U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Plays for assessment in Region VII, Mid-Continent as of October 4, 1993 1995 National Assessment of Oil and Gas

compiled by

D.L. Gautier[1] and K.L. Varnes [1]

Open-File Report 93-596-G

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

[1] U.S. Geological Survey
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The U.S. Geological Survey periodically makes appraisals of the undiscovered oil and gas resources of the Nation. For the 1995 National Assessment the onshore areas and adjoining State waters of the Nation have been divided into eight Regions which are subdivided into 72 provinces. Regions II through VIII comprise the Lower 48 States; Alaska comprises Region I. A map at scale 1:5,000,000 showing the boundaries of Regions II through VIII for this assessment has been released in open file (Dolton, G.L., Varnes, K.L., Gautier, D.L., and Baird, J.K. compilers, 1992, Oil and gas assessment areas, 1992, Lower 48 States: U.S. Geological Survey Open-File Report 92-696, scale 1:5,000,000).

The provinces and assigned Province Geologists for Region VII are listed in Table 1. The basic assessment unit is the play. Table 2 lists by number and name the plays considered at this time (October 1993) in Region VII, Mid-Continent. Descriptions of the plays follow; in most cases these descriptions are written by the assigned Province Geologist (Table 1).

Because this National assessment is currently in progress, these listings and descriptions are preliminary. The plays and/or their names may change as the project progresses; some plays may be added, and others dropped. The descriptions may also change. The plays, play names, and descriptions may or may not duplicate plays appraised in other National assessments.

Table 1. List of Provinces and Province Geologists in Region VII, Mid-Continent

Prov.	Province Name	Province Geologist(s)	Telephone No.	Telephone No.
51	Superior	Palacas, J.G.	(303) 236-9383	
52	Iowa Shelf	Palacas, J.G.	(303) 236-9383	
53	Cambridge Arch - Central Kansas Uplift	Higley, D.K.	(303) 236-5791	
54	Salina Basin	Prensky, S.E.	(303) 236-5772	
55	Nemaha Uplift	Charpentier, R.R.	(303) 236-5766	
56	Forest City Basin	Charpentier, R.R.	(303) 236-5766	
57	Ozark Uplift	Hatch, J.R.	(303) 236-5418	
58	Anadarko Basin	Henry, M.E., and Hester, T.C.	(303) 236-5793	(303) 236-5792
59	Sedgwick Basin	Prensky, S.E.	(303) 236-5772	
60	Cherokee Platform	Charpentier, R.R.	(303) 236-5766	
61	Southern Oklahoma	Henry, M.E., and Hester, T.C.	(303) 236-5793	(303) 236-5792
62	Arkoma Basin	Perry, W.J.	(303) 236-5767	

