, and lands that are within State Wildlife Reserves and State Parks that have been withdrawn from mineral entry. The SITLA Web site, <<u>http://www.utahtrustlands.com/default.asp</u>>, provides links to downloadable GIS files that provide surface and mineral ownership coverage statewide, and oil and gas leasing rules, regulations, and a schedule for competitive lease offerings.

U.S. Fish and Wildlife Reserve Lands

There are about 8975 acres (3632 ha) of land within the Ouray Wildlife Refuge of the Uinta Basin province. Some or all of these lands may be withdrawn from mineral entry or surface occupancy. An examination of MT plats will show which lands have been withdrawn. The Vernal FO is aware of lands that have restricted surface occupancy.

Paradox Basin Land Classification Summary

The Paradox Basin province is located primarily in southeastern Utah and southwestern Colorado with a small amount of land in northeastern Arizona. The Paradox Basin province is the largest of the four oil-producing provinces in terms of major oil play areas (7.78 million acres [3.15 million ha]), and includes 6.18 million acres in (2.50 million) Utah, 1.48 million acres (0.60 million ha) in Colorado, and about 121,000 acres (490,000 ha) in Arizona (figure 11, table 5). The province is also one of the first areas to be explored for oil in the state.



Figure 11. Surface and/or mineral ownership map for the Paradox Basin oil-producing province.

Land Classification	Mineral Mgt. Agency	Acres	Percent of Play Area
BLM	State/District office	4,246,997	54.6
Forest Service	State/District office	479,966	6.2
Military Reservations	Department of Defense	1631	<0.1
National Parks/Monuments	National Park Service	677,890	8.7
Native American Reservations	BIA/Indian Tribe	675,011	8.7
Private	Individual/Corporate	1,146,324	14.7
State/Sovereign Lands	State	493,697	6.3
Wilderness Area	Federal	45,956	0.6
Water	State/Federal	9806	0.1
Totals		7,777,278	100.0

 Table 5. Paradox Basin land classification summary.

Bureau of Land Management Lands

There are approximately 4.25 million acres (1.72 million ha) of BLM lands in play areas of the Paradox Basin province, including 812,539 acres (328,835 ha) in Colorado, and 3,434,458 acres (1,389,925 ha) in Utah (figure 11, table 5). Approximately 282,066 acres (114,152 ha) are subject to protective withdrawal orders and include lands in Primitive Areas, Public Water Reserves, or under the control of the BOR. The BLM lands in Colorado have been mapped and acreage summaries have been prepared for each BLM district. Research is ongoing to document withdrawal orders, if any, on these Colorado lands.

Appendix B contains a listing of BLM FO addresses and Web sites for the Paradox Basin province; Appendix C contains a listing of the county courthouses within the province.

U.S. Forest Service Lands

There are approximately 479,966 acres (194,242 ha) of FS lands in play areas of the Paradox Basin province, including 16,208 acres (6559 ha) in Colorado and 460,758 acres (186,469 ha) in Utah. Approximately 6970 acres (2820 ha) are subject to protective withdrawal. All of the FS lands in Utah are in the Manti-La Sal NF, <<u>http://www.fs.fed.us/r4/mantilasal/</u>>. Forest Service lands in Colorado are in the San Juan NF, <<u>http://www.fs.fed.us/r4/mantilasal/</u>>. Links to the FS Web site and subsequent links to the policies, regulations, and rules pertaining to oil and gas drilling and development have been presented in a previous section of this report.

Military Reservation Lands

Approximately 1630 acres (660 ha) in the Paradox Basin province is classified as Military Reservation lands. These lands are located near Green River, Utah, and are associated with the former Green River missile launching facility.

National Parks, Monuments, and Recreation Areas

Play areas of the Paradox Basin province have about 677,890 acres (274,340 ha) classified as National Parks and Monuments, including 231 acres (94 ha) in <u>Hovenweep National Monument</u> in Utah and Colorado, and 677,659 acres (274,249 ha) in <u>Arches National Park</u>, <u>Canyonlands National Park</u>, <u>Natural Bridges National Monument</u>, and <u>Glen Canyon</u>

National Recreation Area (NRA) in Utah. It is likely that the lands within National Parks and Monuments have been withdrawn from mineral entry, but additional research by the UGS is required to determine which, if not all, of the lands in the Glen Canyon NRA have been withdrawn.

