

Title Analysis of Low-Permeability Gas Sands Suitable for Future Research Programs

Contractor Bureau of Economic Geology, The University of Texas at Austin, GRI Contract No. GRI-BEG-SC-112-82

Technical Perspective Past and current research on tight gas sands has focused primarily on lenticular sands. Blanket-geometry sands were deposited by different depositional systems than lenticular sands; hence they have different external and internal reservoir geometries and require different techniques to find, to develop, and to produce the contained gas. To assure that research on selected tight gas sand reservoirs would be applicable to other reservoirs, a survey was conducted with emphasis on clastic depositional systems and the expected transferability of results between stratigraphic units. Five stratigraphic units were selected for additional study, on the basis of this survey, and data collection for expanded study of these units was initiated during this contract period.

Results A work plan was prepared for analysis of five stratigraphic units. The plan includes preparation of geologic cross sections and maps, review of productive areas, analysis of resources, and documentation of results. The units being studied are the Travis Peak Formation, the Corcoran and Cozzette Sandstones, the Mancos "B" interval of the Mancos Shale, the upper Almond Formation, and the Frontier Formation. Data acquired include 208 well logs in Colorado and 372 well logs in Wyoming; 170 well logs from Bureau files have been identified for the Travis Peak. Wells suitable for use on cross sections have been identified for the Travis Peak and Corcoran/Cozzette, and three cross sections have been prepared in the latter trend.

Technical Approach Three activities have been accomplished during the 3-month contract period: development of a work plan, evaluation of existing data, and acquisition of new data, primarily geophysical well logs. Technical discussions have been held with the Colorado Geological Survey, the Geological Survey of Wyoming, and the U.S. Geological Survey regarding their participation in the project. Both the Geological Survey of Wyoming and the U.S. Geological Survey have verbally agreed to participate in the period November 1, 1982 -March 31, 1983. Preliminary review of the Mancos "B" suggests major differences between it and other tight gas sandstones. Inclusion of the Olmos Formation in future studies appears warranted if the average depth to the Frontier Formation is considered too great. The Rollins Sandstone, which overlies the Cozzette, may readily be included in studies of the latter unit and the Corcoran Sandstone.

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INTRODUCTION

One objective of the Gas Research Institute (GRI) is to promote the understanding and ultimate use of unconventional gas resources. One such resource is gas within tight, or low-permeability, blanket-geometry sandstones. A survey of the geology and engineering characteristics of more than 30 such sandstones in 16 sedimentary basins was completed for the Gas Research Institute to provide the basis for selection of a smaller number of stratigraphic units suitable for additional research (Finley, 1982). This survey emphasized the environment of deposition as a key factor controlling internal and external geometry of reservoirs. In contrast to predominantly fluvial sandstones of lenticular geometry, blanket-geometry sandstones were deposited as barrier-strandplain and deltaic systems and, to a lesser extent, as shelf systems. The study of blanket-geometry sandstones encompasses a different group of tight gas sand reservoirs than those under study by the U.S. Department of Energy as part of the Western Gas Sands Project. The latter are mostly lenticular.

Basis for Research Program

Guiding basin-analysis research at the Bureau of Economic Geology has been the principle that sandstone bodies are the product of a suite of processes operating within major environments or depositional systems that are active during infilling of a basin. Typical active systems include several major environments of sand deposition; resultant sand bodies are the genetic facies, such as meanderbelt, coastal barrier, or crevasse splay facies. Each of these facies has consistent physical attributes within an individual system or major depositional element where processes and available sediment types were relatively uniform. Consequently, description and mapping of the depositional systems and their component facies are basic steps in the geologic characterization of any hydrocarbon reservoir.

The depositional system and associated facies of a tight gas reservoir can be emphasized to provide a basis of comparison between formations of different ages in different structural and sedimentary settings. Once established, the known facies within each formation become the basis for evaluating the transferability of geologic and engineering knowledge from one formation to another. The expected transferability of research results, as judged on the basis of existing available information, was termed "extrapolation potential" by Finley (1982). Extrapolation potential was used with other factors, such as depth, thickness, net pay, post-stimulation gas flow, operator interest, and degree of present resource development, to recommend five stratigraphic units for additional study. These units are the Travis Peak Formation (East Texas Basin/North Louisiana Salt Basin), the Frontier Formation (Greater Green River Basin), the Cozzette and Corcoran Sandstones (Piceance Creek Basin), the upper Almond Formation (Greater Green River Basin), and the Mancos-Mancos "B" Shale (Piceance Creek Basin). No ranking within this group is implied. Under the present contract, study of these five stratigraphic units has been initiated to provide GRI with the technical basis for further narrowing this group to a primary and a secondary research area. Such areas may ultimately encompass a sedimentary basin or subbasin, a formation, or a particular depositional environment as the GRI Program Plan for Tight Gas Sand Reservoirs is finally formulated (GRI, 1982).

STRATIGRAPHIC UNITS RECOMMENDED FOR EXPANDED STUDY

Deltaic systems and barrier-strandplain systems encompass most of the siliciclastic formations suitable for additional research. Among deltaic systems, the Travis Peak (Hosston) and Frontier Formations are areally extensive fan-delta and delta systems, respectively, with potential for greatly increased commercialization. Operator interest in the Travis Peak is high, and depths to the formation are not excessive. The "Clinton"-Medina sands of the Appalachian Basin are interpreted, in part, to be a fan-delta system,

and it appears that studies of the Travis Peak could be beneficial to understanding development of the "Clinton"-Medina. In particular, such studies may foster closer examination of "Clinton"-Medina and equivalent sands east of the present productive areas. The Frontier Formation has a unique extrapolation potential in that the unit occurs in multiple basins in Wyoming and can also be compared to wave-dominated deltaic systems in other basins. The latter systems, however, will be smaller and thinner than the Frontier. Operator interest in the Frontier is high, and depths to the formation are not excessive around basin margins but are in the range of 20,000 ft toward basin centers. Finley (1982) also described the Olmos Formation (Maverick Basin) as a deltaic system suitable for further study should factors such as depth and winter operating conditions be considered unsuitable for the Frontier Formation.

Barrier-strandplain depositional systems include a large number of dominantly regressive sandstones primarily within the Mesaverde Group in the San Juan, Piceance Creek, Uinta, and Greater Green River Basins (seven formations). Numerous transgressions and regressions occurred on the scale of individual formations and on even smaller scales as Late Cretaceous shorelines alternately were inundated or prograded. The progradation of shorelines by accretion of strandplain and barrier island systems, in association with offshore bar, estuarine, and other marginal marine facies, represents a style of sedimentation characteristic of much of the Upper Cretaceous stratigraphic section from the Western Interior of North America.

Among barrier-strandplain systems the Cozzette and Corcoran Sandstones and the Almond Formation (upper part) will be considered in more detail as part of the final selection of research areas. Published data are somewhat limited on the Cozzette and Corcoran; however, these units form a play that is currently active, and unpublished information from the Multi-Well Experiment (MWX) may also become available. A study of the Cozzette and Corcoran may include the Castlegate and Segó marginal marine

sandstones of the Uinta Basin, which are parts of the same major progradational package. Within the Piceance Creek Basin the Rollins Sandstone appears to be a marginal marine unit similar to the Corcoran and Cozzette and can readily be included in an analysis of the latter units. The upper Almond may be less attractive because of greater depth, but in some trends it shows good dip continuity and excellent strike continuity and appears to be a good example of a marginal marine, blanket-geometry sandstone within the eastern part of the Greater Green River Basin.

One shelf system may be included in those formations considered for more detailed study. The Mancos of the Piceance Creek Basin is recommended, and the study should examine Mancos siltstones and fine sandstones, in general, and not just within the "B" interval. Such shelf clastics may have more widespread potential than currently available information and operator activity suggest. A more detailed examination of the Mancos than the initial survey is needed to make this determination. Study of the Mancos can be integrated with the review of the Cozzette and Corcoran, which overlie the Mancos and form a progradational sequence.

The Mancos "B" stratigraphic unit was deposited in a shelf system and consists of an interval of thinly bedded sandstone, siltstone, and shale within the Mancos Shale (Finley, 1982). The laminated to thinly bedded character of the Mancos "B" over a defined zone differs from the more discrete and thicker sandstone beds of the pay zones within barrier-strandplain and deltaic tight gas reservoirs. This distinction appears to be a factor limiting extrapolation potential to other siliciclastic units unless selected shelf units of the Northern Great Plains Province of the Western Gas Sands Project are to be considered for GRI studies.

Because of the thin bedding of the Mancos "B" and the possible limitations due to relatively greater depths to the Frontier Formation, it is suggested that the Olmos Formation in the Maverick Basin of Texas also be included in the study of tight gas

reservoirs suitable for future research programs. The deltaic nature of the Olmos probably offers better extrapolation potential to other blanket-geometry sandstones than does the Mancos "B." This could be accomplished by the Bureau of Economic Geology largely using data already in-house and with the background provided by work on other projects. The depth range for gas production in the Olmos (generally 4,000-8,000 ft) potentially offers more favorable economics for staged field tests than the mostly deeper Frontier Formation.

TECHNICAL APPROACH

Overview

The selection of priority areas under the Resource Identification Project in the draft GRI Program Plan for Tight Gas Sand Reservoirs (GRI, 1982) involves the already-completed broad survey (Finley, 1982) to be followed by more detailed study of a selected group of stratigraphic units. The study of the latter group has been initiated in the period August 1 - October 31, 1982, under the present GRI subcontract through CER Corporation. The detailed study will continue through March 31, 1983, under a research proposal submitted to GRI, and will be followed by selection on the part of GRI of primary and secondary research areas.