Table 2. List of plays for consideration, Region VII, Mid-Continent

Prov.	Play No.	Play Name
51	5100	unassigned
51	5101	Precambrian MidContinent Rift
52	5200	unassigned
52	5201	Middle Ordovician
52	5202	Precambrian Mid-continent Rift System
53	5300	unassigned
53	5301	Niobrara Limestone Biogenic Gas
53	5302	Dakota Oil
53	5303	Permian Oil/Gas/Underpressured Gas
53	5304	Mississippian Oil, Gas
53	5305	Pennsylvanian Cyclical Carbonates Oil
53	5306	Pennsylvanian Basal Sandstone Oil
53	5307	Pennsylvanian Conglomerate Oil
53	5308	Ordovician Oil,Gas
53	5309	Early Ordovician/Cambrian Arbuckle Oil
54	5400	unassigned
54	5404	Cretaceous Coals of Central Kansas and Nebraska
55	5500	unassigned
55	5501	Lower Paleozoic
55	5502	Woodford Shale
55	5503	Mississippian
55	5504	Pennsylvanian-Permian Structural
55	5505	Desmoinesian Stratigraphic
55	5506	Coalbed Methane
56	5600	unassigned
56	5601	Lower Paleozoic
56	5602	Mississippian
56	5603	Pennsylvanian
56	5604	Coalbed Methane
57	5700	unassigned
57	5701	Middle Ordovician (Champlainian)
58	5800	unassigned
58	5801	Deep Structural Gas
58	5802	Arbuckle-Nemaha Ridge-Pratt Anticline Oil
58	5803	Arbuckle Stratigraphic Oil and Gas
58	5804	Wichita Mountains Uplift Oil and Gas
58	5805	Eastern Anadarko Basin Simpson Oil and Gas
58	5806	Greater Anadarko Basin Simpson Oil and Gas
58	5807	Viola-Nemaha Ridge-Pratt Anticline-Central Kansas Uplift Oil and Gas
58	5808	Greater Anadarko Basin Viola
58	5809	Hunton Stratigraphic Unconformity Oil and Gas
58	5810	Misener Oil and Gas
58	5811	Woodford Shale Oil and Gas
58	5812	Deep Stratigraphic Gas
58	5813	Lower Mississippian Stratigraphic Oil and Gas
58	5814	Upper Mississippian Stratigraphic Oil and Gas
58	5815	Springer Stratigraphic Gas and Oil
58	5816	Morrow Sandstone Oil and Gas Stratigraphic
58	5817	Atokan Sandstone Stratigraphic Oil and Gas
58	5818	Atokan Limestone StratigraphicGas and Oil
58	5819	Lower Desmoinesian Oil and Gas Stratigraphic
58	5820	Upper Desmoinesian Oil and Gas

Table 2. List of plays for consideration, Region VII, Mid-Continent

58	5821	Lower Missourian Oil and Gas
58	5822	Upper Missourian Oil and Gas
58	5823	Lower Virgilian Gas and Oil
58	5824	Upper Virgilian Stratigraphic Gas and Oil
58	5825	Permian Carbonate Stratigraphic Gas
58	5826	Coal-bed Methane
58	5827	Wichita Mountains Wash, Gas and Oil
58	5828	Permian Sandstone Oil and Gas
59	5900	unassigned
59	5901	Lower Paleozoic Structural Traps with Stratigraphic Control
59	5902	Mississippian Structural Traps with Stratigraphic Control
59	5903	Pennsylvanian Structural Traps with Stratigraphic Control
59	5904	Pennsylvanian Coals of the Western Interior Coal Basin
60	6000	unassigned
60	6001	Lower Paleozoic
60	6002	Woodford Shale
60	6003	Mississippian
60	6004	Pennsylvanian Structural
60	6005	Pennsylvanian Stratigraphic
60	6006	Coalbed Methane
61	6100	unassigned
61	6101	Deep Gas
61	6102	Arbuckle Oil and Gas
61	6103	Simpson Structural
61	6104	Viola Oil and Gas
61	6105	Hunton Oil and Gas
61	6106	Mississippian Chert Oil and Gas
61	6107	Mississippian Oil and Gas
61	6108	Springer Sandstone
61	6109	Atokan Sandstone
61	6110	Desmoinesian Sandstone
61	6111	Missourian Sandstone
61	6112	Virgilian Sandstone
61	6113	Permian Sandstone
61	6114	Detrital Washes
61	6115	Cretaceous
62	6200	unassigned
62	6201	Ouachita Hinterland Oil
62	6202	Atokan-Desmoinesian Fluvial-Deltaic and Shelf Sandstone Gas
62	6203	Atoka Deep-Water Sandstone Gas
62	6204	Morrowan Shallow-marine Sandstone and Limestone Gas
62	6205	Arbuckle through Mississippian Misener Basement Fault and Shelf Gas
62	6206	Spiro-Wapanucka Sub-Choctaw-Thrust Gas
62	6207	Carboniferous Turbidite Thrust-belt Gas
62	6208	Lower Paleozoic - Mississippian Eastern Arkoma Gas
62	6209	Morrowan Clastic Wedge Gas
62	6210	Nonconventional Mississippian-Devonian Shale Gas
62	6211	Coalbed Methane Pennsylvanian Gas