Native American Reservations

Play areas of the Paradox Basin province contain 675,011 acres (273,177 ha) classified as Native American Reservation lands. The majority of these are <u>Navajo Nation</u> tribal lands that lie within the Navajo Indian Reservation, and include all Native American Reservation lands in Utah and Arizona. The Navajo Nation administration center is in Window Rock, Arizona. Native American Reservation lands in Colorado are within the <u>Ute Mountain Ute</u> Indian Reservation. Ute Mountain Ute tribal offices are a few miles south of Cortez in Towaoc, Colorado. Contact information for each tribe is contained in Appendix D. Research is ongoing by the UGS to determine the mineral acreages for each tribe, and the determination of which tribal lands are held in trust and which lands are owned in fee.

Privately Owned Lands

There are approximately 1.15 million acres (0.47 million ha) of privately owned lands in play areas of the Paradox Basin province, including 643,788 acres (260,541 ha) in Colorado, and 502,546 acres (203,380 ha) in Utah. Privately owned lands include those lands owned by corporate or individual entities, organizations, and sovereign nations in the case of lands owned by Indian tribes. Some of these lands have split-mineral estate and are subject to withdrawal, including some privately owned lands within the NF system. An examination of MT plats is required to determine which lands are owned in fee and which have split-mineral estate. Master Title plats are available at BLM SOs, and at local county courthouses.

State and Sovereign Lands

There are about 488,502 acres (197,697 ha) of Utah and Colorado state lands in play areas of the Paradox Basin province, and about 5195 acres (2102 ha) of Sovereign lands in Utah. Some of the lands are in state parks, recreation areas, or wildlife reserves, and some are subject to protective withdrawal. The <u>Colorado State Land Board</u> manages the trust lands in Colorado, and <u>SITLA</u> manages the trust lands in Utah. Research is in progress to determine the amount of trust lands in each state. The Utah <u>Division of Forestry</u>, Fire, & State Lands manages sovereign lands in Utah. Office addresses and a discussion of each agency have been provided earlier in this summary.

Wilderness Area and Wilderness Study Area Lands

The Dark Canyon Wilderness Area is the only Wilderness Area in the Paradox Basin province and encompasses about 45,956 acres (18,598 ha) within the Manti-La Sal National Forest between Cathedral Butte and Natural Bridges National Monument. Research by the UGS is in progress to compile locations and document Wilderness Study Area (WSA) lands in the Utah portion of the Paradox Basin province. There are no WSAs in the Colorado or Arizona parts of the province.

TECHNOLOGY TRANSFER

The UGS is the Principal Investigator and prime contractor for this project under the U. S. Department of Energy (DOE) Preferred Upstream Management Program (PUMPII). All play maps, reports, databases, and other deliverables produced for the PUMPII project will be published in interactive, menu-driven digital (Web-based and compact disc) and hard-copy formats by the UGS for presentation to the petroleum industry. Syntheses and highlights will be submitted to refereed journals, as appropriate, such as the *American Association of Petroleum Geologists (AAPG) Bulletin* and *Journal of Petroleum Technology*, and to trade publications such as the *Oil and Gas Journal*.

The technology-transfer plan included the formation of a Technical Advisory Board and a Stake Holders Board. These boards meet annually with the project technical team members. The Technical Advisory Board advises the technical team on the direction of study, reviews technical progress, recommends changes and additions to the study, and provides data. The Technical Advisory Board is composed of field operators from the oil-producing provinces of Utah that also extend into Wyoming or Colorado. This board ensures direct communication of the study methods and results to the operators. The Stake Holders Board is composed of groups that have a financial interest in the study area including representatives from the State of Utah (School and Institutional Trust Lands Administration and Utah Division of Oil, Gas and Mining) and the federal government (Bureau of Land Management and Bureau of Indian Affairs). The members of the Technical Advisory and Stake Holders Boards receive all quarterly technical reports and copies of all publications, and other material resulting from the study. Board members also provide field and reservoir data, especially data pertaining to best practices. Project activities, results, and recommendations were presented at this meeting.

Project materials, plans, and objectives were displayed at the UGS booth during the 2006 AAPG Annual Convention, April 9-12, 2006, in Houston, Texas, and AAPG Rocky Mountain Section (RMS) Meeting, June 10-13, 2006, in Billings, Montana. Three UGS scientists staffed the display booth at this event. Project displays will be included as part of the UGS booth at professional and other public meetings throughout the duration of the project.