The level of detail and new data developed (cross sections and maps) will be appropriate to the needs of GRI and to the time frame stipulated for this work. It is anticipated that representative areas will be selected for study within the overall depositional trend of each stratigraphic unit. A report presenting results of these studies will be submitted to the Gas Research Institute with the completion of this research phase in March 1983. Parameters of each stratigraphic unit to be addressed are the same as those covered for each unit by Finley (1982) with the following additions:

(1) interpretation of depositional systems will be expanded and verified by new interpretation of geophysical well logs, drilling and completion reports, sample descriptions, etc., whereas the previous survey relied on the interpretations of others; (2) extrapolation potential will be presented in greater detail as a result of the more detailed understanding of depositional systems; and (3) previously unavailable information will be developed to the greatest extent possible, with inclusion of resource estimates. This effort would provide information required to complete Task Area 200.02 now defined in the draft GRI Program Plan (1982) as "Select Priority Areas for Research."

Work Plan

The following work plan provides details of the technical approach followed during the period August 1, 1982 - October 31, 1982, and to be continued into the period November 1, 1982 - March 31, 1983, under a proposed contract with GRI.

Phase A. Investigation of Five Stratigraphic Units¹

Task I. Geologic Cross Sections and Maps

Subtask 1. Obtain base maps for Greater Green River, Piceance Creek, and East Texas/North Louisiana Basins.*

Subtask 2. Plot existing cross sections on base maps, including Bureau, U.S. Geological Survey, and operator data derived from applications for tight formation designations.*

Subtask 3. Use base maps, existing cross sections, and literature survey to begin acquisition of geophysical well logs.*

¹Includes work funded by GRI under present subcontract through CER Corporation where indicated by asterisk (*).

Subtask 4. Use acquired logs and existing cross sections to set up new lines of regional cross sections. Well logs may be added within or at ends of operator's cross sections to make maximum use of existing data.*

Subtask 5. Set up working definitions of well log picks and their variations across basins of interest. Consult subcontractors and literature. Coordinate subcontractor cross sections with Bureau work.

Subtask 6. Interpret cross sections in conjunction with literature to make generalized facies interpretations.

Subtask 7. Correlate logs across study areas to prepare structure contour and isopach maps of each stratigraphic unit.

Subtask 8. Define large-scale variations in continuity of stratigraphic unit (township-to-township basis).

Subtask 9. Illustrate small-scale variations in continuity of stratigraphic unit using local cross sections in selected area(s) of dense data (section-to-section basis).

Task II. Production Review

Subtask 1. Define existing gas production from unit of interest on regional map base and relate to basin boundaries and major, within-basin structural features.

Subtask 2. Overlay designated tight areas on production map, using information updated since completion of literature survey.

Subtask 3. Define areas of production known to be tight, on the basis of operator data.

Task III. Resource Analysis

Subtask 1. Define information needed to estimate potential resource base for stratigraphic units of interest.

Subtask 2. Evaluate available engineering data, such as formation test results, and coordinate with GRI and other contractors in resource analysis.

Task IV. Documentation

Subtask 1. Select representative cross sections, maps, and type logs for drafting and photographic reproduction.

Subtask 2. Write report documenting investigation of each of five stratigraphic units as part of Phase A.

Subtask 3. Compare major characteristics of each unit in a tabular format, and make recommendations for selection process.

EVALUATION OF DATA AVAILABILITY

Procurement of data during the contract period focused on selection of geophysical logs for wells posted on base maps obtained from Petroleum Information, Inc. (PI) (Rocky Mountain region), and Geomap, Inc. (East Texas/North Louisiana). Well logs for the Rocky Mountain region have been purchased from Petroleum Information, Inc., whereas logs needed for studies of the Travis Peak Formation were available from files within the Bureau of Economic Geology. It is anticipated that some Travis Peak logs will be purchased, especially for the counties along the Texas-Louisiana border where Bureau coverage is incomplete. Base maps for East Texas were available in-house, as were those which may be used in the Maverick Basin of South Texas in the study of the Olmos Formation. Base maps for the Rocky Mountains were purchased under this contract.

Cross sections initially plotted on base maps were derived from previous Bureau research, from the U.S. Geological Survey Western Gas Sands Project, and from operator applications for tight gas sand designations. Depths to the tops of the stratigraphic units under study and the log character of these tops were derived from wells on the cross

sections. These data were used as a guide in ordering additional well logs, and in picking tops in a wider group of logs. An electrical resistivity log was ordered and was available for most wells; however, neutron-formation density logs have been obtained for a few wells, especially for use with data from operator applications in the Rocky Mountain province. The gamma-ray trace on the latter type of log is sometimes necessary for sandstone delineation where the spontaneous potential (SP) curve is relatively featureless because of poor contrast between the salinity of the formation water and the mud filtrate. Reversed SP is noted on parts of some logs from the Rocky Mountains.

Data packages consisting of maps and computer printouts have been obtained from Petroleum Information, Inc., to provide an overview of well information in the Piceance Creek and Greater Green River Basins. Well data include log tops, perforated intervals, test results, cored intervals, initial potential, fracture treatments, and other data useful in identifying key wells and in relating production to facies. Near field areas not all well names and total depths are posted on base maps; the computer printouts, which are sorted by section, township, and range, are necessary for selecting well logs from such congested areas. The PI data will also be used to correlate producing zones with facies analyses of the formations within several fields.

Listed below are the number of well logs acquired by county as of October 19, 1982. Few additional logs will be acquired during the rest of the contract period; a list of logs acquired by county and by township and range is included in Appendix A. A limited number of these logs may later be excluded from further use if the quality is poor or if the objective interval does not appear on the log.

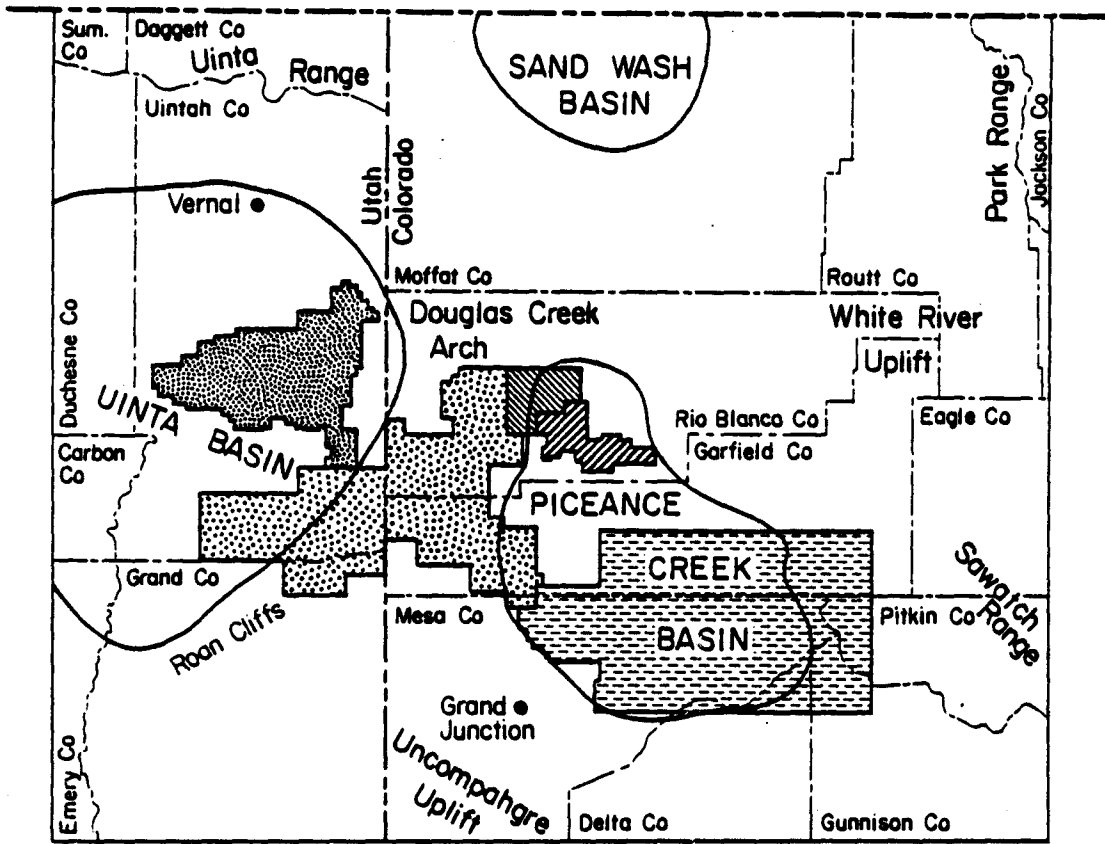
Piceance Creek Basin Data: Corcoran/Cozzette
Sandstones and Mancos "B"

For analysis of the Corcoran and Cozzette Sandstones, and for probable additional work on the Rollins Sandstone, a total of 118 well logs have been acquired in Mesa (76),






Garfield (32), Gunnison (4), Delta (4), and Pitkin (2) Counties, Colorado. For analysis of the Mancos "B" interval of the Mancos Shale, 90 well logs have been acquired in Rio Blanco County, Colorado. Extension of Mancos "B" studies into adjacent Uintah and Grand Counties, Utah, has been deferred pending further discussions with GRI on the utility to the overall program of studies within the shelf depositional system. Base maps for these counties have been acquired, however, and logs can be obtained quickly if extension of studies into designated tight areas in Utah becomes appropriate.

