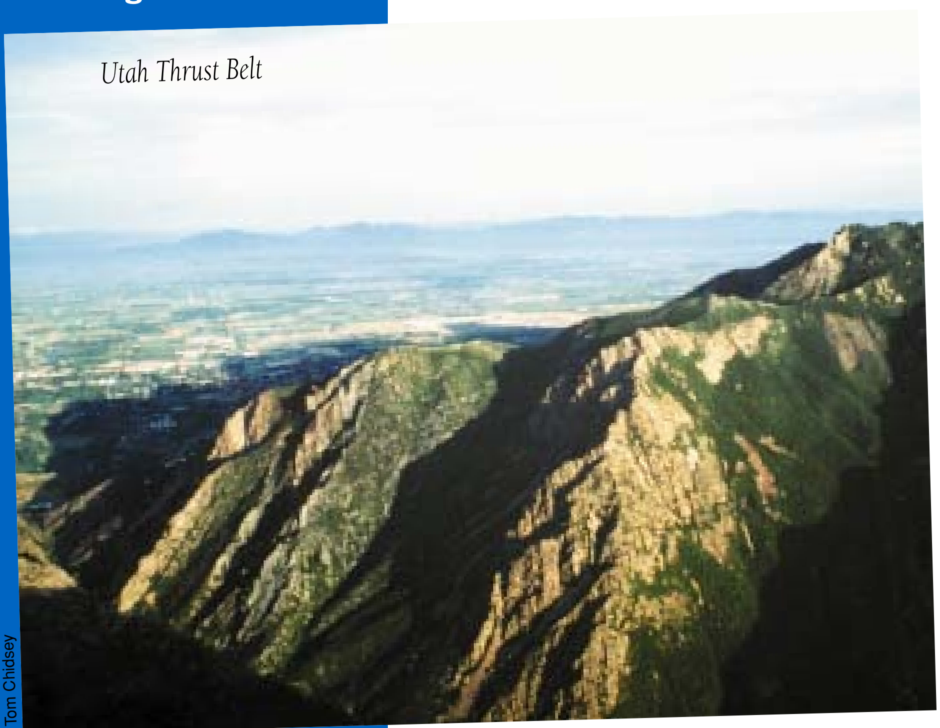
August 2004 Volume 10/1

The Class Act

DOE's Field Demonstration and Best Practices Newsletter

New Oil and Gas Fields Map of Utah

Thomas C. Chidsey, Jr. and Sharon Wakefield,
Utah Geological Survey



Tom Chidsey

Geologists from all over the world come to Utah to view its spectacular geology and study classic outcrop reservoir analogs. However, they may not realize that Utah is a major petroleum-producing state.

Utah has over 200 oil and gas fields and 5200 producing wells; more than 1.2 billion barrels of oil and 7.8 trillion cubic feet of gas have flowed from these fields. Utah consistently ranks in the top 15 oil-and-gas-producing states. Oil and gas pipelines crisscross many areas of Utah. However, there are no pump jacks, wellheads, or drilling derricks readily apparent when traveling near or through Utah's famous national parks and monuments.

So, where are all the oil and gas fields in Utah? The answer to that question can be found on a new map (**Figure 1**), *Oil and Gas Fields of Utah* (available in both hard copy and digital format) produced as part of a project titled *Major Oil and Gas Plays in Utah and Vicinity* funded through the DOE Preferred Upstream Management Practices (PUMP II) program.

Most oil and gas fields are located in two large basins - the Uinta and Paradox basins (**Figure 2**) in eastern and southeastern Utah, respectively. The map outlines key geologic/physiographic features such as major plateaus, uplifts, and sedimentary basins.

This map presents a wealth of information, and shows more than just the location of oil and gas fields. The map identifies geologic age, resource, reservoir and rock formations, specific field designations, major oil and gas pipelines and enhanced oil recovery projects (horizontal drilling, water floods, and gas injection). Fields are color-coded; red for natural gas (methane), green for oil and purple for carbon dioxide.

The new map shows the approximate locations of major oil and gas pipelines in Utah, pipe diameter, direction of flow, and current operators. Natural gas processing plants and oil refineries, daily capacities, and operators are also shown on the map.

The new oil and gas fields map was produced not just for oil and gas companies. It can be used by government land managers, regulators, and decision-makers; environmentalists; Native American groups; and farmers, ranchers, and mineral-lease owners. This map will help inform all interested parties as to where the oil and gas resources are located without taking sides on the issues of exploration and development.