Utah Geological Survey Survey Notes and Web Site

The UGS publication *Survey Notes* provides non-technical information on contemporary geologic topics, issues, events, and ongoing UGS projects to Utah's geologic community, educators, state and local officials and other decision-makers, and the public. *Survey Notes* is published three times yearly. Single copies are distributed free of charge and reproduction (with recognition of source) is encouraged.

The UGS maintains a Web site on the Internet, <u>http://geology.utah.gov</u>. The UGS site includes a page under the heading *Utah Geology/Oil, Coal, and Energy*, which describes the UGS/DOE cooperative studies (PUMPII, Paradox Basin [two projects], Ferron Sandstone, Bluebell field, Green River Formation), and has a link to the DOE Web site. Each UGS/DOE cooperative study also has its own separate page on the UGS Web site. The PUMPII project page, <u>http://geology.utah.gov/emp/pump/index.htm</u>, contains (1) a project location map, (2) a description of the project, (3) a reference list of all publications that are a direct result of the project, (4) poster presentations, and (5) quarterly technical progress reports.

Presentations

The following presentations were made during the reporting period as part of the technology transfer activities:

"Exploration History and Petroleum Geology of the Central Utah Thrust Belt" by Douglas A. Sprinkel and Thomas C. Chidsey, Jr., April 6, 2006, at the Guy F. Atkinson Lecture Series, University of Utah, Salt Lake City, Utah. The exploration history, petroleum geology, oil source and migration, the Covenant field discovery, and potential of the central Utah thrust belt Navajo Sandstone oil play comprised the presentation.

"Major Oil Plays in San Juan County" by Roger L. Bon, May 15, 2006, to the San Juan County Commissioners and general public, Monticello, Utah. The petroleum geology of the Paradox Basin, play potentials, land-use issues, and the economic impact on the counties were the focus of the discussion.

"Utah's Petroleum Systems, Enhanced Oil Recovery, and Opportunities for CO_2 Sequestration" by Rick Allis, May 23, 2006, at the Interstate Oil & Gas Compact Commission Midyear Issues Summit, Billings, Montana. Utah's exploration history and an overview of the petroleum geology of the major plays and their potential were part of the presentation.

"Discovering Oil in Old Wells: Recent Success in the Roosevelt Unit and Bluebell Field, Uinta Basin, Utah" by C.D. Morgan, June 13, 2006, at the AAPG Rocky Mountain Section Meeting, Billings, Montana. An overview of Uinta Basin oil plays, the geology of Bluebell field, and best practices were included in the presentation.

Project Publications

- Chidsey, T.C., Jr., 2006, Major oil plays in Utah and vicinity quarterly technical progress report for the period January 1 to March 31, 2006: U.S. Department of Energy, DOE/FC26-02NT15133-15, 67 p.
- Sprinkel, D.A., and Chidsey, T.C., Jr., 2006, Exploration history and petroleum geology of the central Utah thrust belt: American Association of Petroleum Geologists Search and Discovery Article No. 10103, Online, <<u>http://www.searchanddiscovery.net/</u><u>documents/2006/06028sprinkel/index.htm</u>>, posted May 13, 2006.

CONCLUSIONS AND RECOMMENDATIONS

1. A combination of depositional and structural events created the right conditions for oil generation and trapping in the major oil-producing provinces. Oil plays are specific geographic areas having petroleum potential due to favorable source rock, migration paths, reservoir characteristics, and other factors. Numerous plays are found in the Utah/Wyoming thrust belt, central Utah thrust belt - Hingeline, Uinta Basin, and

Paradox Basin – the four major oil-producing provinces of Utah, three of which extend into Wyoming, Colorado, and/or Arizona.

