

Chukchi Sea Play 29: Deep (>10,000 ft) Basal Sandstones-Hope Basin

Correlative to Hope Basin Play 4

Geological Assessment

GRASP UAI: AAAAA DBD

Play Area: 214 square miles

Play Water Depth Range: 115-165 feet

Play Depth Range: 10,000-11,500 feet

Play Exploration Chance: 0.01176

Play 29, the “Deep (>10,000 ft) Basal Sandstones-Hope Basin” play, is a subordinate play in the Chukchi Sea OCS Planning Area, with negligible technically recoverable petroleum resources.

Table 1 summarizes the volumetric input data developed for the GRASP computer model of Chukchi Sea play 29. Table 2 reports the risk model used for play 29. The location of play 29 is shown in figure 1.

Plays 28 and 29 were defined to acknowledge the possible existence of sandstones (presence inferred by analogy to Norton basin) creating potential traps at the base of the sedimentary fill of Hope and Kotzebue basins. The two plays are separated at a burial depth of 10,000 feet. Density log porosities of sandstones in the Kotzebue basin wells are projected¹ to fall below 10 percent at burial depths greater than 10,000 feet. Because most types of sandstones cannot house extractable petroleum when porosities fall below 10 percent, the model reflects our view that it is improbable that viable (sufficiently porous and permeable) sandstone reservoirs were preserved in the Deep Basal Sand (29) play. Potential source rocks for prospects in plays 28 and 29 would include the gas-prone

organic material detected in Early Sequence samples in the two Kotzebue basin wells. Other petroleum sources of a speculative nature might include older, un-sampled rocks in the deeper parts of Hope basin, or basement rocks. The Deep Basal Sand play (29) lies entirely within the area where rocks are projected to have achieved sufficient thermal maturity to generate thermogenic oil or gas (below 7,300 ft subsea or 0.6% Ro isograd). Given viable organic sources within the Eocene rocks that appear to floor Hope basin, prospects involving the basin-floor sandstones of play 29 would be best positioned to capture expelled thermogenic hydrocarbons.

Owing to high risks associated with preservation of sandstone porosity and the small numbers of identified prospects in the very small play area within the Chukchi Sea Planning Area, play 29 is presently (2006) assessed with negligible quantities of undiscovered technically-recoverable oil and gas resources.

¹*extrapolated below well data using a Norton basin porosity decline rate (based on data presented by Turner and others, 1986, fig. 24)*

GRASP Play Data Form (Minerals Management Service-Alaska Regional Office)

Basin: Chukchi Sea Planning Area
Play Number: 29 (Not Assessed)
Play UAI Number: AAAAA DBD

Assessor: K.W. Sherwood
Play Name: Deep (>10,000 ft) Basal Sandstones - Hope Basin (Not Assessed)
Date: January 2005

Play Area: mi² (million acres) 214 (0.137)
Reservoir Thermal Maturity: % Ro 0.88-1.02

Play Depth Range: feet 10,000 - 11,500 (mean = 10,500)
Expected Oil Gravity: ° API 40
Play Water Depth Range: feet 115 - 165 (mean = 140)

POOLS Module (Volumes of Pools, Acre-Feet)

Fractile	F100	F95	F90	F75	F50	Mean/Std. Dev.	F25	F15	F10	F05	F02	F01	F00
Prospect Area (acres)-Model Input*	5576		8302		20437	26166/20919			50314				55410
Prospect Area (acres)-Model Output**	5582	7507	8944	13200	19928	22630/12026	30157	36846	41212	46669			55379
Fill Fraction (Fraction of Area Filled)	0.04	0.09	0.10	0.12	0.15	0.16/0.05	0.19	0.21	0.23	0.26			0.50
Productive Area of Pool (acres)***	424	999	1237	1842	2978	3590/2388	4663	5815	6775	8247	9600	10500	18291
Pay Thickness (feet)	18	36	40	48	60	63/20	74	83	90	101	115	125	195

* model fit to prospect area data in *BESTFIT*

** output from @RISK after aggregation with fill fraction

*** from @RISK aggregation of probability distributions for prospect area and fill fraction

MPRO Module (Numbers of Pools)

Input Play Level Chance	0.4	Prospect Level Chance	0.0294	Exploration Chance	0.01176
Output Play Level Chance*	0.0404				

*From "0 Pools" Probability Reported in MPRO Module

Risk Model	Play Chance	Petroleum System Factors	Prospect Chance
		Seal Integrity (many faults-traps fault bounded)	0.7
		Reservoir Presence (unknown)	0.8
		Chance Porosity > 10%	0.15
0.5		Source Presence	
0.8		Source Maturity (small generation volume)	
		Migration (primarily vertical and along faults; source beds may lie above reservoir)	0.35

Fractile	F99	F95	F90	F75	F50	Mean/Std. Dev.	F25	F15	F10	F05	F02	F01	F00
Numbers of Prospects in Play	2	2.2	2.4	2.7	3	3.57/0.67	3.4	3.7	3.9	4.1	4.3	4.6	6
Numbers of Pools in Play						0.04/0.21					1	1	3

Zero Pools at F04.04

Minimum Number of Pools	1 (F04)	Mean Number of Pools	0.04	Maximum Number of Pools	3
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Play 29 not assessed (assigned negligible resources) because mean number of pools < 1.0 (B. Dickerson Rule)

POOLS/PSRK/PSUM Modules (Play Resources)