Descriptions of Plays to be Considered
Region VII, Mid-Continent

Province 51. Superior

Play 5101 Precambrian Midcontinent Rift System

This hypothetical play consists of the occurrence of oil and gas in structural and stratigraphic traps associated with the Midcontinent Rift System (MRS)--a long, linear tectonic structure that extends from central Lake Superior to central Iowa. The MRS occupies portions of the Superior, Iowa Shelf (52), Salina Basin (54), Nemaha Uplift (55), and Forest City Basin (56) provinces. Based on a generalized structural figuration, the MRS play is subdivided into two elements: 1) axial horsts, composed mostly of basaltic volcanics and lesser amounts of clastic rocks, that are bounded by steeply dipping reverse faults (volcanics-dominated domain), and 2) asymmetric basins filled primarily with clastic rocks (as much as 33,000 feet) and subordinately with volcanic rocks (sediment-dominated domain), the latter of which having the greater potential of petroleum reserves. Fair, incipiently mature to overmature source rocks, containing as much as 3% TOC (average 0.6%), have been identified in the Keweenawan-Oronto Group-Nonesuch Formation or equivalent rock. Sandstone reservoirs with adequate intergranular and/or fracture porosities within, above, and below the Nonesuch or equivalent rocks are likely.

Province 52. Iowa Shelf

Play 5201 Middle Ordovician

This hypothetical play is based on the (1) presence of minor oil production (400 barrels, Keota Dome, southeastern Iowa), (2) commercial production from equivalent rocks in adjacent provinces, (3) presence of good to excellent, immature to moderately mature source rocks within the Middle and Upper Ordovician sections, and (4) presence of potential sandstone and porous dolomite reservoirs. Both structural and stratigraphic traps are possible on the Iowa shelf. Rocks of the Middle Ordovician play underlie most of the province except for small areas in northwestern Iowa and southeastern Minnesota.

Play 5202 Precambrian Mid-Continent Rift System

This play in the Iowa shelf province is discussed along with the entire Mid-continent Rift system underplay 5101.

Province 53. Cambridge Arch - Central Kansas Uplift

Play 5301 The Niobrara Limestone produces mainly gas, largely of biogenic origin. Production is from limestones and shales, located primarily in the west-central part of the province.

Play 5302 The Dakota Sandstone includes the J and D sandstones; mainly stratigraphically-trapped oil is produced. While the sandstones cover most of the province, production and potentially productive areas are near the western boundary.

Play 5303 Permian Oil/Gas/Underpressured Gas
Traps are primarily structural and combination structure/stratigraphy. Producing and potentially productive formation are limestones of the Chase, Council Grove, and Admire Groups and, in the western NE panhandle, dolomites of Wolfcamp age.

Play 5304 Mississippian Oil, Gas
This play is primarily structural with combination structure/stratigraphic traps. Producing formations are Mississippian limestone and chert units, Misener, Kinderhookian, and Osage rocks. These formations are eroded from most of the province; they are located approximately parallel to province boundaries along the southern margin.

Play 5305 Pennsylvanian Cyclical Carbonates Oil
Traps are primarily low-relief structural noses and combination structure/stratigraphy. Production is concentrated proximal to the Central Kansas Uplift/Cambridge Arch. Producing formations include Wabaunsee, Shawnee, Douglas, Lansing, Kansas City, Marmaton, and Cherokee.

Play 5306 Pennsylvanian Basal Sandstone Oil
Traps are primarily structural with combination structure/stratigraphy. Production is concentrated proximal to the Central Kansas Uplift/Cambridge Arch. Production is from the Pennsylvanian basal sandstone.

Play 5307 Pennsylvanian Conglomerate
Traps are primarily structural with combination structure/stratigraphy. Production is concentrated proximal to the Central Kansas Uplift/Cambridge Arch. Production is from the Pennsylvanian conglomerate.

Play 5308 Ordovician Oil, Gas
Traps are primarily structural with influence of updip porosity/permeability pinchouts. Production is from Viola limestones and dolomites and Simpson sandstone.