Two dip-oriented cross sections trending generally northwest-southeast have been prepared and correlations established within the Corcoran/Cozzette trend of the Piceance Creek Basin. Original depositional dip direction has been initially inferred as normal to the shoreline orientations presented by Warner (1964). An additional cross section, which is strike oriented, runs generally north-northeast to south-southwest across the south-central Piceance Creek Basin. The strike section and one dip section include the CER Corporation MWX-1. The top of the Rollins Sandstone is a convenient datum for the three stratigraphic sections, one of which was also prepared as a structural section to show variation in depth to the Rollins, Cozzette, and Corcoran Sandstones due to Laramide structural development of the Piceance Creek Basin. A topographic profile along the latter section shows that wellsite elevations varying by over 2,000 ft affect drilling depths to the top of the Rollins between adjacent wells on the cross section. Cross sections prepared by Snyder Oil Company as part of a tight formation application including the Corcoran and Cozzette, and by other companies, were used to establish log picks in the area (Colorado Oil and Gas Conservation Commission, 1980a) (fig. 1). These data were supplemented by cross sections prepared by the U.S. Geological Survey (Johnson and others, 1979a, b, c), but the latter generally do not include the Corcoran and the underlying transition into the Mancos Shale.

Ninety well logs have been acquired in the Mancos "B" trend of the Piceance Creek Basin (along the Douglas Creek Arch) within Rio Blanco County, Colorado. No U.S.



EXPLANATION

-  Wasatch Formation and Mesaverde Group (undifferentiated) tight gas sand area (Utah Cause No. TGF-100)
-  Mancos "B" tight gas sand areas (in Utah, Cause TGF-100; in Colorado Cause Nos. NG-5, NG-6, NG-15)
-  Mancos "B" and Mesaverde Group (undifferentiated) (Colorado Cause No. NG-27)
-  Corcoran and Cozzette Sandstones (in part includes Rollins) tight gas sand area (Colorado Cause Nos. NG-7, NG-17, NG-21, NG-26, NG-12)
-  Mancos "B" to base Douglas Creek Sand (includes Mesaverde Group) (Colorado Cause No. NG-9)

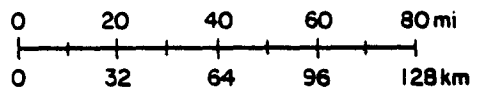
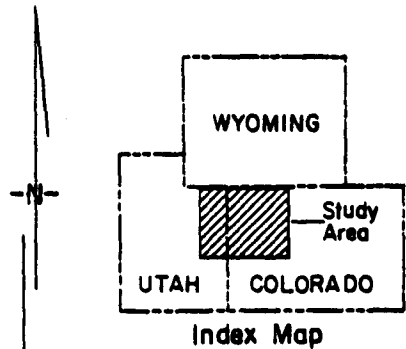


Figure 1. Areas covered by tight gas sand applications, Piceance Creek and Uinta Basins.

Geological Survey cross sections show the Mancos "B." Cross sections prepared by Coseka Resources (U.S.A.) Limited and Northwest Exploration Company and a type log with tops picked by Sun Oil Company have helped to define the Mancos "B" interval of interest (Colorado Oil and Gas Conservation Commission, 1980b, 1980c, 1981). Project cross sections have not thus far been prepared for the Mancos "B."

Greater Green River Basin Data: Upper Almond Formation and Frontier Formation

For analysis of the upper Almond Formation 31 well logs in Moffat County, Colorado, and 62 well logs in Carbon County, Wyoming, have been acquired. Within Sweetwater County, Wyoming, 221 logs have been received for analysis of the upper Almond and the Frontier Formation, and within Uinta, Lincoln, and Sublette Counties, Wyoming, 58 logs have been acquired for analysis of the Frontier Formation.

Within the Greater Green River Basin, along and east of the Rock Springs Uplift, a cross section network prepared by the U.S. Geological Survey is useful in defining the Mesaverde Group and the upper Almond Formation (Tyler, 1978, 1979, 1980a, 1980b; Tyler and others, 1981). The application by Amoco Production Company for designation of the Mesaverde Group as a tight formation provides a lesser amount of data on formation tops (Wyoming Oil and Gas Conservation Commission, 1980a). The existing cross section network in the eastern Greater Green River Basin will be used to the greatest extent possible in analysis of the upper Almond Formation.

In the western Greater Green River Basin, cross sections and log data from applications by Amoco Production Company, Energetics, Incorporated, Belco Petroleum Corporation, and others will be used to define formation boundaries (Wyoming Oil and Gas Conservation Commission, 1980b, 1981a, and 1981b) (fig. 2). A recently released U.S. Geological Survey cross section (Bader and others, 1982) includes parts of the Frontier Formation, and cross sections by Miller and VerPloeg (1980) also show the Frontier

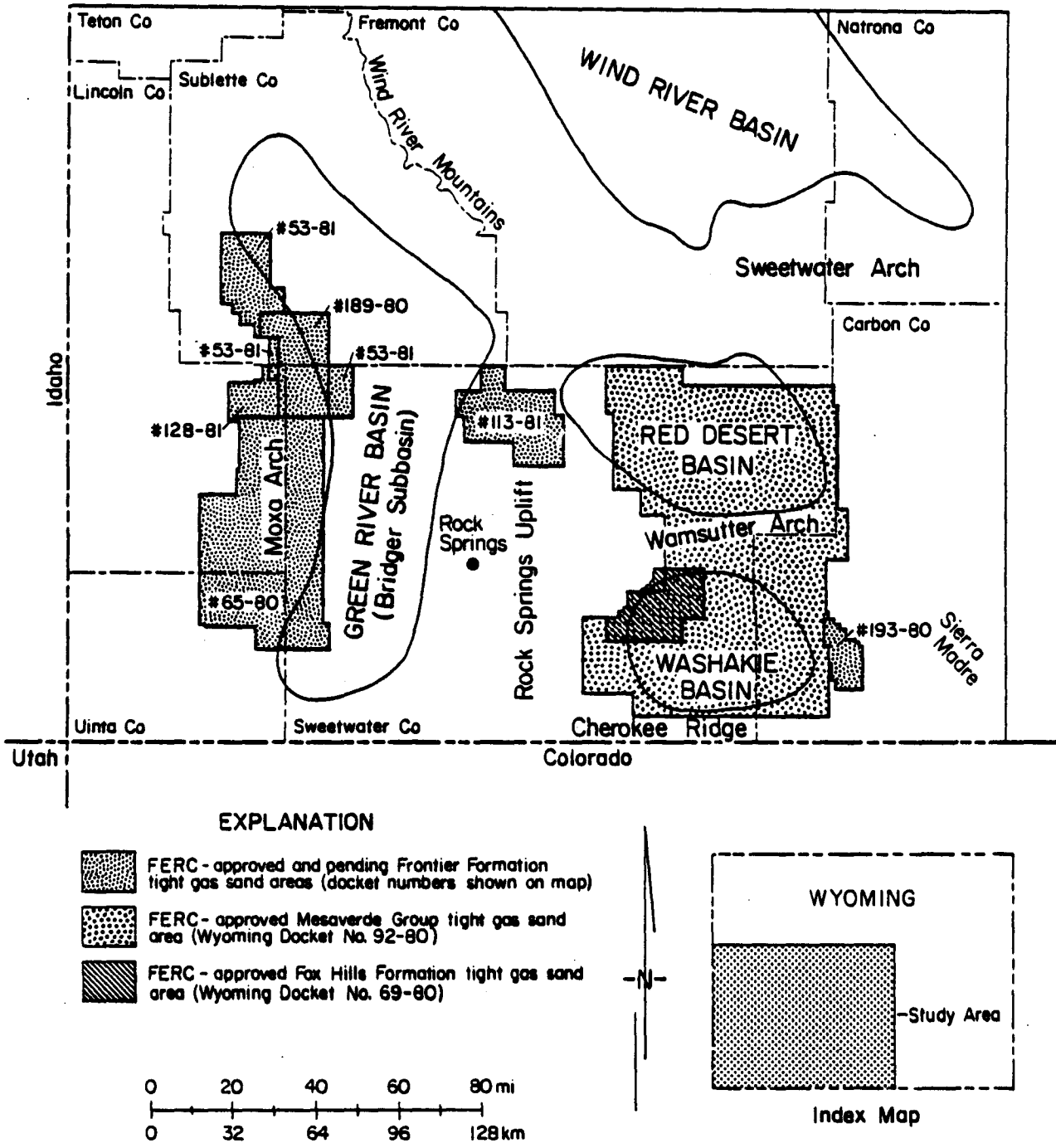


Figure 2. Areas covered by tight gas sand applications, Greater Green River Basin.

Formation. Limited well penetration of the Frontier on the flanks of the Rock Springs Uplift and east of the Uplift may affect the completeness of studies in the eastern Greater Green River Basin.