What's Inside

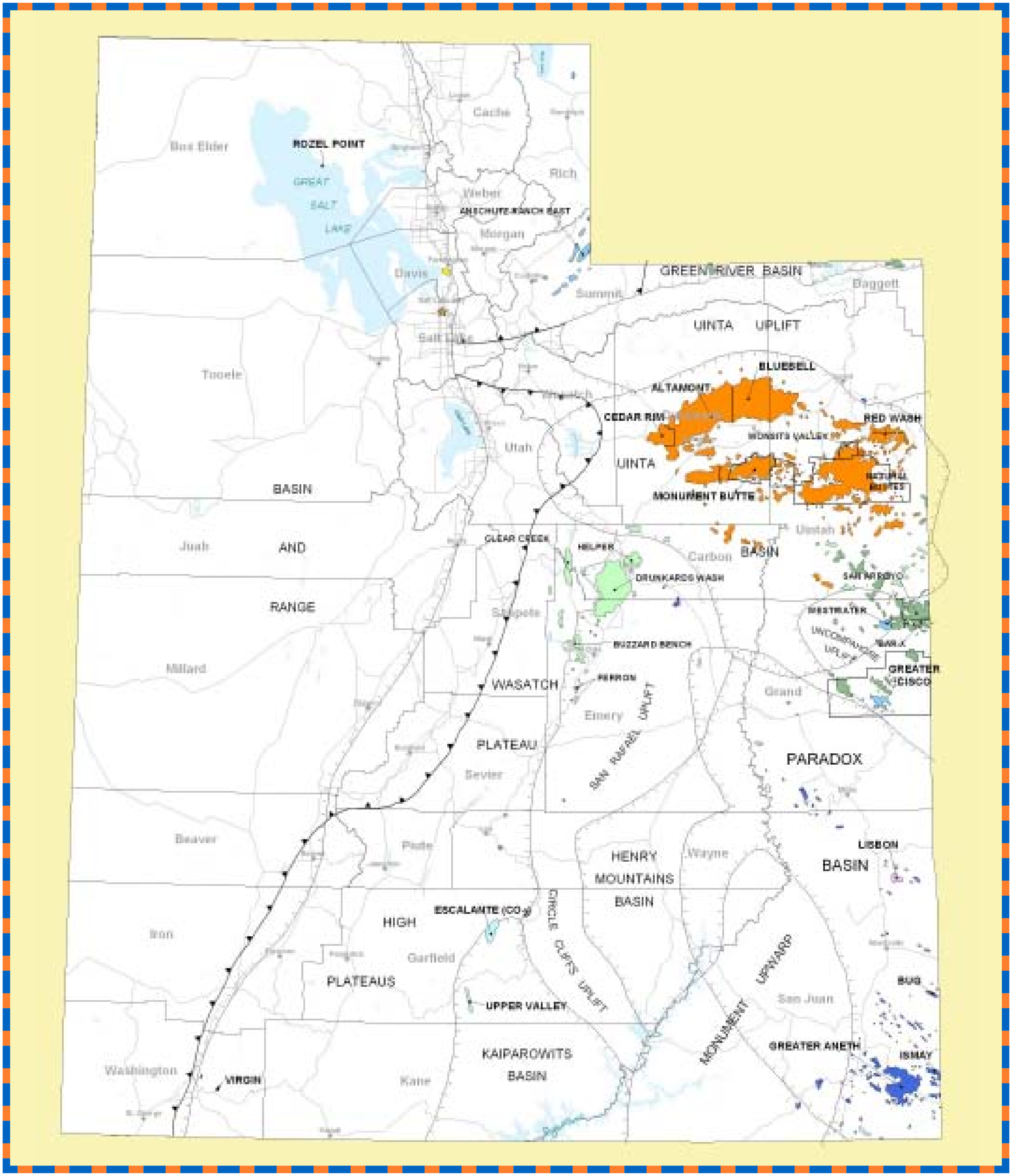
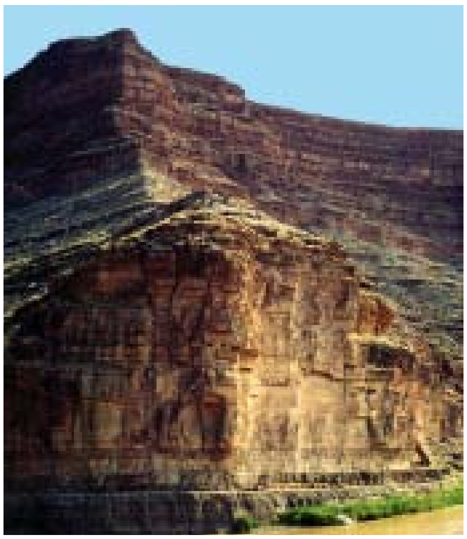


Figure 1. This is a simplified version of Map 203DM showing an example of the detail that can be found at www.ugs.state.ut.us

Reservoir Rocks

- Tertiary (T)
- Upper Cretaceous (K)
- Upper-Lower Cretaceous (K)

Other items identified on the map include major roads, reservoirs, and rivers; county boundaries and seats; Indian reservations; wilderness areas; and national parks, monuments, and recreation areas. Thus, the map shows where the oil and gas fields and pipelines are in relation to these various features, many of which are obviously environmentally sensitive.



Tom Chidsey

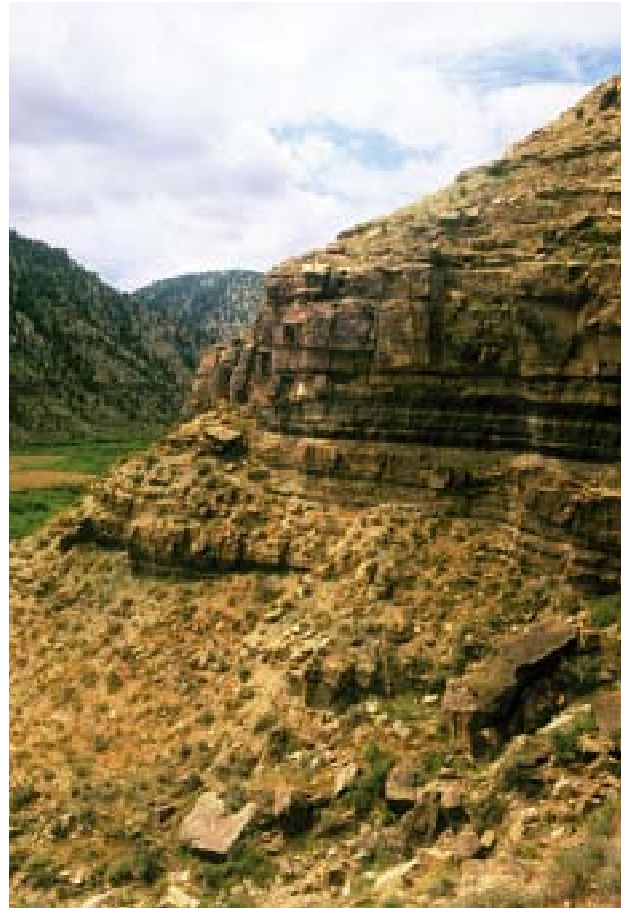
Figure 2. Outcrop in the Paradox Basin along the San Juan River, Utah.

Some may be surprised by what the map shows. For example, new gas exploration proposed near the archeologically rich Nine Mile Canyon area (**Figure 3**) in east-central Utah has created a storm of controversy in local newspaper articles. However, the map indicates that there are already several gas fields in the area (which include 22 gas wells that have produced over 10 BCFG) and a 20-inch gas pipeline running through the canyon. The environmental and visual impact on Nine Mile Canyon is minimal.

The map also shows a string of producing and abandoned oil fields between Arches and Canyonlands National Parks. A 26-inch-diameter gas pipeline crosses through the middle of Arches National Park.

One oil field, Upper Valley, is partly within Grand Staircase-Escalante National Monument. This field has 21 wells that produce nearly 17,000 barrels of oil per month (trucked to market) and have had a cumulative production of about 27 million barrels of oil since discovery in 1964. The thrust belt fields are only 40 miles east–northeast of Salt Lake City. The same formations, the Jurassic Nugget Sandstone and Twin Creek Limestone, crop out along the city's east side. These fields have produced 165 million barrels of oil and 158 BCFG.