Play 5309 Early Ordovician/Cambrian Arbuckle Oil
This play has primarily structural with combination structure/stratigraphic traps. Production is concentrated proximal to the Central Kansas Uplift/Cambridge Arch. Production is from Eminence and Bonneterre dolomites, Reagan Sandstone, and mostly fractured rocks of Precambrian age.

Province 54. Salina Basin

Play 5404 Cretaceous Coals of Central Kansas and Nebraska
Description not available.

Province 55. Nemaha Uplift

Play 5501 Lower Paleozoic
This play includes both sandstone and carbonate reservoirs of Cambrian to Devonian age, mostly in the Arbuckle, Simpson, Viola, and Hunton. The traps are mostly structural (anticlinal) or unconformity-related.

Play 5502 Woodford Shale
This play includes potential production from self-sourced gas reservoirs in the Woodford Shale. It will be assessed as an unconventional play.

Play 5503 Mississippian
This play includes carbonate or chert reservoirs of Mississippian age. Traps are structural (anticlinal) or combination.

Play 5504 Pennsylvanian-Permian Structural
This play includes sandstone reservoirs of Pennsylvanian, mostly Desmoinesian, or Permian age. Traps are structural (anticlinal) or combination.

Play 5505 Desmoinesian Stratigraphic
This play includes sandstone reservoirs of Desmoinesian age. Traps are stratigraphic (primarily controlled by facies change).

Play 5506 Coalbed Methane

This play includes potential production from self-sourced gas reservoirs in coalbeds. It will be assessed as an unconventional play.

Province 56. Forest City Basin

Play 5601 Lower Paleozoic

This play includes both sandstone and carbonate reservoirs of Cambrian to Devonian age, mostly in the Simpson, Viola, and "Hunton." The traps are mostly structural (anticlinal) or combination, (with some possibility of Silurian reefs?).

Play 5602 Mississippian

This play includes carbonate reservoirs of Mississippian age. Traps are structural (anticlinal) or combination.

Play 5603 Pennsylvanian

This play includes sandstone reservoirs of Pennsylvanian, mainly Desmoinesian, age. Traps are stratigraphic (primarily controlled by facies change).

Play 5604 Coalbed Methane

This play includes potential production from self-sourced gas reservoirs in coalbeds. It will be assessed as an unconventional play.

Province 57. Ozark Uplift

Play 5701 Middle Ordovician (Champlainian) Play

The Middle Ordovician (Champlainian) hypothetical play in the Ozark Uplift province is based on: 1) prior minor petroleum production from Middle Ordovician rocks in the Florissant field on the eastern edge of the province; 2) current hydrocarbon production from age equivalent rocks in adjacent provinces; 3) the presence of good to excellent hydrocarbon source rocks within the Middle Ordovician section; and 4) the presence of potential sandstone and porous dolomite reservoirs.

Province 58. Anadarko Basin

Play 5801 Deep Structural Gas

The play is generally defined by the 13,000 ft. depth contour and the presence of large pre-Mississippian structures in the deep Anadarko basin. The play includes Cambrian through Devonian age rocks. Traps are generally faulted anticlines and reservoir lithology is generally carbonate.

Play 5802 Arbuckle--Nemaha Ridge--Pratt Anticline Oil
The play covers an area along and west of the Nemaha Ridge and south of the Pratt Anticline and includes Cambrian Reagan Sandstone and Arbuckle Group rocks. Traps are generally combination type.

Play 5803 Arbuckle Stratigraphic Oil and Gas
This play is composed of Arbuckle rocks located away from major structural features primarily in the northern and western part of the province. Traps are expected to be stratigraphic or combination types.

Play 5804 Wichita Mountains Uplift Oil and Gas
Play includes rocks from Cambrian to Permian in age. Structural traps are the most common and are related to Pennsylvanian uplift along and north of the Wichita-Amarillo Mountains.

Play 5805 Eastern Anadarko Basin Simpson Oil and Gas
The play is restricted to rocks of the Ordovician age Simpson Group along and near the Nemaha Ridge or Pratt Anticline. Combination and structural traps are most common.