- 2. Land-use constraints within oil plays are a critical concern to current and potential operators exploring and developing petroleum resources in Utah and vicinity. Land classification maps and land ownership acreage summaries for Utah's major oil-producing provinces portray multiple types of surface and/or mineral ownership. These maps and summaries will help guide petroleum companies in planning exploration and land-acquisition strategies, pipeline companies and gas processors in planning future facilities and pipeline extensions, and government agencies in decision-making processes.
- 3. Substantial land, environmental, regulatory, and mineral leasing information is available on all of the federal Web sites involved in oil and gas leasing and/or regulation. To a lesser extent similar information is available on most state Web sites. We have compiled locations and documented the major land and mineral ownership types in each oil-producing province; identified the federal, state, county, and other private and nonprofit agencies involved in the environmental analysis, leasing, and development of oil and gas resources; and provided an overview and listing of pertinent data, documents, and research tools that might be helpful in understanding the oil and gas industry, primarily in Utah, but also in Arizona, Colorado, and Wyoming.
- 4. The major plays in the oil-producing provinces encompass nearly 15.1 million acres (6.1 million ha) and include almost all of the potential oil- and gas-bearing land in Utah. Mineral ownership and management, including leasing, is divided primarily among federal, state, and private interests. Private interests also include Native American Reservation lands and may include Native American mineral ownership outside an Indian Reservation. Mineral ownership patterns vary among the provinces and dominant ownership is somewhat different in each area. Federal ownership is multifaceted in that while the mineral estate is managed by the BLM, the overlying surface estate might be managed by other federal agencies. The surface estate may be privately owned, creating a split estate, which is very common in the Western U.S.
- 5. We recommend additional research and mapping by the UGS to summarize WA, WSA, and BLM lands that are within the National Forest system in oil-producing provinces. Research is in progress to determine the amount of trust lands in these provinces for each state. In addition, withdrawal orders have not been researched for any lands identified in the Utah/Wyoming thrust belt province and should be completed. Research is required to verify that Utah state lands in the Utah/Wyoming thrust belt province containing state parks and wildlife reserves have been withdrawn from mineral entry. Military Reservation land in the central Utah thrust belt Hingeline province needs to be verified and its use determined. For Native American Reservation lands, research needs to be done to identify the tribal entity, provide contact information, determine mineral acreages for each tribe, and delineate which tribal lands are held in trust and which lands are owned in fee. Study and documentation is required to identify the Wilderness Study Area lands in the Uinta Basin province. Research is ongoing to

document withdrawal orders, if any, on Colorado BLM lands in the Paradox Basin province. It is likely that the lands within National Parks and Monuments have been withdrawn from mineral entry, but additional evaluation is required to determine which, if not all, of the lands in the Glen Canyon NRA have been withdrawn.

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James Parker, Sharon Wakefield, and Cheryl Gustin of the UGS prepared the figures. Cheryl Gustin formatted the manuscript. This report was reviewed by David Tabet and Michael Hylland of the UGS.

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APPENDIX A

FEDERAL AGENCIES INVOLVED IN MINERAL LEASING ACTIVITIES

U.S. Department of the Interior

Bureau of Indian Affairs Office of Indian Energy and Economic Development 1951 Constitution Avenue, N.W., Room 20–South Interior Building Washington, D.C. 20245 http://www.bia.gov (currently inactive)

Bureau of Land Management MAILING ADDRESS: 1849 C St NW, Washington, DC 20240 STREET ADDRESS: 1620 L St NW, Washington, DC 20036 http://www.blm.gov/nhp/

Bureau of Reclamation Washington, DC 1849 C St., NW Washington, DC 20240 http://www.usbr.gov/ U.S. Fish and Wildlife Service 1849 C Street, NW Washington, DC 20240 Phone: 1 (800) 344-9453 http://www.fws.gov

Minerals Management Service Washington, DC 1849 C Street, N. W. MS 4243 Washington, D. C., 20240 Phone: (202) 208-3500 http://www.mms.gov

Minerals Revenue Management P.O. Box 25165 Denver Federal Center, Building 85 Denver, CO 80225-0165 Phone: (303) 231-3162 http://www.mrm.mms.gov

U.S. Department of Agriculture

U.S. Forest Service Mail Stop 1126 RPC 5 1400 Independence Av SW Washington, D.C. 20250 Phone: (703) 605-4545 Fax: (703) 605-1575 <u>http://www.fs.fed.us/</u> Web site for Energy Leasable Minerals <u>http://www.fs.fed.us/geology/mgm_leasable.html</u>

APPENDIX B

BUREAU OF LAND MANAGEMENT STATE AND FIELD OFFICES

Utah/Wyoming Thrust Belt

Utah

Utah State Office 440 West 200 South, Suite 500 Salt Lake City, UT 84145 Phone: (801) 539-4001 Fax: (801) 539-4013 http://www.ut.blm.gov Salt Lake Field Office 2370 South 2300 West Salt Lake City, UT 84119 Phone: (801) 977-4300 Fax: (801) 977-4397 http://www.ut.blm.gov/saltlake_fo/