Maps showing mineral resources and methods of transport are nothing really new. Most students of geology remember learning about an Englishman named William Smith, a self-taught engineer, fossil collector, and "canal digger," who in 1815 published the world's first geologic map—a geologic map of Great Britain. This remarkable map showed where the various formations crop out and predicted where they were in the subsurface. However, the map also included the location of mineral resources and mines—coal, tin, lead, and copper. In addition, the map specifically displayed the railroads, rivers, and canals capable of transporting these mineral resources to markets, factories, and smelters. Since Smith's map was published, geologists have produced geologic *and* mineral resource maps, which now include oil and gas fields and pipelines.



Tom Chidsey

Figure 3. Nine Mile Canyon, Uinta Basin, Utah.

For the public as well as independent oil and gas producers, the *Oil and Gas Fields of Utah* map will be a valuable source of information.

Major Oil and Gas Plays in Utah and Vicinity is a DOE PUMP 2 project. The map and other publications are available at Utah Geological Survey's website www.ugs.state.ut.us.

Heavy Oil Recovery in Missouri

Shari Dunn-Norman, U. of Missouri–Rolla

Significant heavy oil reserves lie along a corridor that extends for 250 miles along the Kansas-Missouri border and covers an area of nearly 8,000 sq. miles (**Figure 4**). Heavy oil (ranging from 8° to 25° API) is found throughout this trend most frequently in the Warner sandstone of the Cherokee Group of the Middle Pennsylvanian age. A previous study conducted by Wells in 1979 indicated that heavy oil reserves in Missouri alone total nearly 2 billion barrels. The current study uses microbial techniques and hydraulic fracturing to address recovery of these heavy oil resources.

Historical attempts to recover Missouri's heavy oil have focused on steamflooding, intermittent steam injection, and a reverse fireflood. While intermittent steam injection has proven technically successful, the operation was not sustainable at low oil prices. Without any enhanced recovery, wells in western Missouri yield less than 1 BOPD.

The goal of the project was to demonstrate an economically viable and sustainable method of producing these shallow heavy oil reserves using a combination of microbial enhanced oil recovery (MEOR) treatments and horizontal fracturing in vertical wells. The project includes a surface geochemistry survey. Electrical resistivity tomography (ERT) was applied to monitor the reservoir volume affected by the microbial treatments.

Figure 4. Occurrence of heavy oil in Western Missouri and Kansas (Heath et al, 1977) and the location of Cushard #1.

Surface Geochemistry

Near surface soil samples were collected over several areas of the leasehold (T35N, R33W, Vernon County, MO). Geochemical analysis of the samples was used to evaluate and indentify productive and non-productive areas of the Warner sand, and also for differentiating the quality of the productive area throughout the leasehold. Approximately 110 soil samples were collected in a grid pattern over part of the leasehold and 65 samples were collected around previously drilled wells to be used for modeling.

Samples were analyzed for C1-C6 hydrocarbons (11 components) using; 1) proprietary desorption method, 2) FID gas chromatography, and for heavy aromatic hydrocarbons using 3) synchronous scanned fluorescence. These methods result in about 17 variables and numerous compositional ratios that can be used in multivariate statistics to model the areas that have producible oil.

The discriminant function model was applied to the C1-C6 data and showed good separation between good oil wells, less productive wells, and dry holes. Fluorescence data showed good contrast between productive and non-productive areas. As expected, the oil producing areas show strongest increases in heavier aromatic hydrocarbons (**Figure 5**). These results clearly demonstrate the utility of surface geochemistry as a means for differentiating the productive and non-productive areas of the Warner sands in the area studied. Results of the surface geochemistry were combined with 2-D electrical resistivity profiles to determine the most favorable drilling location on the leasehold.

Drilling and Hydraulic Fracturing

Five, vertical wells were drilled through the Warner sand to depths of approximately 220 ft (**Figure 5**). Three wells (#2,3,4) were completed openhole and equipped with electrical resistivity tomography arrays. Wells #1 and #5 were cased, cemented and perforated in the top of the Warner sand (**Figure 6**).

Continuous cores from wells (coreholes) drilled prior to this project were selectively sampled to develop a geomechanical dataset for