East Texas Basin Data: Travis Peak Formation

A grid of cross sections covering the western and central East Texas Basin was analyzed to identify 170 wells that penetrate the base of the Travis Peak Formation. Most of these wells are along the northern and western margins of the basin, and few are within the central, deeper part of the basin. Logs for these wells were already within the files of the Bureau of Economic Geology, as were base maps from Geomap, Inc., for the East Texas Basin. A map base for part of North Louisiana was acquired from Geomap, Inc., as were small-scale reference maps showing production and field names for both East Texas and North Louisiana. The latter maps, in conjunction with data from the Railroad Commission of Texas (1980), were used to define areas of Travis Peak gas production, especially areas with annual production exceeding 1 Bcf (billion cubic feet).

Wells to be used in two regional cross sections have been identified; one of these sections will include areas of Travis Peak gas production in Cherokee and Nacogdoches Counties, Texas, which are identified in operator applications for tight formation designations (Railroad Commission of Texas, 1981a, 1981b). Additional well logs will be acquired that are now lacking from the Bureau well file, notably in Marion, Harrison, Panola, Shelby, and parts of Rusk, Nacogdoches, and Upshur Counties, Texas, and in North Louisiana.

SUMMARY

During the contract period of August 1 - October 31, 1982, research efforts have focused on developing a research plan for studies of five tight gas sand reservoirs. The

feasibility of adding a sixth stratigraphic unit, the Olmos Formation, is under consideration, as is slightly reducing the emphasis on studying the Mancos "B" interval of the Mancos Shale. The research plan developed is to be carried out in the period through March 31, 1982, and contains four tasks involving development of geologic cross sections and maps, review of gas production, analysis of resources, and documentation of results.

To implement this plan, base maps and geophysical well logs have been purchased and have been assembled from existing files within the Bureau of Economic Geology. Published type logs, data from cross sections prepared by operators for tight gas formation applications, and cross sections prepared by the U.S. Geological Survey have been used to define formation boundaries and to extend log picks to additional well logs. Three cross sections have been prepared showing the Rollins, Corcoran, and Cozzette Sandstones (Piceance Creek Basin), and logs have been assembled for two regional cross sections showing the Travis Peak Formation in the East Texas Basin. A total of 580 well logs have been purchased for study of 4 formations in the Piceance Creek and Greater Green River Basins, and 170 logs for wells in the East Texas Basin have been obtained from Bureau files. All data have been catalogued and are now in use for continuing stratigraphic and depositional systems analysis.

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APPENDIX A:

**Well Logs Acquired for Analysis
Tight Gas Sandstones in Colorado and Wyoming**

Delta County, Colorado

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
11S-91W-4	Victor	#1 Govt.
11S-91W-6	Pan Am. Pet.	Marvin Wolf #1
11S-94W-34	Apache Corp.	#2 Mickelson
12S-92W-8	Sunray	#1-C Govt.

Garfield County, Colorado

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
4S-93W-31	Maquire Oil	North Rifle #2
5S-102W-28	Provident Resources	Young #3-28-5-102
5S-102W-35	Tippeary Oil & Gas	1-35-C
5S-103W-2	Coseka Resources	Fed. 2T2
5S-103W-25	Pan American	Baxter Pass S. 4-2
5S-104W-23	Taiga Energy	1-S-2S
6S-92W-26	Koch Explr.	Frick Mc 11-26
6S-94W-21	Northwest Explr.	Clough #2
6S-94W-34	CER Corp.	MWX #1
6S-94W-34	CER Corp.	MWX #2
6S-94W-35	Southern Union	#1 Juhan-Fed.
6S-99W-17	Nucorp Energy	Sheffield 1-17
6S-100W-22	El Paso Nat. Gas	#2 Roan Creek
6S-102W-14	Potrero Oil	Calf Canyon #1
6S-103W-17	Belco Petro.	W. Salt Creek Fed 4-1
7S-90W-17	California Oil	#1 Baldy Creek
7S-91W-22	Mountain States	#1 Boulton
7S-91W-29	Derby-Roberts	Divide Creek N. #1
7S-92W-25	Mountain States	#1 Starbuck
7S-92W-36	Sun Oil	#1 Philpott
7S-93W-9	Chevron Oil	Skonberg #1
7S-93W-12	California Oil	#1 Shaeffer
7S-94W-1	Carter & Carter	#1-B Juhan
7S-95W-14	Southern Union	#14-95 Fed.

Garfield County, Colorado (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
7S-95W-25	Austral Oil	25-95 Hayward
7S-95W-29	Southern Union	#95-29 Govt.
7S-95W-30	Southern Union	Fed. 30-95
7S-99W-6	El Paso Nat. Gas	#1 Std. Shale
7S-99W-14	El Paso Nat. Gas	#1 Nichols-Govt.
7S-101W-20	C & K Petroleum	CSOC Fed. 1-20
8S-92W-18	Wacker Oil	Govt. #1
8S-100W-10	Great Basin Pet.	#1 Govt.

Gunnison County, Colorado

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
10S-90W-31	Ralston Production	Fed. 31
11S-90W-27	Delhi-Taylor	#1 Pasco Spatafore
12S-89W-17	Delhi-Taylor	#1 McLaughlin-Gov.
12S-90W-11	Petro-Lewis	Hotchkiss Ranch 3-11

Mesa County, Colorado

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
1S-2E-26	Acadian Energy	Somerville 1-26
8S-94W-25	Mobil Oil	Brush Creek 1-25
8S-94W-33	Fred. W. Pool	Janice #1
8S-96W-15	Don M. Rounds	Kennon #1
8S-98W-25	Oroco Oil & Gas	#2 Oroco-Coon Hollow
8S-98W-31	United Producing	Debeque 1-31
8S-98W-31	Phillips Petro.	#1 Pray Govt.
8S-98W-36	Teton Energy	Harvey Fed. 36-3
8S-99W-13	Koch Explr.	Hancock Gulch #1
8S-99W-30	Andrews & Cooper	#1 Govt.
8S-99W-34	Marathon Oil	DeBeque #2
8S-100W-29	Great Basin Petro.	#1 Unit
9S-91W-2	Sun Oil	Divide Creek #13
9S-91W-28	Mountain States	#1-28 Govt.
9S-92W-2	Pacific Nat. Gas	E. Buzzard Crk 31-2
9S-92W-5	Apache Corp.	#1-C U.S. Rushmore
9S-92W-8	El Paso Nat. Gas	#1 Govt.-Conoco
9S-92W-20	Nordon Corp.	Govt. #1
9S-93W-12	Union of California	#1 Buzzard Creek
9S-93W-15	Union of California	#1 Van Den Heuvel
9S-94W-17	Pan Am. Petro.	#1 Govt.-Lowther
9S-94W-33	Western Frontier	Hawkins #1
9S-95W-13	Fred Pool	McCurry #1
9S-95W-33	Chandler & Assoc.	Stites 15-33

Mesa County, Colorado (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
9S-95W-36	Carter & Carter	#1 Plateau Creek Ranch
9S-95W-36	Teton Energy	Sparks 36-4
9S-96W-30	Pacific Nat. Gas	Shire Gulch 14-30-3
9S-97W-8	Coors Energy	Debeque 1-8
9S-97W-25	Norris Oil	Fed. 25-1
9S-97W-29	Koch Explr.	Horseshoe Canyon #2
9S-97W-32	Texaco	#1 Haffelmire-Govt.
9S-97W-32	Alta Energy	Fed. 32-1
9S-97W-33	Koch Explr.	Horseshoe Canyon #4
9S-97W-34	Koch Explr.	Horseshoe Canyon #5
9S-97W-35	Pacific Nat. Gas	Shire Gulch 23-35
9S-97W-36	Norris Oil	Fed. 36-1
9S-98W-23	United Producing	#2-23 Govt.
9S-98W-29	F. R. Anderson	#24-29 Govt.
10S-93W-10	Exxon USA	Vega Unit #3
10S-93W-29	El Paso Natural Gas	#1 Leon Creek
10S-94W-7	Teton Energy	Anderson 7-3
10S-94W-18	Teton Energy	Williams 18-3
10S-94W-24	Alpine Oil	Govt. #1
10S-95W-3	McColloch Oil	#1 Webb
10S-95W-4	Chandler & Assoc.	Webb 11-4
10S-95W-7	Adolph Coors	Big Creek 2-7
10S-95W-12	Pan American	#1 Walck
10S-95W-14	Teton Energy	Walck 14-3

Mesa County, Colorado (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
10S-95W-17	Bow Valley Expl.	Wissel 17-2
10S-95W-18	Apache Corp.	#1 Thomas
10S-95W-19	Flying Diamond	#1-19 Wallace Currier
10S-95W-19	Flying Diamond	Wallace Currier 19-2
10S-95W-36	Exxon Company	#2 Old Man Mtn.
10S-96W-1	El Paso Natural Gas	#1 Rushmore-Fed.
10S-96W-10	Flying Diamond	Federal 10-1
10S-96W-11	Gasco	Gasco-Walker #1
10S-96W-12	El Paso Natural Gas	#1 Skyline-Hittle
10S-96W-13	Flying Diamond	B. E. Nichols 13-1
10S-96W-17	Chandler & Assoc.	Jenacaro 2-17
10S-96W-19	Adolph Coors	Fetters 3-19
10S-96W-21	Gasco	Gasco-Nichols #1
10S-96W-23	Hammonds & Blanco Oil	Johnson 23-1
10S-96W-25	La Cima Corp.	Milholland #2
10S-96W-27	Norris Oil	Moran 2-27
10S-96W-28	Apache Corp.	#1 Govt.-Moran
10S-97W-1	Martin Oil	Federal 1-3
10S-97W-4	Texaco	Roberts Canyon #3
10S-97W-14	Coors Energy	Nichols 1-14 CM
10S-97W-15	Coors Energy	Nichols 1-15 CM
10S-97W-22	Adolph Coors	Nichols #1-22 CM
10S-97W-24	Adolph Coors	Acco-Meador 1-24
10S-97W-26	Coors Energy	Nichols 2-26 CM