Play 5806 Greater Anadarko Basin Simpson Oil and Gas
Play restricted to rocks of the Simpson Group away from major structural features. No major reservoirs are listed in Nehring's data set but some production exists. Traps are expected to be small structures although other trap types may exist.

Play 5807 Viola--Nemaha Ridge--Pratt Anticline-Central Kansas Uplift-Oil and Gas
Play includes the Viola Limestone in areas near major structural features along the eastern and northeastern boundary of the province. Known fields are structural and combination types.

Play 5808 Greater Anadarko Basin Viola
Play includes the Viola Limestone in areas away from major structural features bounding the province. Traps are expected to be primarily combination .

Play 5809 Hunton Stratigraphic Unconformity Oil and Gas
Play is composed of Hunton Group rocks and is related to a regional unconformity near the top of the group and other unconformities within the group. Traps are stratigraphic and structural.

Play 5810 Misener Oil and Gas

Play is composed of the Misener Sandstone. Traps are combination type and known major fields are found in the eastern one-third of the province and in a small area near the Las Animas Arch.

Play 5811 Woodford Shale Oil and Gas

This play is general restricted to areas near major structural features along the eastern boundary of the province. Fracturing is an important element of reservoir quality.

Play 5812 Deep Stratigraphic Gas

The play is composed of rocks that range from the Misener Sandstone to Missourian rocks that lie below 13,000 ft.. Traps are primarily stratigraphic.

Play 5813 Lower Mississippian Stratigraphic Oil and Gas

Play includes rocks of Kinderhookian through Meremecian age that exist above 13,000 ft.. Most major fields are stratigraphic although fracturing is an important element of reservoir quality for the play.

Play 5814 Upper Mississippian Stratigraphic Gas and Oil

This play includes rocks of Chesterian age, the upper part of the Meremecian (St. Louis Limestone) and selected "Mississippian undifferentiated" and "Mississippian lime" reservoirs above 13,000 ft. Traps are primarily stratigraphic and are generally related to a major unconformity near the top of the Chester.

Play 5815 Springer Stratigraphic Gas and Oil

This play includes all Springer age rocks above 13,000 ft. depth and exists in the southeastern part of the province. The play area reflects the distribution of the reservoir sands of that age.

Play 5816 Morrow Sandstone Oil and Gas Stratigraphic

The play, consisting of Morrowan age rocks that occur at depths of less than 13,000 ft., contains major accumulations virtually throughout its distribution. Most known traps are stratigraphic and were probably sourced from enclosing Morrowan shales. This play is one of the two most significant petroleum producing plays in the province.

Play 5817 Atokan Sandstone Stratigraphic Oil and Gas

This play is composed of Atokan age rocks that exist at depths of less than 13,000 ft. and is located in the southeastern part of the Anadarko Basin. Most known traps are stratigraphic type.

Play 5818 Atokan Limestone Stratigraphic Gas and Oil

This play is composed of Atokan age rocks that exist at depths less than 13,000 ft. and is located in the northwestern part of the province. Traps are generally stratigraphic and combination type. Source rocks may be Atokan age shales.

Play 5819 Lower Desmoinesian Oil and Gas Stratigraphic

Play is predominately sandstones of generally early Desmoinesian age found above 13,000 ft. Traps are generally stratigraphic. Source rocks are believed to be Pennsylvanian age shales.

Play 5820 Upper Desmoinesian Oil and Gas

The play includes late Desmoinesian age rocks (predominately limestones) located above 13,000 ft. Common trap types for known accumulations are structural and stratigraphic. Pennsylvanian shales are probable source rocks.

Play 5821 Lower Missourian Oil and Gas

Play is composed of lower Missourian rocks that are generally more sandy in the southeastern part of the province. This play contains the oldest Pennsylvanian rocks; these do not exist in the deep stratigraphic gas play. Source rocks for this play may range from Ordovician to Pennsylvanian in age. Stratigraphic, structural and combination traps are common.

Play 5822 Upper Missourian Oil and Gas

The play is composed of upper Missourian rocks that are generally more calcareous in the northwestern part of the province. Structural and combination traps exist within the play. Source rocks for the play may range in age from Ordovician to Pennsylvanian.