Wyoming

Wyoming State Office 5353 Yellowstone Rd. Cheyenne, WY 82003 Phone: (307) 775-6256 Fax: (307) 775-6082 http://www.wy.blm.gov/ Kemmerer Field Office 312 Highway 189 N. Kemmerer, WY 83101-9711 Phone: (307) 828-4500 Fax: (307) 828-4539 http://www.wy.blm.gov/kfo/index.htm

Central Utah Thrust Belt - Hingeline

UtahRichfield Field OfficeSalt150 East 900 North2370Richfield, Utah 84701SaltPhone: (435) 896-1500PhonFax: (435) 896-1550Fax:http://www.ut.blm.gov/richfield/http://

Fillmore Field Office 35 E. 500 N. Fillmore, UT 84631 Phone: (435) 743-3100 Fax: (435) 743-3135 http://www.ut.blm.gov/fillmore fo/ Salt Lake Field Office 2370 South 2300 West Salt Lake City, UT 84119 Phone: (801) 977-4300 Fax: (801) 977-4397 http://www.ut.blm.gov/saltlake_fo/

Cedar City Field Office 176 East DL Sargent Drive Cedar City, UT 84720 Phone: (435) 586-2401 Fax: (435) 865-3058 http://www.ut.blm.gov/cedarcity_fo/

Uinta Basin

Colorado

Colorado State Office 2850 Youngfield Street Lakewood, CO 80215 White River Field Office 73544 Hwy 64 Meeker, CO 81641 Phone: (303) 239-3600 Fax: (303) 239-3933 http://www.co.blm.gov

Grand Junction Field Office 2815 H Road Grand Junction, CO 81506 Phone: (970) 244-3000 Fax: (970) 244-3083 http://www.co.blm.gov/gjra/gjra.html Phone: (970) 878-3800 Fax: (970) 878-3805 http://www.co.blm.gov/wrra/index.htm

Utah State Office 440 West 200 South, Suite 500 Salt Lake City, UT 84145 Phone: (801) 539-4001 Fax: (801) 539-4013 http://www.ut.blm.gov

Vernal Field Office 170 South 500 East Vernal, UT 84078 Phone: (435) 781-4400 Fax: (435) 781-4410 http://www.blm.gov/utah/vernal/index.html Salt Lake Field Office 2370 South 2300 West Salt Lake City, UT 84119 Phone: (801) 977-4300 Fax: (801) 977-4397 http://www.ut.blm.gov/saltlake_fo/

Price Field Office 125 South 600 West Price, UT 84501 Phone: (435) 636-3600 Fax: (435) 636-3657 http://www.blm.gov/utah/price/

Moab Field Office 82 East Dogwood Moab, Utah 84532 Phone: (435) 259-2100 Fax: (435) 259-2106 http://www.blm.gov/utah/moab/index.html

Paradox Basin

Utah

Arizona				
Arizona State Office	Farmington, NM Field Office			
One North Central Avenue, Suite 800	1235 La Plata Highway, Suite A			
Phoenix, AZ 85004-4427	Farmington, NM 87401			
Phone: (602) 417-9200	Phone: (505) 599-8900			
Fax: (602) 417-9314	Fax: (505) 599-8998			
http://www.blm.gov/az/iac/index.htm	http://www.nm.blm.gov/ffo/ffo_home.html			
Col	orado			
Grand Junction Field Office	Uncompahgre Field Office			
2815 H Road	2505 S. Townsend Avenue			
Grand Junction, Colorado 81506	Montrose, Colorado 81401			

Phone: (970) 244-3000 Fax: (970) 244-3083 http://www.co.blm.gov/gjra/gjra.html Phone: (970) 240-5300 Fax: (970) 240-5367 http://www.co.blm.gov/ubra/index.html

Mancos/Dolores Field Office (BLM/USFS) 100 N. 6th St., P O Box 210 Dolores, Colorado 81323 Phone: (970) 882-7296 Fax: N/A No Web site

Utah

Price Field Office 125 South 600 West Price, UT 84501 Phone: (435) 636-3600 Fax: (435) 636-3657 http://www.blm.gov/utah/price/