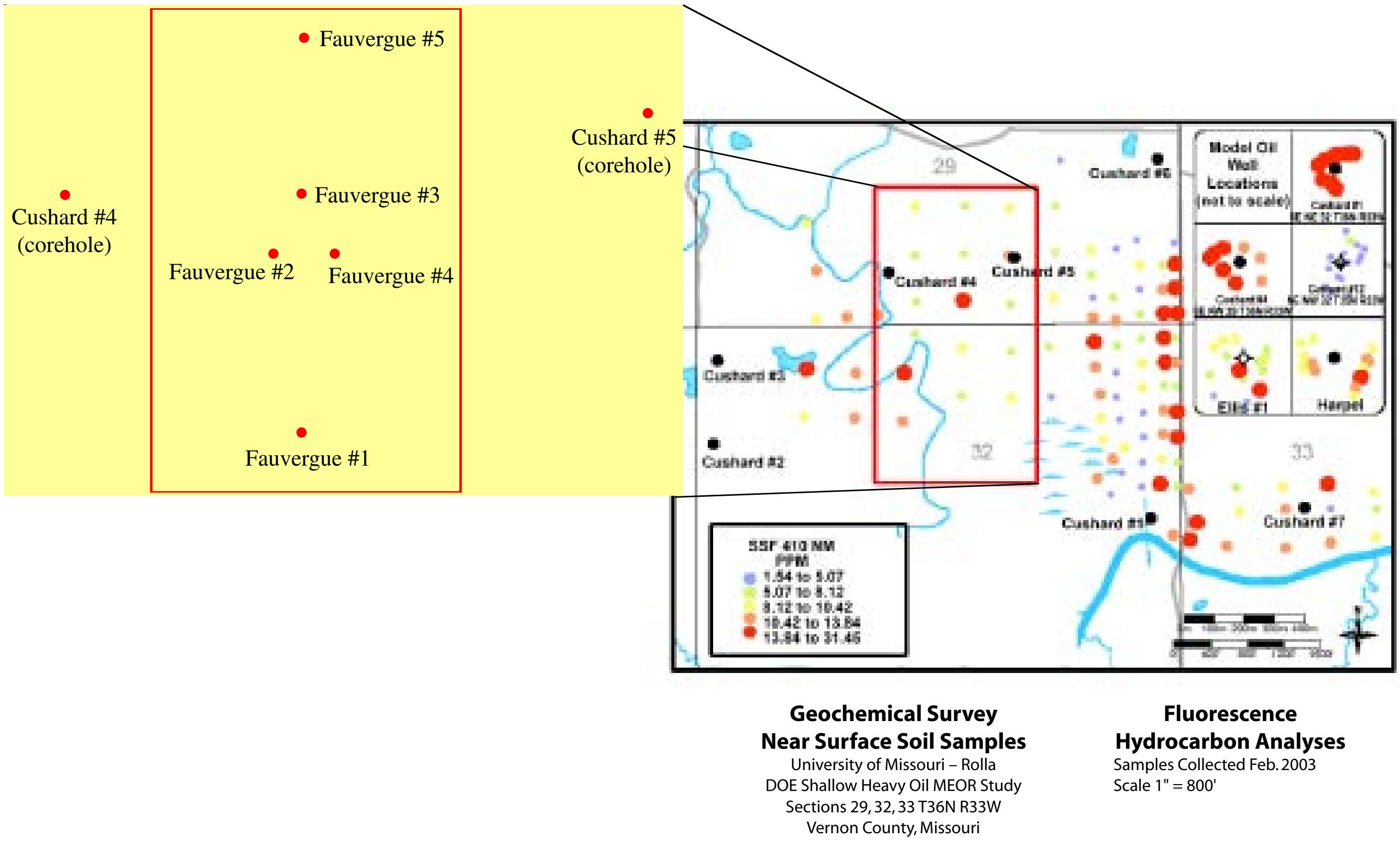


Figure 5. Fluorescence hydrocarbon analysis sample locations with vertical well configuration shown in inset.

designing the hydraulic fracturing treatment.The process of developing a geomechanical dataset includes the development of a profile with depth versus Young's Modulus, in-situ stress and fracture fluid leak-off. Fifteen samples were taken from the Cushard #1 (see **Figure 4**) core, ranging from the shale immediately above the Bluejacket Sandstone, through the Bluejacket and Warner Sandstones, and into the Graydon Shale immediately below the Warner Sandstone. Results of lab analysis indicated that the Warner sand was much more competent than the published geological reports indicated.

Based on the geomechanical study, a hydraulic fracture treatment was designed for wells #1 and #5. The intent was to perform high permeability fracturing and tip screen out (TSO) since the Warner sand permeability averages over 350 mD. Each well was stimulated with 23,000 gallons of 30 lb/gal linear guar gel and 47,000 lbs of 20/40 mesh Brady sand with an end of job concentration of 10 lb/gal.

Well #1 was stimulated according to plan but TSO was not possible. Blender problems were encountered while pumping on well #5. Sand concentrations of up to 17 lb/gal were pumped near the end of this treatment, but no TSO could be effected. It was concluded that the leakoff rate in the Warner is too low to accommodate a tip screen out.

Fifteen latest generation, self-leveling tiltmeters were placed in prepared surface holes, located around the #1 well in a circular array. Analysis of the tiltmeter information showed that the deformation was located approximately 80 ft East and 20 ft. North of the well (#1). The primary fracture induced was near horizontal, and elliptical, with dimensions of 200 ft. by 300 ft (**Figure 7**).

Microbial Treatment Commenced

In the latter part of 2003, microbial treatments commenced on all wells. The wells have been treated monthly with 8 gallons Para-Bac S, 4 gallons of Ben-Bac and 8 gallons of Corroso-Bac with one bbl of flush. MEOR treatments were placed in the wellbore but were not squeezed into the formation, primarily due to limitations of the openhole wells.

Following each microbial treatment, 3-D electrical resistivity tomography measurements were taken in an effort to determine the affects that microbes are having on the heavy oil. ERT data acquisition involves the collection of resistivity and chargeability (induced polarization – IP) data between all three well pairs; wells #2 to #3, wells #2 to #4, and wells #3 to #4. Datasets showed strong evidence for electri-

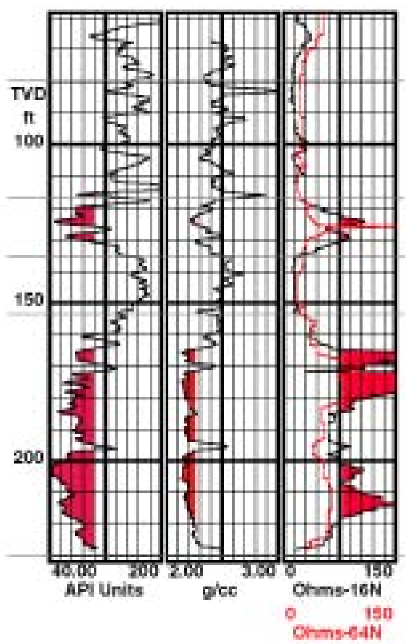


Figure 6. Typical log showing Bluejacket and Warner sandstones.

cal changes in the oil bearing formation since the start of microbial treatment. Generally, there has been an increase in resistivity of the Warner sand since initiation of the microbial treatment. This may result from the bacterial mobilization of oil from the mineral surface into the pore space.

ERT wells have not been pumped as planned due to difficulties in removing the ERT arrays. Pumping results on the hydraulically stimulated wells have had strong oil shows with gas. Microbial treatments will continue into the summer of 2004, and at least one ERT well will be pumped to determine the production results of this project.

Conclusions

According to the U. S. Geological Survey, heavy oil makes up 9% of oil in the United States. While Missouri is not known as a major oil-producing state, experts have estimated that it has the equivalent of more than two billion barrels of oil beneath its surface. The implication to the economy in the state of Missouri is enormous. The University of Missouri, Rolla is the only petroleum engineering program in the state, and is leading the way in technology to demonstrate how to develop this natural resource. Heavy oil reservoirs, similar to the Vernon County deposits, are found in Oklahoma, Kansas and Texas. These states could benefit from using the microbial, surface geochemical and hydraulic fracturing recovery techniques described.

Project participants include the University of Missouri – Rolla, Garland Oil and Gas Company, Direct Geochemical, Nolte Smith Inc (NSI), Halliburton Energy Services, J-Environmental, and Pinnacle Technologies, Inc.

Preliminary results of the PUMP 3 project indicate that using microbial techniques will assist in identifiying heavy oil drilling targets. The use of hydraulic fracture treatments will singificantly improve recovery of heavy oil from wells in western Missouri. Tiltmeter analysis is helpful in determining the placement and success of the hydraulic fractures.

A poster presentation detailing the concepts and technology for heavy oil recovery in Missouri was made at the AAPG National Convention in April 2004 in Dallas, TX.

Microbial Enhanced Oil Recovery Combined with Surface Geochemistry, Hydraulic Fracturing and Geophysics to Recover Heavy Oil in Missouri is a DOE PUMP 3 project.