Fractile	F100	F95	F90	F75	F50	Mean/Std. Dev.	F25	F15	F10	F05	F02	F01	F00
Oil Recovery Factor (bbl/acre-foot)	18	33	37	46	61	70/35	83	100	115	138	160	170	335
Gas Recovery Factor (Mcfg/acre-foot)	245	368	395	449	535	560/148	644	711	759	835	900	950	1268
Gas Oil Ratio (Sol'n Gas)(cf/bbl)	1400	1445	1452	1464	1476		1488	1496	1500	1507	1515	1520	1550
Condensate Yield ((bbl/Mmcfg)	13	18	19	22	25	25/5	28	30	31	33	36	38	50

Pool Size Distribution Statistics from *POOLS* (1,000 BOE): μ (mu)= Not Run σ^2 (sigma squared)= Not Run Random Number Generator Seed= 898620

BOE Conversion Factor (cf/bbl)	5620	Probability Any Pool Contains Both Oil and Free Gas (Gas Cap)	0.1
Probability Any Pool is 100% Oil	0	Fraction of Pool Volume Gas-Bearing in Oil Pools with Gas Cap	0.5
Probability Any Pool is 100% Gas	0.9		

Table 1. Input data for Chukchi Sea play 29, 2006 assessment. Because the play contains less than 1 pool, it was not quantitatively assessed but was assigned negligible resources.

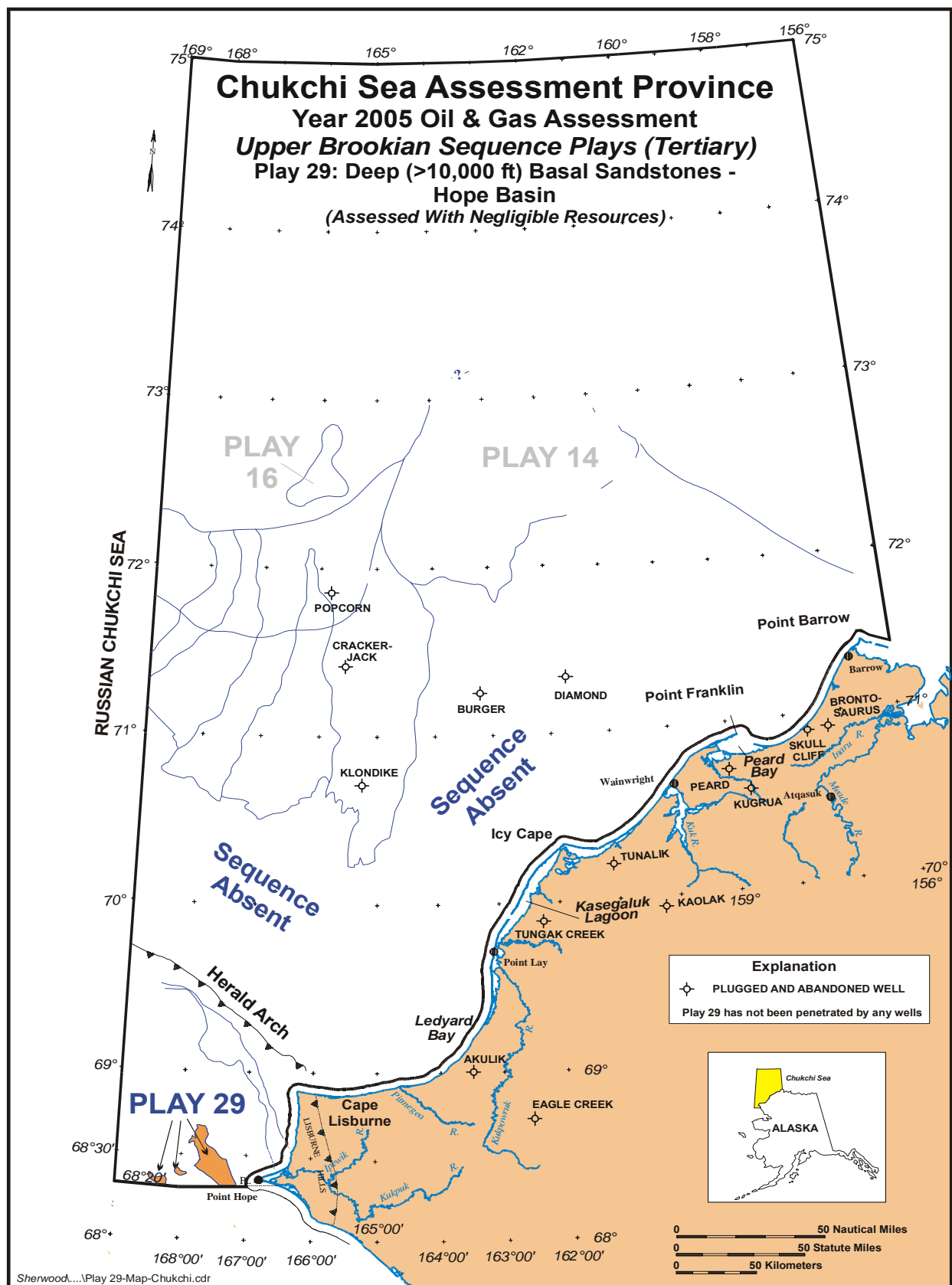


Figure 1. Map location of Chukchi Sea play 29, 2006 assessment.