Richfield Field Office 150 East 900 North Richfield, UT 84701 Phone: (435) 896-1500 Fax: (435) 896-1550 http://www.ut.blm.gov/richfield/index.html Moab Field Office 82 East Dogwood, Suite M Moab, UT 84532 Phone: (435) 259-2100 Fax: (435) 259-2106 http://www.ut.blm.gov/moab/index.html

Monticello Field Office 435 North Main Street P.O. Box 7 Monticello, UT 84535 Phone: (435) 587-1500 Fax: (435) 587-1518 http://www.blm.gov/utah/monticello/index.html

APPENDIX C

LOCATION OF COUNTY COURTHOUSES

Utah/Wyoming Thrust Belt

Utah

Morgan County Courthouse 48 W. Young St. Morgan, Utah 84050 Phone: (801) 845-4006 Fax: (801) 845-6006 http://www.morgan-county.net

Rich County Courthouse 20 S. Main St. Randolph, UT 84064 Phone: (435) 793-2415 Fax: (435) 793-2410 http://www.richcountyut.org

Summit County Courthouse 60 N. Main St. Coalville, UT 84017 Phone: (435) 336-3220 Fax: (435) 336-3030 http://www.co.summit.ut.us

Wyoming

Lincoln County Courthouse 925 Sage Ave. Kemmerer, WY 83101 Phone: (307) 877-9056 Fax: (307) 877-3101 http://www.lcwv.org

Uinta County Courthouse 225 9th St. Evanston, WY 82930 Phone: (307) 783-3001 Fax: (307) 783-0511 http://www.uintacountv.com

Central Utah Thrust Belt - Hingeline

Utah

Beaver County Administration Bldg. P.O. Box 431 105 East Center St. Beaver, UT 84713 Phone: (435) 438-6480 (435) 438-6481 Fax: http://www.beaver.state.ut.us

Millard County Courthouse 50 South Main St. Fillmore, UT 84631-5504 Phone: (435) 743-6210 Fax: (435) 743-4221 http://www.millardcounty.com

Sanpete County Courthouse 160 North Main St. Manti, UT 84642-1268 Phone: (435) 835-2181 Fax: (435) 835-2182 www.sanpetecounty.org

Piute County Courthouse 550 North Main St. P.O. Box 116 Junction, UT 84740-0116 Phone: (435) 577-2505 (435) 577-2433 Fax: http://www.piute.org

Juab County Courthouse 160 North Main St. Nephi, UT 84648-1412 Phone: (435) 623-3430 Fax: (435) 623-5936 http://www.co.juab.ut.us

Sevier County Courthouse 250 North Main St. Richfield, UT 84701-2156 Phone: (435) 896-9262 Fax: (435) 896-8888 www.sevierutah.net

Utah County Administration Building 100 East Center St., Ste. 1300 Provo, UT 84606 Phone: (801) 851-8179 Fax: (801) 851-8181 http://www.utahcountyonline.org

Uinta Basin

Garfield County Courthouse 109 8th St., Ste. 200 Glenwood Springs, CO 81601-3355 Phone: (970) 945-2377 Fax: (970) 947-1078 http://www.garfield-county.com

Colorado

Rio Blanco County Courthouse 555 Main St. P.O. Box 1067 Meeker, CO 81641 Phone: (970) 878-9460 Fax: (970) 878-3587 http://www.co.rio-blanco.co.us

Carbon County Courthouse 120 East Main St. Price, UT 84501 Phone: (435) 636-3711 Fax: (435) 636-3244 http://www.carboncountyutah.com

Emery County Courthouse 75 East Main St. P.O. Box 698 Castle Dale, UT 84513 Phone: (435) 381-2414 Fax: (435) 381-2614 http://www.emerycounty.com

Utah County Administration Building 100 East Center St., Ste. 1300 Provo, UT 84606 Phone: (801) 851-8179 Fax: (801) 851-8181 http://www.utahcountyonline.org

Morgan County Courthouse 48 West Young St. P.O. Box 886 Morgan, UT 84050

Utah

Grand County Courthouse 125 East Center St. Moab, UT 84532 Phone: (435) 259-1333 Fax: (435) 259-1382 http://www.grandcountyutah.net