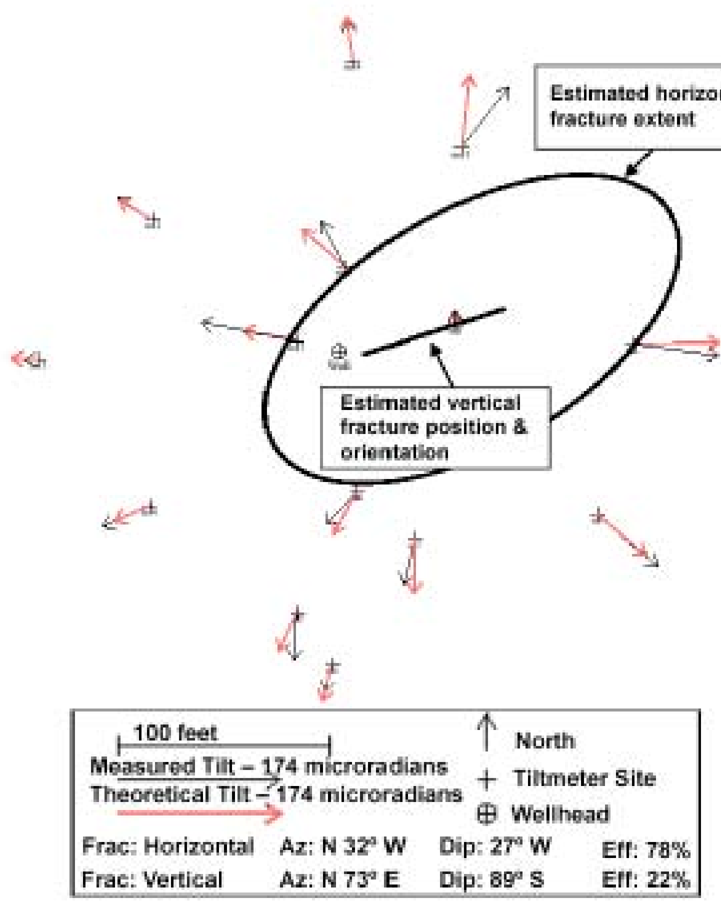


Figure 7. Tiltmeter analysis and fracture extent (Pinnacle Technologies).

Increasing Heavy Oil Reserves in the Wilmington Oil Field, California

Scott Hara, Tidelands Oil Production Company, Long Beach, CA

The overall objective of this Class III steamflood project is to increase heavy oil reserves in slope and basin clastic (SBC) reservoirs through the application of advanced reservoir characterization and thermal production technologies. The project involves improving thermal recovery techniques in the Tar Zone of Fault Blocks II-A and V (Tar II-A and Tar V) of the Wilmington Field in Los Angeles County, near Long Beach, California.

Recent successes in Wilmington Field are the result of a tremendous amount of knowledge learned during the past eight years of research. This knowledge has now been applied to improve oil and gas recovery from areas of Wilmington Field outside of the original DOE project boundaries, more than doubling the research area.

Thermal recovery operations in the Tar II-A and Tar V have historically been relatively inefficient because of several producibility problems which are common in SBC reservoirs. Inadequate characterization of the heterogeneous turbidite sands, high permeability thief zones, low gravity oil, and nonuniform distribution of remaining oil have all contributed to poor sweep efficiency, high steam-oil ratios, and early steam breakthrough. Operational problems include steam breakthrough, high reservoir pressure, and unconsolidated formation sands, which caused wellbore and downhole equipment failures. In aggregate, these reservoir and operational constraints resulted in increased operating costs and decreased recoverable reserves that resulted in marginal economics and threatened future operations.

The research, modeling and field tests conducted, as part of these DOE projects have led to application of improved drilling and completion technologies and strategies, which are significantly more successful than previous operations.