Mesa County, Colorado (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
10S-97W-28	Coors Energy	Cameoland 1-28c
11S-93W-9	Exxon USA	Kenny Creek #1
11S-94W-15	Great Western	11-94-15 #1 Fed.
11S-96W-15	Kenai Oil & Gas	Bull Basin Fed. 15-3

Moffat County, Colorado

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
7N-93W-9	The Carter Oil Co.	Annia P. Olsen #1
7N-93W-16	Intex Oil Co.	#1-16 Intex Alpha
7N-94W-3	U.S. Smelting Co.	McIntyre #2
8N-89W-22	Forest Oil Co.	Panak #22-1
8N-90W-30	Carter Oil Co.	#1 North Craig Unit
8N-93W-13	Humble Oil & Ref.	North Lay Ck. Unit #1
8N-93W-14	King Resources Co.	#2 Lay Creek Unit #1
8N-94W-31	U.S. Smelting & Mining	Federal 8-94 #1-31
8N-95W-29	Intex Oil Co.	#1 Reust
8N-96W-27	Wainoco & Huber	J. M. Huber Corp. Godiva Rim #3
9N-91W-6	Skelly Oil Co.	#1 Sager
9N-93W-12	The Kemmerer Coal Co.	Kemmerer-Suburban 12-1
9N-94W-27	Quadrant-Westrans	#32-27 Federal
10N-90W-26	Midwest Oil Corp.	#1 Villiard
10N-90W-28	Belco Petr. Corp.	Welba Peak #1
10N-94W-22	Skelly Oil	Colorado Fed. "C" #1
10N-95W-23	Wainoco-J. M. Huber Corp.	Godiva Rim Unit 23-1
10N-99W-2	The California Co. (Sun)	#1 Calco Govt.
11N-89W-7	Gulf Energy & Mineral Co.	Slater Ck. Unit #1
11N-91W-3	Pan American Petr. Co.	#1 Govt.-Kirby
11N-91W-22	Midwest Oil Corp.	Midwest Skyline #1 Colo. 22-11-91
11N-92W-2	HLM Drilling Co.	HLM #3 Pole Gulch Unit
11N-93W-6	Phillips Petr. Co.	#1-a Moffat
11N-93W-26	Wainoco & J. M. Huber	Timberlake Unit 26-1

Moffat County, Colorado (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
11N-99W-15	Humble Oil & Ref. Co.	#1 Lookout Mountain
11N-100W-1	Mountain Fuel Supply Co.	#1 Govt.
11N-100W-16	Mountain Fuel Supply	#1 State
11N-101W-15	Chandler & Simpson	#1 Talamantes
11N-102W-4	Pan American	#1-A Madeline P. Gilbert
12N-99W-23	Pan American	#1 Unit
12N-101W-24	Skelly Oil Co.	#1-B Govt.

Pitkin County, Colorado

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
8S-90W-34	California Oil	#3 Unit
10S-89W-9	Superior Oil	#1 Coal Basin

Rio Blanco County, Colorado

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
1N-103W-35	Argo Oil	Govt. Chorney #1
1N-102W-27	Texaco	Govt. Erving Wolf A#1
1N-101W-19	Phillips Pet.	Gilliam #5
1N-100W-14	Chorney Oil	East Rangely 1-14
1N-100W-6	Chorney Oil	Federal 1-6
1S-99W-16	Teton Energy	Yellow Ck. Fed 16-3
1S-100W-19	Stauffer Chem.	Big Ridge #1
1S-100W-25	Munson & Assoc.	Fed 25-1-100
1S-101W-7	Chandler & Assoc.	Fork Unit Fed 12-7-1-1
1S-101W-17	Chandler & Assoc.	Fork Unit 5-17-1-1
1S-101W-30	Chandler & Assoc.	Fork Unit 10-30-1-1
1S-101W-31	Chandler & Assoc.	C & A Fed. 1-31
1S-101W-32	Chandler & Assoc.	Fed 12-32
1S-101W-33	Chandler & Assoc.	Douglas Ck 3-33-1-1
1S-102W-22	Chandler & Assoc.	Fork Unit 1-22-1-2
1S-103W-8	Alamo Corp.	Lower Horse Draw #10
2S-96W-16	Mobil	Piceance Ck. F41-16G
2S-98W-29	CSG Expl.	Rio Blanco 298-29-2
2S-99W-11	Sun Gas	Sage Brush Hills 11-2-99A
2S-100W-29	Shenandoah Oil	1-29 Fed.
2S-100W-32	Shenandoah Oil	Fed 1-32
2S-101W-3	Northwest Expl.	Philadelphia Ck. #9
2S-101W-3	N.W. Pipeline	Philadelphia Ck. #1
2S-101W-4	Chandler & Assoc.	N. Douglas Ck. 3-4-2-1

Rio Blanco County, Colorado (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
2S-101W-7	Chandler & Assoc.	C & A Fed 3-7
2S-101W-10	J & D Assoc.	Fed 10-2
2S-101W-11	Northwest Expl.	Philadelphia Ck #16
2S-101W-15	Northwest Expl.	Philadelphia Ck #20
2S-101W-16	Fuel Resources Dev.	Fed 16-1
2S-101W-18	Fuel Resources Dev.	Fed 7-18-2-101S
2S-101W-21	Fuel Resources Dev.	Fed 21-1
2S-101W-22	Fuelco	Fed 22-1
2S-101W-26	Mountain Fuel	Big Horse Draw Fed 26-2
2S-101W-27	Fuelco	Fed 27-1
2S-101W-28	Mountain Fuel	Big Horse Draw 28-1
2S-101W-29	C. E. Chancellor	Fed 29-1
2S-101W-30	Continental Oil	Dragon Trail #24
2S-101W-31	Continental Oil	#5 Douglas Ck.
2S-101W-31	Fuel Resources Dev.	Fed 31-1
2S-101W-32	Continental Oil	#14-32
2S-101W-33	Chancellor & Ridgeway	Fed. 33-2
2S-101W-34	Twin Arrow	Mnt Fuel 5-34
2S-101W-36	Fuel Resources Dev.	Fed N-36-2-101-S
2S-102W-3	Chandler & Assoc.	Fed 2-3
2S-102W-6	Chandler & Simpson	#1 Govt.
2S-102W-11	Chandler & Assoc.	Fed 6-11
2S-102W-14	Chandler & Assoc.	Fed 2-14
2S-102W-26	Continental Oil	#1 Dragon Trail

Rio Blanco County, Colorado (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
2S-102W-22	Continental Oil	#4 Unit-22
2S-102W-27	Continental Oil	#3 Unit
2S-102W-28	Continental Oil	#2-28 Unit
2S-103W-17	Alamo Corp.	#5 Unit-Govt.
2S-103W-22	Alamo Corp.	#4 Unit
2S-103W-24	General Petroleum	#1 Govt.
2S-103W-25	Continental Oil	#2 Govt. 25
3S-100W-8	Twin Arrow	Continental 4-8
3S-100W-16	Twin Arrow	Continental 2-16
3S-100W-17	Twin Arrow	Continental 1-17
3S-100W-17	Twin Arrow	N. W. Brown 2-17
3S-100W-18	Continental Oil	S. E. Douglas Ck #3
3S-100W-19	Twin Arrow	Universal 1-19
3S-100W-20	Twin Arrow	Continental 1-20
3S-100W-23	Twin Arrow	Coors 3-23-X
3S-100W-31	Tipperary Oil & Gas	1-31B
3S-101W-6	Continental Oil	6-6 Govt.
3S-101W-7	Fuelco	Fed 7-1
3S-101W-10	Chancellor & Ridgeway	C & R #10-1 Fed
3S-101W-11	Twin Arrow	1-11 C & K
3S-101W-13	Twin Arrow	C & K 1-13
3S-101W-13	Twin Arrow	C & K 1-13x
3S-101W-16	Bear Tooth Oil & Gas	Fed D-16-3-101-S
3S-101W-16	Fuelco	Fed N-16-3-101-S

Rio Blanco County, Colorado (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
3S-101W-26	Fuelco	Fed 26-2
3S-101W-32	Lawrence Barker	Govt 32-3
3S-102W-2	Continental Oil	10-2 Douglas Creek
3S-102W-3	Fuelco	3-3 Federal
3S-102W-4	Chandler & Assoc.	#1 Roberts Govt.
3S-102W-11	Fuel Resources Dev.	11-1 Fed.
3S-102W-16	National Assoc. Pet.	#1-Govt.
3S-102W-24	Fuel Resources Dev.	Fed 24-2
3S-102W-30	Continental Oil	Missouri Ck #6
3S-103W-1	Chandler & Simpson	Govt 3-1
3S-103W-19	Adolph Coors	USA 1-19
3S-104W-13	Taiga Energy	Fed 19G-13-3S-104W
4S-100W-2	Mountain Fuel	Cathedral Bluffs #1
4S-102W-9	Taiga Energy	Federal 4E9
4S-102W-18	Provident Res.	Govt. 3-18-4-102
4S-102W-21	Taiga Energy	8-G-21
4S-102W-31	Sweet Pea Oil & Gas	Evacuation Ck 2-31-4-102
4S-103W-9	Taiga	Fed 16-0-9
5S-103W-6	Coseka Resources	Gentry 16-6-5-103