Play 5823 Lower Virgilian Gas and Oil

This play consists of lower Virgilian reservoir rocks that are generally sandstones in the southern part of the province. Traps consist of stratigraphic, combination and structural types. Probable source rocks are Pennsylvanian age.

Play 5824 Upper Virgilian Stratigraphic Gas and Oil

The play is composed of upper Virgillian age rocks that are generally limestones in the northern and western parts of the province. Traps are generally stratigraphic and probable source rocks are Pennsylvanian in age.

Play 5825 Permian Carbonate Stratigraphic Gas

The play is essentially the Hugoton-Guymon-Panhandle complex of fields located in the western part of the province. Trapping has been described as stratigraphic-hydrodynamic. Probable source rocks for the play include Pennsylvanian age rocks and possibly the Woodford Shale.

Play 5826 Coal-Bed Methane.

This hypothetical play is restricted to areas along the north eastern part of the province where coals are known to exist.

Play 5827 Wichita Mountains Wash, Gas and Oil

This play is composed of detrital material eroded from the Wichita-Amarillo Mountains. Reservoir rocks consist of limestone, chert, dolomite and true "granite wash". These rocks range in age from Atokan to Permian. Trap types include structural, stratigraphic, and combination. Pennsylvanian rocks are probable sources for the play.

Play 5828 Permian Sandstone Oil and Gas

The play is restricted to the southeastern part of the province and is composed of sandstone reservoirs. Pennsylvanian rocks probably sourced these accumulations. Combination and structural traps are the common types.

Province 59. Sedgwick Basin

Play 5901 Lower Paleozoic Structural Traps with Stratigraphic Control

Locally sourced (Simpson) oil and gas is trapped in Lower Paleozoic reservoirs situated on low-relief anticlinal closures (noses) with stratigraphic control. Reservoirs consist of dolomites and sandstones of the Simpson Group (gas); carbonates of the Ordovician Viola Limestone and Maquoketa Shale (oil); carbonates of the Siluro-Devonian "Hunton Group."

Play 5902 Mississippian Structural Traps with Stratigraphic Control

Migrated (Woodford) oil and gas is trapped in basal Mississippian sandstone ("Misener"), Mississippian carbonates (Warsaw and Spergen Limestones) and "chert" (chat) on low relief anticlinal structures (noses). Stratigraphic control over porosity development includes updip facies changes (e.g. pinchout at the basal Pennsylvanian unconformity) or, in the case of the chert ("Chat"), by paleotopography and paleostructure.

Play 5903 Pennsylvanian Structural Traps with Stratigraphic Control
Locally sourced (Pennsylvanian) and migrated (Woodford?/Simpson?) oil and gas is trapped in Pennsylvanian sandstone and carbonate reservoirs, primarily within the Lansing-Kansas City Group, on anticlinal closures with stratigraphic controls. Primary reservoirs are Des Moinesian (Cherokee and Marmaton Group) sandstones and limestones: Missourian (Lansing and Kansas City Groups) limestones; Virgilian (Shawnee and Wabaunsee Groups) limestones and(Douglas) sandstones; Permian Wolfcampian (Admire Group) sandstone.

Stacking with deeper reservoirs is common, since structural relief appears to increase with depth. Stray sandstones and carbonates in the Wabaunsee, Shawnee, Douglas, Marmaton, and Cherokee Groups may be productive in the Sedgwick Basin, particularly where they pinchout updip (e.g. Whelan field) or at abrupt facies changes occurring on anticlinal flanks (e.g. Sun City field; Rhodes field).

Province 60. Cherokee Platform

Play 6001 Lower Paleozoic
This play includes both sandstone and carbonate reservoirs of Cambrian to Devonian age, mostly in the Arbuckle, Simpson, Viola, Hunton, and Misener. The traps are mostly structural (anticlinal) or combination.

Play 6002 Woodford Shale
This play includes potential production from self-sourced gas reservoirs in the Woodford Shale. It will be assessed as an unconventional play.