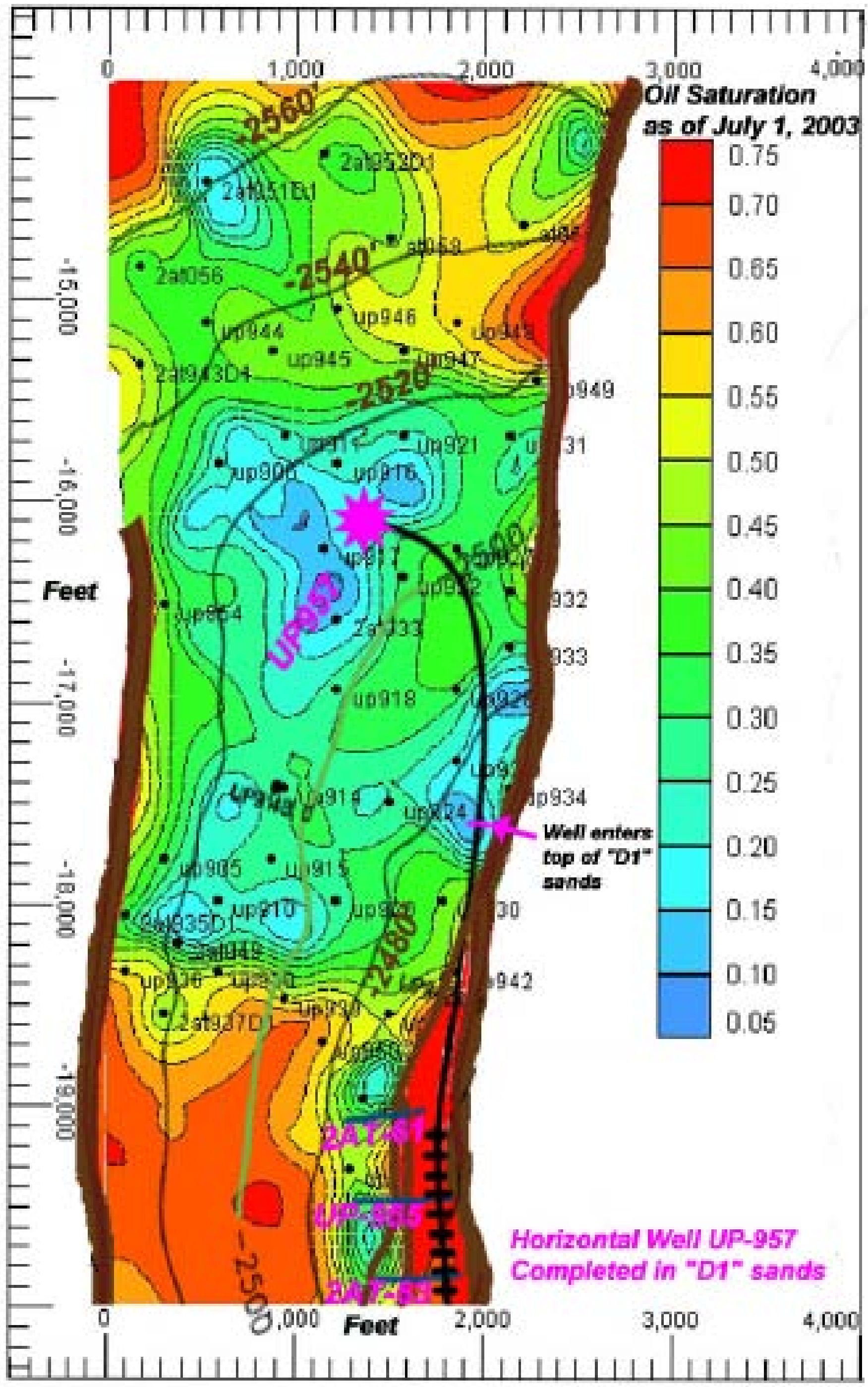


Figure 8. Structure contour map of the top of "D1" sands Tar II-A zone, Wilmington field, CA.

Last year, 2003 was the most successful round of drilling in the last twenty years at the Wilmington Reservoir for the City of Long Beach. A seven well package came in well above oil rate projections and below budget, with the best well having an initial production rate over 700 bbl/day! The first quarter of 2004 Tidelands drilled an additional seven well package and these wells just started coming on production at the end of March. The first week of April 2004 Tidelands initialed

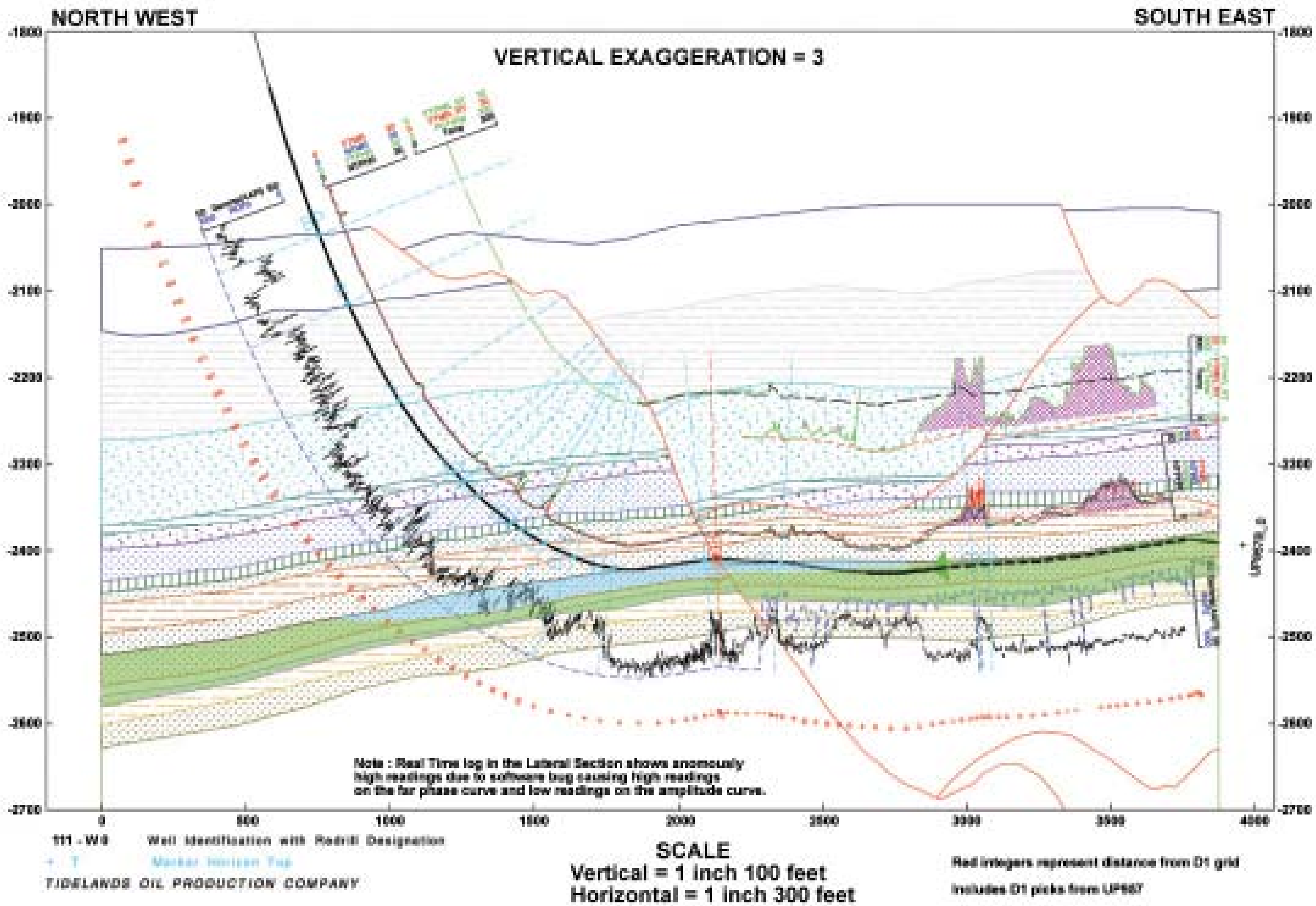


Figure 9. Cross section along actual well course UP957 in Wilmington field Tar II-A.

a well which came on at over 900 bbl/day in an area the City of Long Beach had almost given up on as depleted. There is no doubt these successes were largely due to technologies transferred from what was learned in the DOE projects. Of particular importance was the 3-D geologic and reservoir modeling, which has had a lot to do with why the latest two drilling packages have been so much more successful than in the past.

A horizontal well, UP-957 (**Figure 8**) was drilled in Tar II-A zone in March 2004 with the down-hole location perpendicular to and above the toes of the horizontal steam flood pilot wells drilled in 1995. This location was considered to have the best oil recovery potential (based on our CMG STARS 3-D deterministic thermal reservoir simulation model runs completed in September 2003). Contour mapping of the interval indicated the areas of high oil saturation (**Figure 9**), which were the target for the horizontal drill path. The well came on production in April, 2004 and initial tests show rates of 247 bbl/day and 1029 barrels of daily gross fluid for a 76% water cut. The well has a high pumping fluid level and can theoretically produce at 200-300% of this rate. The initial oil rate for UP-957 is significantly higher than the projected initial rate in the affordable cost analysis of 100 bbl/day, and over 500% higher than the average Tar II-A producer rates of 45 bbl/day and 1250 barrels of daily gross fluid (96.4% water cut).