Carbon County, Wyoming

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
12N-90W-18	Kirby Royalties, Inc.	#1 Montgomery
12N-91W-11	Consolidated Oil & Gas	Sheehan #1
12N-92W-10	Phillips Petroleum	#B Unit
12N-92W-15	Calvert Drig. & Prod.	South Baggs Unit #15
12N-92W-16	Devel. Serv. & Calvert Drig. & Prod.	S. Baggs Unit #13
12N-93W-3	W. G. Gruenerwald	#2 South Baggs
12N-93W-9	Rainbow Resources	State 1-9
12N-93W-13	Huber, J. M. Corp.	#13-1 Christensen Ranch
12N-93W-16	Wolf Exploration Co.	#1 Smith Rancho
13N-89W-5	Westrans Petroleum Inc.	#14-5 Federal Wildcat
13N-89W-20	Carter Oil Co.	#2 Unit
13N-89W-24	Woodward & Co.	#2 Jack Boyer
13N-89W-33	Petroleum Exploration Inc.	Lapin #1
13N-90W-19	Argo Oil & Cosden Petroleum	#1 Govt. Fleetwood
13N-91W-8	True Oil Co.	Muddy Creek Unit #1
13N-91W-9	Brinkerhoff Drilling Co.	#1 Unit
13N-91W-12	Caulkins Oil & Alpine Oil Co.	#1 Unit
13N-91W-28	Davis Oil Co.	#1 Stanton
13N-91W-31	Kirby Petroleum Co.	Kirby-Jim Baker-Govt. #1
13N-92W-35	The Texas Co.	#1 Baggs Unit
13N-93W-10	William Moss Prop.	Moss-CIG 10-13-93 Federal
14N-90W-7	Chandler & Simpson	#1 Govt.
14N-91W-11	Sun Oil Co.	#1 Browning-Govt.

Carbon County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
14N-91W-21	True Oil Co.	#1 Craig
14N-91W-24	American Quasar Pet. Inc.	Browning Fed. #2
14N-91W-31	True Oil Co.	Robber's Gulch #1
14N-92W-7	C.I.G.	7-14-92 Blue Gap II Unit
14N-92W-8	C.I.G.	2-8-14-92 Blue Gap Unit
14N-92W-12	True Oil Co. & Mule Ck. Oil Co.	#44-12 Mandell
14N-92W-35	Burton-Hawks Expl. Co.	#1 Rutter Federal
15N-89W-31	Walter Fees	Stratton #1
15N-91W-14	G. H. Vaughn, Jr.	#1 State
15N-91W-15	U.S. Nat. Gas Corp.	Cherokee Ck. 23-15
15N-91W-23	U.S. Nat. Gas Corp.	Cherokee Ck. 32-23
15N-93W-23	C.I.G., Inc.	Blue Gap II Unit 5
15N-92W-27	Hamilton Brothers Oil Co.	#1 Federal
15N-93W-34	Chorney Oil Co.	Blue Gap Unit Block A-1
16N-90W-5	U.S. Nat. Gas Corp.	Horse Gulch Unit #1
16N-90W-21	Davis Oil Co.	Ilabelle Federal #1
16N-90W-31	Benson-Montin-Greer	Brown's Hill Unit J-31X
16N-90W-32	Amerada Petroleum	Deep Creek Unit #2
16N-91W-21	U.S. Nat. Gas Corp.	Fed. 32-21 (North Cherokee Ck)
16N-91W-22	Davis Oil Co.	#1 Deep Gulch Unit
16N-92W-11	U.S. Nat. Gas Corp.	Cow Ck. Unit 41-11
16N-92W-12	SOHIO Petroleum	#1 Unit
16N-92W-17	Ohio Oil Co.	#1 Unit

Carbon County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
16N-93W-11	Pan American Pet. Co.	Barrel Springs Unit #3
16N-93W-13	Union Texas Nat. Gas Corp.	#2 Govt.
18N-91W-16	Samedan Oil Corp.	#1 State
18N-91W-28	Mountain Fuel Supply	#1 Unit
18N-92W-9	Michigan Wisconsin Pipeline Co.	9-1 Amoco
18N-92W-12	Amoco Prod. Co.	Creston Unit #1
18N-93W-5	Amoco Prod. Co.	Champlin 222 Amoco II
18N-93W-27	Amoco Prod. Co.	Champlin 226 Amoco "F" #1
19N-90W-17	Texas Oil & Gas	Txo Amoco C#1
19N-91W-20	Davis Oil Co.	#1 Tom Federal
19N-91W-32	Davis Oil & Southland Royalty	#1 Petroleum Fed.
19N-92W-1	Amoco Prod. Co.	Fillmore Ck. W.I. Unit #1
19N-92W-20	Humble Oil & Ref.- Mnt. Fuel Supply Co.	#1-c Unit
19N-92W-26	Carter Oil Co.	#1-A Unit
19N-93W-21	Amoco Prod. Co.	Champlin 242 Amoco "A"
19N-93W-21	Amoco Prod. Co.	Champlin 222-E #1

Fremont County, Wyoming

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
27N-98W-30	Chorney Oil Company	Circle Bar Unit #1
27N-101W-24	Mountain Fuel Supply	Dickie Springs Unit #1

Lincoln County, Wyoming

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
19N-112W-5	Amoco Production Co.	Wilson Ranch #13
19N-112W-33	Amoco Production Co.	149 Champlin G-1
19N-113W-3	Amoco Production Co.	Wilson Ranch Unit #4
19N-113W-19	Amoco Production Co.	Champlin 412 Amoco "A" #1
19N-115W-30	Belco Petroleum Corp.	Hams Fork Unit #2
20N-112W-18	C&K Petroleum, Inc.	Christman #1
20N-112W-27	Amoco Production Co.	Champlin 285 Amoco 1-A
20N-114W-16	Amoco Production Co.	Dry Muddy Creek Unit #1
20N-115W-11	Amoco Production Co.	Champlin 422 Amoco A-1
21N-112W-14	Amoco Production Co.	Whiskey Buttes Unit #5
21N-113W-14	Pacific Transmission Supply Co.	Pts. 14-14 Federal-Cow Hollow
22N-111W-19	Amoco Production Co.	#3 Whiskey Buttes Unit
22N-112W-20	Belfer Natural Gas Co.	#2 Unit
22N-113W-1	Belfer Natural Gas Co.	#2 Unit
22N-115W-35	Union Oil Co. of California	#1 Waterfall Heath Unit
23N-112W-26	Belco Petroleum Corp.	Emigrant Springs Unit #4
24N-112W-34	Amoco Production Co.	Gravel Unit #1
25N-112W-2	Pacific Transmission Supply Co.	Pts. 14-2 Federal
25N-112W-3	Pacific Transmission Supply Co.	Pts. 31-3 Federal
25N-112W-7	Pacific Transmission Supply Co.	Pts. 23-7 Federal
25N-112W-9	Pacific Transmission Supply Co.	Pts. 13-9 Federal
25N-112W-10	Pacific Transmission Supply Co.	Pts. 32-10 Federal

Lincoln County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
25N-113W-26	Apache Oil Corp.	#1 Unit
26N-111W-19	Pacific Transmission Supply Co.	Pts. 32-19 Federal
26N-111W-31	Pacific Transmission Supply Co.	Pts. 32-31
26N-112W-19	Belfer Natural Gas Co.	#3 CP-BNG Larson-McGinnis
26N-112W-23	Pacific Transmission Supply Co.	34-23 Federal
26N-112W-25	Pacific Transmission Supply Co., FMC, & Chorney Oil Co.	Pts. 42-25 Federal
26N-112W-26	Chorney Oil Co., PGT, & FMC	Fontenelle #1-26
26N-112W-26	Pacific Transmission Supply Co., FMC, & Chorney Oil Co.	Pts. 14-26 Federal
26N-112W-27	Pacific Transmission Supply Co., FMC, & Chorney Oil Co.	Pts. 14-27 Federal
26N-112W-32	Pacific Transmission Supply Co.	Pts. 42-32 BUCK
26N-112W-33	Pacific Transmission Supply Co.	Pts. 42-33 Federal
26N-112W-35	Pacific Transmission Supply Co.	Pts. 23-35 Federal
26N-112W-36	Pacific Transmission Supply Co.	Pts. 24-36 State
26N-112W-36	Pacific Transmission Supply Co.	Pts. 41-36 State
26N-113W-34	Belco Petroleum Corp.	#2 Unit

Sublette County, Wyoming

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
27N-103W-27	Superior Oil Co.	Pacific Creek Unit #1
27N-109W-7	Davis Oil Co.	Sugar Loaf Unit #1
27N-111W-7	Energetics, Inc.	Federal 40-7
27N-111W-19	Energetics, Inc.	Federal 10-19
27N-111W-30	Energetics, Inc.	Federal 40-30
27N-111W-30	Energetics, Inc.	Federal 10-30
27N-112W-28	Belfer Natural Gas Co.	#5 Unit
28N-109W-29	Woods Petroleum Corp.	Cutlass Unit #1
28N-111W-17	Woods Petroleum Corp.	U.S.A. Reardon 17-1
28N-112W-15	Belco Petroleum Corp.	Tarter Island 4-15
28N-112W-19	Belco Petroleum Corp.	#12 Unit
28N-113W-4	Belco Petroleum Corp.	#1 Unit
29N-113W-8	Belco Petroleum Corp.	Thompson #2-8
30N-109W-33	Davis Oil Co.	West Pinedale #1
30N-113W-32	Belco Petroleum Co.	#1 Deer Hill
31N-114W-4	Pacific Transmission Supply Co.	Federal 13-4