Duchesne County Administration 734 North Center St. P.O. Box 910 Duchesne, UT 84021 Phone: (435) 738-1100 Fax: (435) 738-5522 http://www.duchesnegov.net

Uintah County Building 147 East Main Vernal, UT 84078 Phone: (435) 781-5361 Fax: (435) 781-6701 http://www.co.uintah.ut.us

Wasatch County Administration Bldg 25 N Main Heber City Utah 84032 Phone: (435) 654-3211 Phone: (801) 829-3277 Fax: (801) 829-6176 http://www.morgan-county.net Fax: (435) 657-0283 http://www.co.wasatch.ut.us

Paradox Basin

Arizona

Apache County Managers Office County Annex Bldg. 75 West Cleveland P.O. Box 428 St. Johns, AZ 85936 Phone: (928) 337-4364 Fax: (928) 337-2003 http://www.co.apache.az.us

Dolores County Courthouse 409 North Main St. P.O. Box 608 Dove Creek, CO 81324-0608 Phone: (970) 677-2383 Fax: (970) 677-2815 http://www.dolorescounty.org

Montezuma County Courthouse 109 West Main St. P.O. Box 3142 Cortez, CO 81321-3142 Phone: (970) 565-8317 Fax: (970) 565-3420 http://www.co.montezuma.co.us

San Miguel County Courthouse 305 West Colorado Ave. P.O. Box 548 Telluride, CO 81435 Phone: (970) 728-3954 Fax: (970) 728-4808 http://www.sanmiguelcounty.org

Emery County Courthouse 75 East Main St. P.O. Box 698 Castle Dale, UT 84513

Colorado

Mesa County Courthouse 544 Rood Ave. P.O. Box 20000 Grand Junction, CO 81502-5006 Phone: (970) 244-1607 Fax: (970) 244-1703 http://www.mesacounty.us

Montrose County Courthouse 320 South First St. P.O. Box 1289 Montrose, CO 81402 Phone: (970) 249-3362, ext. 1 Fax: (970) 249-0757 http://www.co.montrose.co.us

Utah

Garfield County Offices 55 South Main St. P.O. Box 77 Panguitch, UT 84759-0077 Phone: (435) 381-2414 Fax: (435) 381-2614 http://www.emerycounty.com

Grand County Courthouse 125 East Center St. Moab, UT 84532 Phone: (435) 259-1333 Fax: (435) 259-1382 http://www.grandcountyutah.net

Wayne County Courthouse 18 South Main P.O. Box 189 Loa, UT 84747 Phone: (435) 836-2765 Fax: N/A http://www.waynecnty.com Phone: (435) 676-1112 Fax: (435) 676-8239 <u>http://utahreach.org/garfield</u>

San Juan County Courthouse 117 South Main St. P.O. Box 789 Monticello, UT 84535 Phone: (435) 587-3228 Fax: (435) 587-2425 http://www.sanjuancounty.org

APPENDIX D

NATIVE AMERICAN CONTACT INFORMATION

Arizona

Navajo Nation P.O. Box 9000 Window Rock, AZ 86515 Division of Natural Resources Phone (928) 871-6592/6593 Fax: (928) 871-7040 http://www.navajo.org/index.htm

Colorado

Ute Mountain Ute Indian Tribe P.O. Box 109 Towaoc, CO 81334 Phone: 1-(800) 258-8007/ (970) 565-8800 Fax: N/A http://www.utemountainute.com/ Southern Ute Indian Tribe P.O. Box 737 Ignacio, CO 81137 Phone: (970) 563-0100 Fax: (970) 563-0137 (administration) http://www.southern-ute.nsn.us/

Utah

Ute Energy, LLC P.O. Box 789 7074 East 900 South Fort Duchesne, UT 84026 Phone: (435) 722-0291 Fax: (435) 722-3902 http://uteenergy.com/

Ute Distribution Corp. 24 South 200 East P.O. Box 696 Roosevelt, UT 84066 Phone: (435) 722-2922 Fax: N/A No Web site BIA Uintah & Ouray Agency 988 South 7500 East P.O. Box 130 Fort Duchesne, UT 84026 Phone: (435) 722-4300 Fax: (435) 722-2809 Web site is unavailable

Ute Indian Tribe P.O. Box 190 910 South 7500 East Fort Duchesne, UT 84026 Phone: (435) 722-5141 Fax: N/A http://www.utetribe.com/