The Tar II-A horizontal steam flood pilot injection well 2AT-61 was converted to production well AT-61 in November 2003 at an initial production rate of 42 bbl/day and 1411 barrels of daily gross fluid. The well has a high pumping fluid level and should be able to double or triple production rates. Although a steam injection well for two years, the well produced oil immediately.

The Tar II-A observation well OB2-3 was converted to a T sand injection well in December 2003 at a water injection rate of about 1000 bbl of water injected/day. The well is being stimulated to increase injectivity to about 2500 bbl of water injected/day.

Also in March a horizontal well, A-604, was drilled in Tar V zone with the down-hole location perpendicular to and above the toes of the horizontal steam flood wells. The well came on production in late March at an initial rate of 215 bbl/day and 447 barrels of daily gross fluid for a 52% water cut. The well is pumped off and may have some formation damage that will require an acid stimulation job. The oil rate has steadily declined to 124 bbl/day and 521 barrels of daily gross fluid after three weeks, but is expected to stabilize near this oil rate. The initial oil rate for A-604 is still higher than the projected initial rate in the AFE of 100 bbl/day and almost 300% higher than the average Tar V horizontal producer rates of 47 bbl/day and 1330 barrels of daily gross fluid (96.5% water cut).

Earlier in the project a novel alkaline steam completion technique to control well sanding problems and fluid entry profiles was discovered by Tidelands. Well failure due to unconsolidated sands had been a persistent problem at Wilmington field and this technique has been successfully applied to a number of wells. To more fully understand how this technique works Stanford University Dept. of Petroleum Engineering conducted research on the sand consolidation process. Recently Stanford completed work determining that they could duplicate the sand consolidation empirical process in the laboratory. Their results show that it may be possible to add calcium silicate to injected hot alkaline water to consolidate formation sands in a perforated well completion. Stanford and Tidelands made the first technical presentation of their research at a Sand Control and Management U.S. Conference sponsored by the International Quality and Productivity Center. Laboratory analysis of the technique will enable field operators to apply sand consolidation methods in other reservoirs. The knowledge will make predictions more reliable, and can be used to optimize well performance

Increasing Heavy Oil Reserves in the Wilmington Oil Field through Advanced Reservoir Characterization and Thermal Production Technologies is a DOE Class III project.

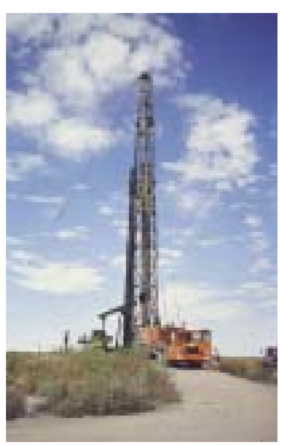
Announcing the release of "Play Analysis and Digital Portfolio of Major Oil Reservoirs in the Permian Basin"

Analysis of 1,339 reservoirs

The maps defines 32 oil plays in the Permian Basin and assigns all significant-sized reservoirs that had cumulative production of >1 MMbbl through 2000 to a play. The GIS maps of each play show play outlines and reservoir locations.

The Digital Play Atlas was produced through a DOE PUMP 2 project.

Available for download at
www.beg.utexas.edu/resprog/permianbasin/Play Analysis.htm



For more information contact:

Shirley Dutton
Principal Investigator
Bureau of Economic Geology
The University of Texas, Austin
Phone: (512) 471-0329
E-mail: shirley.dutton@beg.utexas.edu

The Class Act

Contacts for Field Demonstration information:

Project Manager
Rhonda Jacobs
Rhonda.Jacobs@netl.doe.gov
918-699-2037

Technology Manager
Roy Long
Roy.Long@netl.doe.gov
918-699-2017

Editor
Viola Rawn-Schatzinger
Viola.Schatzinger@cd.netl.doe.gov
918-699-2018

Contributing to *The Class Act*
If you have a news item or project to feature in an upcoming issue, please contact the editor.

U.S. Department of Energy
Office of Fossil Energy
National Energy Technology Laboratory
One West Third St., Ste. 1400
Tulsa, OK 74103-3519

BEG's Houston Research Center

Figure 10. Core repository at the Houston Research Center.

The Bureau of Economic Geology (BEG) at the University of Texas, Austin has established the Houston Research Center. An initial gift from BP, with additional funding from the Department of Energy (DOE), the National Research Council (NRC), and the National Science Foundation (NSF) has been used to develop the first public regional core and sample research center in Houston, Texas.

This state-of-the-art climate-controlled facility (**Figure 10**) is equipped to permanently store and curate over 500,000 boxes of geologic core and cuttings in addition to the climate-controlled core and cuttings warehouse, the HRC complex has offices, laboratories, and a well-lit core layout room available for visiting scientists and petroleum industry users. There are also two conference rooms to accommodate guests attending short courses and seminars. Nominal fees are charged to rent table space and to view core.

In 2004 the Houston Research Center received the donation of a extensive technical library from Unocal Corporation, valued at $5 million. The library includes books, journals, maps, field guides, Federal reports, and monographs of more than 50,000 items. The research library emphasis is on geology, geophysics, and petroleum engineering.

The BEG's Integrated Core and Log Database (**IGOR**) is a searchable database for all core and well cutting holdings, including some core data found at the Austin and Midland facilities.

Goals of the Houston Research Center are to provide access to geological materials and a forum to conduct geological studies, to increase awareness of the value of rock materials through outreach programs to the public, and to enable academic and industry members to promote and defend the importance of geological material in the financial decision-making process.

Please contact James Donnelly (512-471-0402) or Laura Zahm (512)471-1534 or laura.zahm@beg.utexas.edu for more information.

Baker Hughes

Microhole I

The Microhole Initiative was based in part on microhole rig development and feasibility studies conducted by Los Alamos National Laboratory (LANL) and their industry partners. The successful feasibility study and demonstration of coiled-tubing-deployed microdrilling provided a promising indication that microholes could assume an important role in increasing recovery from domestic oil and gas fields.

The first solicitation from the Microhole Initiative focused on field demonstrations and development of critical technologies needed to employ coiled-tubing microhole drilling in the field. Summaries the 6 projects selected are below.