Sweetwater County, Wyoming

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
12N-94W-11	Gulf Oil Corporation	#1 Govt.
12N-95W-16	Anadarko Petr. Co.	#1 Fireplace Rock
12N-96W-3	Pan American Petr. Co.	USA Pan Am G-1
12N-96W-15	Amoco Prod. Co.	#1 USA Amoco K
12N-97W-8	Mountain Fuel Supply Co.	Powder Mnt. Unit #1
12N-98W-14	Champlin Oil & Ref. Co.	#1-A Federal Damewood
12N-99W-6	Mid-America Minerals, Inc.	#1-6 Govt. Unit
12N-99W-22	True Oil Co.	#1-A Taylor
12N-100W-21	Mountain Fuel Supply Co.	Radosevich #1
12N-101W-3	Stanolind O & G Co.	#1 Canyon Creek
12N-101W-8	Mountain Fuel Supply Co.	Canyon Ck #19
12N-101W-13	Mountain Fuel Supply Co.	Unit #1
12N-101W-15	Mountain Fuel Supply Co.	Canyon Creek #30
12N-101W-15	Mountain Fuel Supply Co.	Canyon Creek #21
12N-101W-17	Continental Oil Co. (P & C West)	Carter State 17 #1
12N-102W-5	Carter Oil	#1 Unit
12N-103W-10	Stanolind O & G Co.	#1 Unit
12N-107W-1	Mountain Fuel Supply Co.	Marsh Creek Unit #1
13N-99W-19	Chicago Corp.- Republic Nat. Gas	#1 Butterwick-Govt.
13N-100W-16	Mountain Fuel Supply Co.	#5 Unit
13N-100W-17	Superior Oil Co.	#1-17 O'Donnell-Govt.
13N-100W-29	Pubco Petr. Co.	La Gloria Federal 1-29-F
13N-101W-7	Union Oil Co. of Calif.	#1-7 Govt.

Sweetwater County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
13N-102W-10	Geronimo Oil Co.	Wisdom #1
13N-102W-35	Mountain Fuel Supply Co.	Fisher Creek Unit 1
13N-103W-8	Caulkins Oil Co.	#1 Govt.-Gribben
13N-104W-15	Caulkins Oil	4-15 Govt.
13N-105W-35	Petroleum Inc.	#1 Govt. Sun.
13N-106W-27	Phillips Petroleum	Govt. #1
13N-106W-36	Gulf Oil Corp.	Marsh Creek Fed. #1
13N-107W-1	Gruenerwald & Associates	Current Creek #4 Unit
14N-100W-2	Edwin W. Pauley	#1 Unit
14N-100W-9	Caulkins Oil Co.	#1-9W Federal
14N-100W-10	El Paso Natural Gas Co.	Kinney Rim Govt. #1
14N-100W-35	Mountain Fuel Supply Co.	Trail #9
14N-102W-9	British-American Oil Co.	#1-E Govt. Ramey
14N-103W-24	Reserve Oil & Gas Co.	Nat. Resources Fed 1-24
14N-105W-8	Caulkins Oil Co.- Republic Nat. Gas	#1-8E Federal Unit #3
14N-106W-9	Caulkins Oil Co.- Republic Nat. Gas	#4-9V Federal
15N-100W-4	Davis Oil Co.	Nuclear Federal #2
15N-100W-6	Apache Corp.	#1 Federal Adkisson
15N-100W-21	Davis Oil Co. & Southland Royalty	Chicken Springs #1
15N-101W-6	True Oil Co.	Swinehart Fed #14-6
15N-102W-29	Skelly Oil Co.	#1 Blum
15N-102W-34	Samedan Oil Co.	Scheggs Draw Unit #1

Sweetwater County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
16N-94W-8	Sands American Corp.	Federal 1-8
16N-98W-1	Amoco Production Corp.	Champlin 269-Amoco A #1
16N-98W-29	Amoco Production Corp.	Champlin 273-Amoco A #1
16N-99W-3	Continental Oil Co.	#2-3 Unit
16N-100W-10	Davis Oil Co.	#1 Conroy-Federal
16N-100W-29	Trans Delta Oil & Gas Co.	Fairway #1
16N-101W-2	Mountain Fuel Supply Co.	#2 Unit
16N-101W-20	Chandler & Simpson	#1 Wallway-Govt.
16N-102W-12	Davis Oil Co.	#1 Fed-Terteling
16N-102W-20	True Oil Co.	S. P. Federal #14-20
17N-94W-7	Amoco Prod. Co.	Champlin 237-Amoco A #1
17N-94W-22	Ladd Petr. Corp.	1-22 Federal
17N-96W-3	Amoco Prod. Co.	Champlin 256-Amoco A #1
17N-97W-14	Davis Oil Co.	#1 North Fork Federal
17N-98W-7	Pan American Petr. Corp.	UPRR-Pan Am "A" (NAV) #1
17N-99W-14	MKM Exploration Co.	Antelope Springs #1
17N-99W-22	Davis Oil Co.	#1 Unit-Federal
17N-99W-28	Davis Oil Co.	Marathon-Govt. #1
17N-99W-30	Davis Oil Co.	#1 Fred Federal
17N-100W-19	Mountain Fuel Supply Co.	Homestead Unit #2
17N-101W-16	Mountain Fuel Supply Co.	Homestead Unit #3
17N-103W-13	Trans Delta Oil & Gas	UPRR #13-4
17N-106W-26	Miami Oil Producers, Inc.	North Firehole #1
17N-107W-26	Colorado Oil & Gas Corp.	#1-26 Rye Grass
17N-112W-14	Mountain Fuel Supply	Unit #16

Sweetwater County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
18N-94W-10	North American Royalties, Inc.	Federal 10-18-94 #1
18N-94W-29	Amoco Production Co.	Champlin 222-Amoco A #1
18N-95W-1	Amoco Production Co.	Champlin 221-Amoco A #1
18N-95W-16	Sands American Corp.	State 1-16
18N-96W-13	Amoco Production Co.	Champlin 267-Amoco "A" #1
18N-97W-10	Anadarko Production Co.	Red Desert Federal D 1-10
18N-97W-29	Continental Oil Co.	#2 Unit
18N-98W-10	Scimitar Oil-Emmett Schieck	#1 Govt.-Mattonen
18N-98W-14	W. S. Kilroy, Kramer Huff Drlg. Co.	#1 Bower
18N-98W-28	Gulf Oil Co.	#1 Unit
18N-99W-18	Odessa Natural Corp.	#2 Wallace Federal
18N-99W-33	Davis Oil Co.	Champlin-Rim #1
18N-100W-8	Chandler & Simpson	Black Buttes Govt. #1
18N-100W-14	Chandler & Simpson	Wolf-Govt. #1
18N-111W-9	Amoco Production Co.	Champlin 356-Amoco A-1
18N-106W-4	Miami Oil Producers	West Rock Spgs #1
19N-90W-3	Mule Creek Oil Co., Inc.	U.P.R.R. #1-243
19N-91W-21	Davis Oil Co. & Southland Royalty	#1 North Creston
19N-94W-1	The Ohio Oil Co.	#1-B Unit
19N-94W-15	Amoco Production Co.	Tierney Unit #2
19N-94W-18	Amerada Petroleum Corp.	#1-A Unit
19N-95W-16	Colorado Oil Co.	Desert Flats 22-16

Sweetwater County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
19N-96W-14	Amoco Production Co.	Tipton 11 Unit #1
19N-96W-20	Anadarko Production Co.	Red Desert Federal B 1-20
19N-97W-5	Texaco Inc.	Champlin A-2
19N-97W-14	McCulloch Oil Corp. of Calif.	#1 McKeever
19N-98W-3	Forest Oil Co.	Arch Unit #77-3-1
19N-98W-9	Forest Oil Corp.	#1 Unit 9-G UPRR
19N-98W-18	Forest Oil Corp.-UPRR	#9 Arch 18-2
19N-98W-18	Texas National Petroleum Co.	#1-18 Govt.
19N-98W-19	Forest Oil Corp.-UPRR	#1-19 Arch 2
19N-98W-28	Benedum-Trees Oil	#1 Govt.
19N-98W-28	Kramer-Huff Drilling Co.	#1 Govt.
19N-98W-34	St. Helens Petroleum Corp.	#1-34 U.S.A.
19N-99W-1	Forest Oil Corp.	Arch Unit #70-1-8
19N-99W-18	Gulf Oil Corporation	#1 Govt.-Leon
19N-99W-23	Forest Exploration Co.	#20 Arch 4-23
19N-99W-29	Texaco Inc.	Texaco-UPRR B-1
19N-99W-34	Texaco Inc.	#9 Unit
19N-100W-10	Chandler & Assoc., Inc.	Rowland-Federal 1-10
19N-100W-28	Union Pacific Railroad Co.	UPRR 43-28
19N-105W-19	Union Oil Co. of Calif.	White Mnt. Unit #1-C-19
19N-106W-16	Miami Oil Producers, Inc.	West White Mountain #1
20N-90W-19	Davis Oil Co.	#1 Red Rim
20N-91W-27	Amoco Production Co.	Champlin 252 Amoco "A" #1
20N-92W-29	Amoco Production Co.	Champlin 345 Amoco "D" 1