Play 6003 Mississippian
This play includes carbonate or chert reservoirs of Mississippian age. Traps are structural (anticlinal) or combination.

Play 6004 Pennsylvanian Structural
This play includes sandstone reservoirs of Pennsylvanian age. Traps are structural (anticlinal) or combination.

Play 6005 Pennsylvanian Stratigraphic
This play includes sandstone reservoirs of Pennsylvanian, mainly Desmoinesian, some Missourian, age. Traps are stratigraphic (primarily controlled by facies change).

Play 6006 Coalbed Methane Play

This play includes potential production from self-sourced gas reservoirs in coalbeds. It will be assessed as an unconventional play.

Province 61. Southern Oklahoma

Play 6101 Deep Gas

This play includes rocks that range in age from Cambrian to the upper Pennsylvanian Deese Formation that are greater than 13,000 ft deep. Known trap types are generally structural. Multiple hydrocarbon sources for the play are likely and include Simpson shales, Woodford Shale, Sylvan Shale, Viola Limestone and Pennsylvanian shales.

Play 6102 Arbuckle Oil and Gas

This play consists of Arbuckle Group rocks that exist at depths of less than 13,000 ft. Because of large vertical offsets on the major faults in the province, placing older rocks against yonger ones, source rocks could be any of the probable sources present in the province. Known traps are generally structural. Reservoir rocks are carbonates.

Play 6103 Simpson Structural

The play consists of Simpson group rocks that exist at depths of less than 13,000 ft. This play could have multiple sources for the same reason described in 6102. Known accumulations are most commonly found in structural traps. The most common reservoir lithology is sandstone.

Play 6104 Viola Oil and Gas

This play is composed of the Viola Limestone at depths of less than 13,000 ft. The Viola and Sylvan Shale are probable source rocks although the structural complexity of the province makes other sources possible. Structural traps are most common. Reservoir lithology is carbonate.

Play 6105 Hunton Oil and Gas

This play consists of Hunton Group rocks at depths of less than 13,000 ft. Structural traps are common. Reservoir lithology is carbonate. The primary source rock for the play is the Woodford Shale but other sources may have contributed to these accumulations.

Play 6106 Mississippian Chert Oil and Gas

This play consists of Woodford Shale and Arkansas Novaculite reservoirs. The Woodford, primarily known for its source rock qualities, forms adequate reservoirs where it has been highly fractured

and retains open fractures. A more cherty character appears to enhance the reservoir qualities of this play. Reservoir lithology is generally shale and cherty shale. The hydrocarbon source is internal.

Play 6107 Mississippian Oil and Gas

This play includes the Goddard Formation, Sycamore Limestone and some undifferentiated Mississippian rocks at depths of less than 13,000 ft. Trap types are generally structural and stratigraphic. The Woodford Shale is the principal source rock for this play.

Play 6108 Springer Sandstone

This play is composed of various Springer Group sandstones above 13,000 ft. Traps are generally structural. Source rocks are thought to be primarily Pennsylvanian shales; possibly the Woodford Shale.

Play 6109 Atokan Sandstone

This play is composed of Atokan age sandstones that exist at depths less than 13,000 ft, Structural traps are the most common known type. Expected source rocks are Pennsylvanian shales.

Play 6110 Desmoinesian Sandstone

This play is the most productive in the province. It is composed of several sandstones that occur at depths of less than 13,000 ft Structural traps are the most common. Source rocks for the play are probably Pennsylvanian shales; possibly the Woodford Shale.

Play 6111 Missourian Sandstone

The play includes several highly productive Missourian-age sandstones. Known traps in the play are generally structural. Source rocks for the play are primarily Pennsylvanian shales; possibly the Woodford Shale.

Play 6112 Virgilian Sandstone

This play consists of several Virgillian-age sandstones. Traps for known major accumulations are generally structural. Source rocks for the play are primarily Pennsylvanian shales; possibly the Woodford Shale.

Play 6113 Permian Sandstone

The play is composed of Permian-age sandstones. Trap types for known accumulations are generally structural. Source rocks for the play are primarily Pennsylvanian shales; possibly the Woodford Shale.