Baker Hughes Inteq, Houston, Texas
"Microhole Smart Steering and Logging While Drilling System"
Area: Bottom Hole Assemblies

The objectives of this project are to design and fabricate a drill bit steering device and a tool that measures the electrical resistivity of the rock. Both the bit steering device and the motor will be 2 inch diameter to serve a 31/2-inch or smaller hole size. The modules will be designed so they fit seamlessly in the already commercially available module 2 3/8 CoilTrak TM a coiled tubing drilling assembly. These tools are expected to provide a modular and effective coiled tubing drilling system that enables higher, more effective production from existing domestic oil fields

Bandera Petroleum Exploration, Tulsa, Oklahoma
"Advanced Mud System for Microhole Coiled Tubing Drilling"
Area: Self-Contained Zero Discharge Drilling Mud System

The technologies to be developed in this project are expected to allow very fast drilling of micro- boreholes. They include an abrasive slurry jetting method that can cut a variety of materials very quickly, a self-contained zero discharge mud processing system, composite coiled tubing to reduce drilling costs, and a high pressure slurry pump. The components developed will be able to be used in other processes and industries.

Gas Production Specialties, Lafayette, Louisiana
"Development of Through Tubing (Microhole) Artificial Lift System"
Area: Completion and Production Equipment

The goal of this project is to develop a novel artificial lift system for gas wells that can remove downhole fluids that hinder gas production. The lift system developed is expected to address problems of mature, low-pressure reservoirs that can't overcome the weight of the wellbore fluids thereby preventing gas production. The technology will allow operators, particularly those in the Gulf of Mexico, to reactivate wells that can no longer flow by natural reservoir pressures. This technology will allow operators to extract more reserves out of reservoirs whose natural pressure have been depleted by previous production.

Schlumberger IPC, Sugarland, Texas
"A Built for Purpose Coiled Tubing Rig"
Area: Built for Purpose Microhole Coiled Tubing Rig

The focus of this project is to develop and build a microhole coiled tubing drilling rig that is designed specifically for the abundant shallow oil and gas reservoirs found in the lower 48 states. The rig will be designed to improve the economics of shallow well drilling by using small and purpose-built equipment that is easy to move and fast to mobilize, yet versatile in its application. The drilling rig will be designed to perform over- and underbalanced drilling work for both new and existing wells

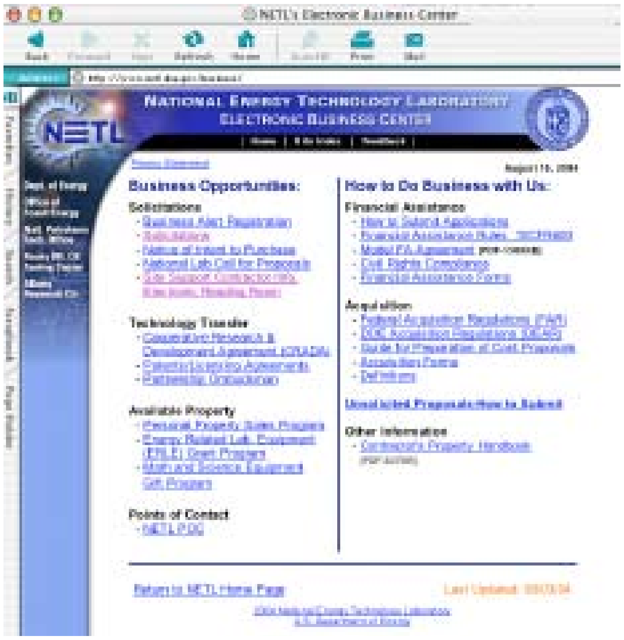
Stolar Research, Raton, New Mexico
"Development of Radar Navigation and Radio Data Transmission for Microhole Coiled Tubing Bottom Hole Assemblies"
Area: Microhole Coiled Tubing Bottom Hole Assemblies

The objectives of this project are to develop technologies to guide the drill bit when drilling horizontal wells and transmit rock and fluid information to the surface as it is collected. Radar will be used to determine the location of the drill bit, and radio data transmission will be used to communicate the measurement data to the surface. Radar will be integrated with the coiled tubing bottomhole assembly and radio data transmission will be accomplished either directly along the coiled tubing or via an insulated slickline inside the coiled tubing to the surface.

Western Well Tool, Anaheim, California
"Microhole Downhole Drilling Tractor"
Area: Microhole Coiled Tubing Bottom Hole Assemblies

The goal of this project is to design and build a reliable and economical hydraulically powered coil tubing drilling tractor that will transport the drill bit and measurement tools into long (3,000+ ft) sections of horizontal wells The prototype drilling tractor will be field tested using a commercial coiled tubing rig at Gas Research Institute drilling test site. Multiple re-entry, inclined and horizontal holes will be drilled.

New Project Funding Opportunities



www.netl.doe.gov/business

Microhole Technology Development II

Microhole Technology Development IIDE-PS26-04NT15480-00 Due date is 10/6/2004. Applications are being sought in the following areas of interest:

DE-PS26-04NT15480-01 - AREA 1 - FIELD DEMONSTRATION
DE-PS26-04NT15480-2A - AREA 2A - ADVANCED MONOBORE CONCEPT
DE-PS26-04NT15480-2B - AREA 2B - MICROHOLE COILED TUBE BOTTOM HOLE ASSEMBLIES
DE-PS26-04NT15480-2C - AREA 2C - MICROHOLE COMPLETION & PRODUCTION EQUIPMENT

Comments and questions are welcomed, and should be transmitted through the “Submit Question” feature of IIPS. Contract Specialist: Donna Jaskolka.

Calendar of Upcoming Events

October 11-12, 2004 SPE/IADC Underbalanced Technology Conference, Woodlands, TX. **www.spe.org**

October 12, 2004 Pumpers & Well Operators Training, Mt. Carmel, IL, PTTC Midwest, 217-244-9337. **www.pttc.org**

October 12-15, 2004 International Petroleum Environmental Conference, Albuquerque, NM. **http://ipec.utulsa.edu**

October 15, 2004 PfEFFER Log Analysis Software, Lawrence, KS, PTTC North Midcontinent, 785-864-7398. **www.pttc.org**

October 28, 2004 Coiled Tubing Application & Operations, Valencia, CA, PTTC Westcoast, 213-740-8076. **www.pttc.org**

November 17, 2004 Annual Illinois Basin Coalbed Methane Symposium, Evansville, IN, 217-244-9337.

December 3, 2004 Waterflood Management, Los Angles, CA, PTTC Westcoast, 213-740-8076.

December 9-10, 2004 2004 CO_2 Conference, Midland, TX CEED/SPE Permian Basin, 432-552-3432.