

ALASKA FEDERAL OFFSHORE
Descriptions of Geologic Plays
1995 National Resource Assessment
U.S. Minerals Management Service

ST. MATTHEW-HALL BASIN ASSESSMENT PROVINCE
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In St. Matthew-Hall basin we distinguish two petroleum plays on the criteria of tectonic setting, reservoir stratigraphy, dominant trap type, and access to thermogenic gas.

Play 1 (UASM0100¹). Rift Sequence Play: The Rift sequence play (play 1) is inferred, on the basis of analogy to Norton basin (geology of latter described by Turner and others, 1986), to consist of Paleocene to lower Oligocene fluvio-deltaic sandstones deposited in fan-deltas along the margins of fault-bounded pull-apart grabens during active wrench faulting in early phases of basin subsidence. Prospects are mostly fault traps, but also include anticlines, faulted anticlines, and sub-unconformity traps. Unmapped stratigraphic traps are anticipated in deep, graben-floor fan systems, but porosity at those depths (>10,000 feet) is expected to be quite low, as observed in Norton basin. However, the deeper traps lie within the oil window and are best positioned to capture thermogenic gas. Potential traps in play 1 range in depth from 4,000 to 13,000 feet. Postulated source rocks are interbedded within the play sequence and are speculated, on the basis of analogy to Norton Basin, to include marine to non-marine shales and coal seams of Eocene and Paleocene age. Early Oligocene coals and shales are speculated to occur in the upper part of the sequence. These latter rocks are probably thermally immature, but may provide feedstock for microbial generation of biogenic gas.

Play 2 (UASM0200). Sag Sequence Play: The Sag sequence play (play 2) consists of inferred late Oligocene shallow shelf sandstones to submarine fan turbidite and basin plain deposits above a prominent (seismic data) unconformity, speculated from analogy to Norton basin to be mid-Oligocene in age. Possible trap types are mostly gentle anticlines, but also include faulted anticlines and fault traps. Additional unmapped traps may occur in stratigraphically isolated shelf sandstones in the upper part of the sequence. Sag sequence traps range in depth from 1,400 to 5,000 feet. Thermogenic gas from thermally mature rocks deep within grabens may charge traps near the grabens. Potential traps at shallow depths or at great distances (some up to

¹The "UA" Code is the "Unique Assessment Identifier" for each play, and is the principal guide to GRASP data files.

100 miles) from the deep pull-apart grabens are likely to contain only biogenic gas.

OIL AND GAS ENDOWMENTS OF ST. MATTHEW-HALL BASIN PLAYS
Risked, Undiscovered, Conventionally Recoverable Oil and Gas

| PLAY NO. | PLAY NAME (UAI * CODE) | OIL (BBO) | | | GAS (TCFG) | | |
|----------|---------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | F95 | MEAN | F05 | F95 | MEAN | F05 |
| 1. | Rift Sequence (UASM0100) | 0.000 | 0.00008 | 0.0004 | 0.000 | 0.008 | 0.041 |
| 2. | Sag Sequence (UASM0200) | 0.000 | 0.001 | 0.006 | 0.000 | 0.147 | 0.606 |
| | FASPAG AGGREGATION | 0.000 | 0.002 | 0.007 | 0.000 | 0.155 | 0.689 |

* *Unique Assessment Identifier, code unique to play.*

REFERENCES CITED

Turner, R.F., Martin, G.C., Risely, D.E., Steffy, D.A., Flett, T.O., and Lynch, M.B., 1986, Geologic Report for the Norton Basin Planning Area, Bering Sea, Alaska: Turner, R.F., ed., U.S. Minerals Management Service, OCS Report, MMS 86-0033, 179 p.