Play 6114 Detrital Washes

This play consists of detrital material shed from the Wichita Mountains. Lithology may vary from carbonate to chert to true granite wash. Trap types for known accumulations are structural. Source rocks are probably Pennsylvanian shales; possibly the Woodford Shale.

Play 6115 Cretaceous

Only two reservoirs are known for this play. they both occur in Cretaceous-age sandstones in the southeastern part of the province. Trap type is structural in both cases. Probable source rocks are Ordovician shales; possibly Cretaceous-age shales.

Province 62. Arkoma Basin

Play 6201 Ouachita Hinterland Oil

Play area is western Ouachita thrust belt, locus of shallow Stanley and novaculite production. Source rocks are primarily deep-water marine Mississippian shales, mudstones and chert.

Play 6202 Atokan-Desmoinesian Fluvial-Deltaic And Shelf Sandstone Gas

Play area is predominately the northern and central Arkoma basin, including Altus-Massard field in Arkansas. Source rocks include deeper water organic-rich Atokan, Morrow, and Springer shales. Known traps are combination; structural-stratigraphic.

Play 6203 Atokan Deep-Water Sandstone Gas

Play area includes both southern Arkoma basin and frontal Ouachita thrust belt. Deposition occurred during time of maximum growth faulting (primarily early to middle Atokan). Source rocks as in play 6202.

Principal fields include those on the Ranger and Washburn anticlines in Arkansas, and portions of the Kinta, Red Oak-Norris, and Wilburton gas fields in Oklahoma.

Play 6204 Morrowan Shallow-Marine Sandstone and Limestone Gas

The Cromwell Sand and Wapanucka Limestone are principal reservoirs in this play in the western Arkoma basin, Oklahoma, and the Hale in the central Arkoma basin, Arkansas. Play limits are the same as play 6202.

Play 6205 Arbuckle Through Mississippian Misener Basement Fault and Shelf Gas

The Play area includes the central and western Arkoma basin and frontal Ouachita thrust belt. Structural traps formed by basement-controlled growth faulting of Atokan age. Source rocks believed to include Devonian and Mississippian organic-rich shales. Reservoirs include Arbuckle through Mississippian Misener.

Play 6206 Spiro-Wapanucka Sub-Choctaw-Thrust Gas

Play area includes the frontal central and western Ouachita thrust belt and adjacent Arkoma basin. Source rocks include deeper water organic-rich Atokan, Morrow, and Mississippian shales.

Play 6207 Carboniferous Turbidite Thrust-Belt Gas

Play area is the entire Ouachita thrust belt, except for Atoka of frontal thrust belt and metamorphosed hinterland uplifts. Source rocks expected in deep-water Mississippian shale and novaculite sequence. Play is conceptual.

Play 6208 Lower Paleozoic Through Mississippian Eastern Arkoma Gas

Play area includes the eastern Arkoma basin and adjacent parts of the Mississippi embayment. Play is conceptual, based on reduced thermal maturities east of central Arkansas. Possible source rocks include organic-rich Devonian and Mississippian shales.

Play 6209 Morrowan Clastic Wedge Gas

Play area includes the eastern Arkoma basin and adjacent Mississippi embayment. Possible source rocks include Upper Mississippian and Lower Pennsylvanian organic-rich shales. Possible reservoir rocks include prodelta and offshelf turbidite sands equivalent to the Caseyville fluvial-deltaic complex of the southern Illinois basin. The play is entirely conceptual.

Play 6210 Nonconventional Mississippian-Devonian Shale Gas

Play area includes the southern and western Arkoma basin. Several scattered wells have indicated production from the Upper Devonian Woodford (Oklahoma)/Chattanooga (Arkansas) shales. Possible shale reservoirs self-sourced and tight except where interbedded fractured chert and/or siltstone is present.

Play 6211 Nonconventional Coalbed-Methane Pennsylvanian Gas

Play area includes western and central Arkoma basin. Numerous coal zones, primarily of Pennsylvanian Desmoinesian age are present. Thin Atoka coals present in central and eastern part of basin.