of organic-rich shale, and (4) contain Type I or II organic matter. These specific USGS criteria when applied to any given shale-oil or shale-gas reservoir might significantly reduce the potential resource assessment area compared to maps made with greater than 1 weight percent TOC.

Geologic Model for Assessment

The geologic model for the assessment is summarized as follows. Volumes of oil and gas generated from organic-rich, deep-basin anoxic facies of the Jurassic Sargelu Formation in the Late Cretaceous remained in the source rock, migrated long distances, or re-migrated during the late Tertiary Zagros tectonic event, which is based on known Sargelu-sourced oil occurring in some Zagros-age structures. About 30 percent of the assessment unit (AU) area at the mode is estimated to contain adequate source facies that were relatively unaffected by structural movements and might have retained oil in the source-reservoir system. Upper Jurassic Gotnia Formation evaporites that overlie the Sargelu Formation likely provide a partial seal to the source-reservoir system. Shales of the Naokelekan Formation were not included in this assessment, as the Naokelekan potentially is a separate source-reservoir rock system.

The input data for the Jurassic Sargelu Continuous Oil AU are shown in table 1.

Resource Summary

The USGS quantitatively assessed unconventional oil and gas resources in the Jurassic Sargelu Formation of Iraq (table 2). For unconventional oil resources, the mean total is 1,606 million barrels of oil (MMBO), with a range from 327 to 3,730 MMBO; for associated gas the mean total is 963 billion cubic feet (BCFG), with a range from 183 to 2,315 BCFG; and a mean total of 29 million barrels of natural gas liquids (MMBNGL), with a range from 5 to 72 MMBNGL. These resource estimates are for undiscovered, technically recoverable volumes of oil and gas and do not reflect volumes of economically recoverable resources.

Table 1. Key assessment input data for the unconventional assessment unit in the Jurassic Sargelu Formation, Iraq.

[EUR (estimated ultimate recovery per well), well drainage area, and success ratios are from U.S. shale-gas and shale-oil analogs. MMBO, million barrels of oil; BCFG, billion cubic feet of gas; AU, assessment unit; %, percent. The average EUR input is the minimum, median, maximum, and calculated mean]

Assessment input data	Sargelu Continuous Oil AU			
	Minimum	Mode	Maximum	Calculated mean
Potential production area of AU (acres)	13,037	3,911,100	13,037,000	5,653,712
Average drainage area of wells (acres)	80	160	220	153
Success ratios (%)	10	50	90	50
Average EUR (MMBO, oil; BCFG, gas)	0.04	0.08	0.2	0.086

Table 2. Jurassic Sargelu Formation assessment results.

[MMBO, million barrels of oil; BCFG, billion cubic feet of gas; MMBNGL, million barrels of natural gas liquids; TPS, total petroleum system; AU, assessment unit. Results shown are fully risked estimates. For gas accumulations, all liquids are included under the NGL (natural gas liquids) category. F95 represents a 95-percent chance of at least the amount tabulated. Other fractiles are defined similarly. Fractiles are additive under assumption of perfect positive correlation]

Total Petroleum System (TPS) and Assessment Units (AUs)	AU Probability	Accumulation Type	Total Undiscovered Resources											
			Oil (MMBO)				Gas (BCFG)				NGL (MMBNGL)			
			F95	F50	F5	Mean	F95	F50	F5	Mean	F95	F50	F5	Mean
Sargelu TPS														
Sargelu Continuous Oil AU (20240261)	1.0	*Oil*	327	1,357	3,730	1,606	183	793	2,315	963	5	23	72	29
Total unconventional resources			327	1,357	3,730	1,606	183	793	2,315	963	5	23	72	29

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For Further Information:

Assessment results are available at the USGS Energy Resources Program Web site, http://energy.usgs.gov/oilgas/.

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