Sweetwater County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
20N-93W-17	Mountain Fuel Supply Co.	Latham Unit #1
20N-93W-27	Amoco Production Co.	Champlin 242 Amoco 6
20N-94W-6	Marathon Oil Co.	Marathon Federal #1-6
20N-94W-15	The Ohio Oil Co.	Wamsutter Unit A-3
20N-95W-14	The Ohio Oil Co.	#2-A Unit
20N-95W-18	Anadarko Production Co.	Red Desert Federal F1-18
20N-95W-25	Shamrock Oil and Gas Corp.	UPRR-Quealy #1
20N-95W-36	Smokey Oil Co.	Cities Service State 22-36
20N-96W-10	McCulloch Oil Corp.	Federal #1-10
20N-96W-20	Anadarko Production Co.	Red Desert Federal #C 1-20
20N-96W-30	Forest Oil Corp.	Forest-Murphy 1-30-1
20N-96W-32	Carter Oil Company	#1 Unit
20N-96W-34	Humble Oil & Refining Co.	Wells Bluff #1 .
20N-97W-10	John H. Hill	Chevron Federal #1
20N-97W-22	Forest Exploration Corp.	Mustang Unit #1-22-1
20N-97W-28	El Paso Natural Gas Co.	#1 Govt.
20N-97W-30	El Paso Natural Gas Co.	Desert Springs Unit #11
20N-98W-4	El Paso Natural Gas Co.	#5 Unit
20N-98W-16	General Petroleum Corp.	#F-11 State
20N-98W-24	Union Oil Co. of Calif.	Federal 1-913
20N-98W-29	Pubco Petroleum & UPRR	Playa Unit 14-29G
20N-99W-8	Union Oil Co. of Calif.	#1-8 Govt. Damuth
20N-99W-17	Texas National Petroleum Co.	#1 UPRR-Rock Springs Grazing
20N-99W-25	Mesa Petroleum Co.	#1-25 Playa UPRR

Sweetwater County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
20N-100W-2	Chandler & Assoc., Inc.	#1 Monsanto-Govt.
20N-100W-20	True Oil Co.	#14-20 Shanahan Federal
20N-100W-22	Lion Oil Co.- Division of Monsanto	#1 Towne
20N-107W-24	Miami Oil Producers, Inc.	East Peru #1
20N-108W-21	Amoco Prod. Co.	Champlin 97, Amoco #1
20N-110W-6	Davis Oil Co.	#1 Lacoy Federal
20N-111W-21	Amoco Production Co.	Champlin 253 Amoco A #1
20N-112W-23	Amoco Production Co.	7-Mile Gulch #4
21N-90W-11	Amoco Production Co.	Champlin 272-Amoco "A" #1
21N-91W-29	Amoco Production Co.	Buck Draw Unit #1
21N-92W-19	Amoco Production Co.	Monument Lake #1
21N-93W-27	Amoco Production Co.	Five Mile Gulch Unit #1
21N-94W-5	Amoco Production Co.	Siberia Ridge #7-A
21N-94W-10	Equity Oil Co.	Siberia Ridge #9
21N-94W-29	Marathon Oil Co.	Wamsutter Unit #A-6
21N-95W-26	Marathon Oil Co.	Wamsutter C-1 Unit
21N-96W-28	Joe W. Brown	#1 Govt.
21N-97W-12	Anadarko Production Co.	Red Desert Federal E 1-12
21N-97W-18	Stauffer Chemical- Jack Grynberg	Govt. #1
21N-98W-3	Davis Oil Co.	Davis Oil #1 UPRR Springs
21N-98W-18	John L. Kemmerer	#1 Unit
21N-99W-10	Statewide Oil Co.	Govt. #1-10
21N-99W-16	Terra Resources	Continental Divide State 16-1

Sweetwater County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
21N-100W-5	Coquina Oil Corp.	Amoco Blue Cheese #1
21N-100W-22	Colorado Oil & Gas Co.	Federal Roser #1
21N-101W-4	Davis Oil Co.	#1-B Federal
21N-106W-36	Miami Oil Producers, Inc.	Miami-State 1556, Well #1
21N-107W-24	Husky Oil Co.	#11-24 Skunk Canyon Federal
22N-92W-32	Amoco Production Co.	Pipeline Unit #1
22N-94W-22	Pacific Transmission Supply Co.	P.T.S. 3-22 Federal
22N-95W-18	Equity Oil Co.	#1 Red Desert
22N-96W-4	Buttes Gas & Oil Co.	#1-4 Federal
22N-96W-28	Cabot Corp.	Red Dunes Unit #1
22N-97W-9	Davis Oil Co. & Southland Royalty Co.	North Sheep Camp #1
22N-98W-3	Murphy Corp.- Utah Southern Oil Co.	#1-A Ohio-Federal
22N-98W-30	Clark Oil & Refining Co.	#F-22-98-30-D1-GOVT
22N-99W-2	Chandler & Simpson, Inc.	Pierson Govt. #2
22N-99W-20	Sinclair Oil & Gas Co.	#3 Unit
22N-100W-12	Sinclair Oil & Gas Co.	Federal #138
22N-100W-16	Sinclair Oil & Gas Co.	#1 State-Husky
22N-101W-16	Rosebud Royalty Co.	#1-16 State
22N-102W-24	Prenalta Corp.	Govt. 23-24-22-102
22N-106W-17	Belco Petroleum Corp.	#1 Unit
22N-111W-24	Amoco Production Co.	Whiskey Buttes #1
23N-97W-21	Apache Corp.	1-21 Yellow Girl
23N-98W-12	The Ohio Oil Co.	#1 Unit

Sweetwater County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
23N-98W-20	Davis Oil Co.	#1 Olshansky-Federal
23N-99W-1	May Petroleum Inc.	May Petroleum 1 Black Rock Federal
23N-100W-9	Davis Oil Co.	#2 Unit
23N-101W-4	Continental Oil Co.	#4-1 Unit
23N-101W-30	Davis Oil Co.	#1C Federal
23N-102W-10	Woods Petroleum Corp.	Bunten-Federal #1
23N-106W-33	Mountain Fuel Supply Co.	Windmill Unit #1
23N-111W-17	Davis Oil Co.	Storm Shelter #9
24N-98W-1	Davis Oil Co.	Buffalo Hump Federal #1
24N-98W-23	Humble Oil & Refining Co.	#1 Lee Federal
24N-100W-3	Sohio Petroleum Co.	Govt.-Pinnacles #1
24N-101W-33	Davis Oil Co.	#1 Treasure Unit
24N-102W-7	Jack Grynberg & Assoc.	Beaver Mesa #1-7 USA
24N-102W-11	Southland Royalty Co.	Federal #11-1
24N-102W-13	Woods Petroleum Corp.	Freighter Gap Unit 13-1
24N-103W-10	Woods Petroleum Corp.	Rim Rock #1
24N-103W-32	Elf Aquitaine Oil & Gas	Nitchie Gulch McBride 33-32
24N-103W-32	W. C. McBride	Govt. 1-32
24N-103W-33	Aquitaine Oil Corp.	Nitchie Gulch Amoco 13-33
24N-103W-34	Elf Aquitaine Oil & Gas	Nitchie Gulch Mesa 13-34
24N-104W-35	Florida Exploration Co.	Goodstein Federal #1-35
24N-110W-7	Davis Oil Company	Horn Canyon #1
24N-111W-25	Davis Oil Company	#1 Paperone Federal
25N-100W-26	SOHIO Petroleum Co.	Govt.-Pinnacles #2

Sweetwater County, Wyoming (cont.)

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
25N-101W-27	Humble Oil & Refining Co.	Parnell Creek #1
25N-102W-26	Skelly Oil Company	#1 Govt.-M. L. Ellsworth
25N-109W-14	Davis Oil Co. & Southland Royalty	Eighteen Mile Canyon Unit #1
25N-109W-30	Davis Oil Co.	#1 Stanley Federal
25N-110W-7	Delta Drilling Co.	Monument Butte Area Unit #5
26N-93W-36	Amoco Production Co.	Osborne Draw Unit #1
26N-102W-34	Gulf Oil Corporation	Morrow Creek Federal 2
26N-103W-25	Wood Petroleum Corp.	Rock Cabin Federal #1
26N-109W-10	Davis Oil Co.	#1 County Line Unit
26N-110W-33	Energetics, Inc.	Ferguson Fed. 32-33
26N-111W-4	Energetics, Inc.	Federal 30-4

Uinta County, Wyoming

<u>Location</u>	<u>Operator</u>	<u>Unit</u>
16N-112W-17	Mountain Fuel Supply Co.	#7 Unit
16N-113W-34	Davis Oil Company	Hank Hollow Federal #1
17N-115W-21	Amoco Production Co.	Amoco Champlin 413 "A"-1
18N-113W-11	Amoco Production Co.	Verne Unit #1
18N-113W-29	Amoco Production Co.	Champlin 228-Amoco A1

*Analysis of Low-Permeability Gas Sands Suitable for
Future Research Programs*

Finley and Han

Final report - October 1982

Figure 1. Areas covered by tight gas sand applications, Piceance Creek and Uinta Basins.

Figure 2. Areas covered by tight gas sand applications, Greater Green River Basin.

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