

									OIL	_		OVERABLE OI			IN-PLACE		VERABLE GAS			IN-PLACE
RZ	TOROK	MIXTURE	MAP	POOL NAME	FIELD NAME	DATE	RESERVOIR NAME	AGE	or	GAS	CUMULATIVE			FAC		CUMULATIVE			FAC	GAS
est)	(West)	(%)	NO.			DISCOVERED			GAS	CAP	(10 <sup>6</sup> BBL)	(10 <sup>6</sup> BBL)	(10 <sup>6</sup> BBL)	(%)	(10 <sup>6</sup> BBL)	(10 <sup>9</sup> FT <sup>3</sup> )	(10 <sup>9</sup> FT <sup>3</sup> )	(10 <sup>9</sup> FT <sup>3</sup> )	(%)	(10 <sup>9</sup> FT <sup>3</sup> )
	0	100T	8	SQUARE LAKE	SQUARE LAKE	18-Apr-52	Seabee Fm	Cretaceous	GAS	na	na	na	na	na	na	na	58	58	nd	nd
)		100G	47	TARN	KUPARUK RIVER	02-Feb-91	Seabee Fm	Cretaceous	OIL	nd	13	nd	nd	nd	nd	17.9	nd	nd	nd	nd
С		50G	33	WALAKPA	WALAKPA FIELD	07-Feb-80	Walakpa sandstone	Cretaceous	GAS	na	na	na	na	nd	nd	7.5	25	32.5	nd	nd
	Х	100T	1	UMIAT	UMIAT	26-Dec-46	Nanushuk Gp	Cretaceous	OIL	no	na	70	70	nd	nd	na	70	nd	nd	<<1
	0																			
(	Х	50G/50T	5	SIMPSON	SIMPSON	23-Oct-50	Nanushuk Gp	Cretaceous	OIL	nd	na	12	12	nd	nd	na	nd	nd	nd	nd
	0	100T	6	WOLF CREEK	WOLF CREEK	04-Jun-51	Nanushuk Gp	Cretaceous	GAS	na	na	na	na	na	na	na	nd	nd	nd	nd
	0	100T	9	EAST UMIAT	EAST UMIAT	28-Mar-64	Nanushuk Gp	Cretaceous	GAS	na	na	na	na	na	na	na	4	4	nd	nd
x	0	50/50	7	GUBIK	GUBIK	11-Aug-51	Prince Ck/Nanushuk Gp	Cretaceous	GAS	na	na	na	na	na	na	na	295	295	nd	600
C		100G	25	EAST KURUPA	EAST KURUPA	01-Mar-76	Torok/Fortress Mt	Cretaceous	GAS	na	na	na	na	na	na	na	nd	nd	nd	nd

RECOVERABLE OIL			REC	IN-PLACE	RECOV	RECOVERABLE GAS			N-PLACE	RECOVERABLE								
RESERVOIR NAME	AGE	MIXTURE CUN	MIXTURE CUMULATIVE REMAINING ORIGINAL			FAC	OIL	CUMULATIVE RE	EMAINING C	ORIGINAL	FAC	GAS	OIL	GAS	BOE	TOTAL BOE	BOE	
		(%)																
Seabee Fm	Cretaceous	100	13	na	13	na	na	17.9	58	75.9	nd	nd	13	75.9	12.65	25.65	14.6	
Walakpa sandstone	Cretaceous	50	na	na	na	nd	nd	3.75	12.5	16.25	nd	nd	na	16.25	2.71	2.71	1.6	
Nanushuk Gp	Cretaceous	100	na	82	82	nd	nd	na	389	389	nd	600	82	389	64.83	146.83	83.8	
Torok/Fortress Mt	Cretaceous	100	na	na	na	na	na	na	nd	nd	nd	nd	na	nd	nd	nd	nd	
			95.0							463.3			95.0	463.3	80.2	175.2	100	
	Seabee Fm Walakpa sandstone Nanushuk Gp	Seabee FmCretaceousWalakpa sandstoneCretaceousNanushuk GpCretaceous	(%)Seabee FmCretaceous100Walakpa sandstoneCretaceous50Nanushuk GpCretaceous100	RESERVOIR NAME  AGE  MIXTURE CUMULATIVE REM    (%)  (%)    Seabee Fm  Cretaceous  100  13    Walakpa sandstone  Cretaceous  50  na    Nanushuk Gp  Cretaceous  100  na	RESERVOIR NAME  AGE  MIXTURE CUMULATIVE REMAINING OF (%)    Seabee Fm  Cretaceous  100  13  na    Walakpa sandstone  Cretaceous  50  na  na    Nanushuk Gp  Cretaceous  100  na  82	RESERVOIR NAMEAGEMIXTURE CUMULATIVE REMAINING ORIGINAL (%)Seabee FmCretaceous10013na13Walakpa sandstoneCretaceous50nananaNanushuk GpCretaceous100na8282Torok/Fortress MtCretaceous100nanana	RESERVOIR NAMEAGEMIXTURE CUMULATIVE REMAINING ORIGINAL (%)FACSeabee FmCretaceous10013na13naWalakpa sandstoneCretaceous50nananandNanushuk GpCretaceous100na8282ndTorok/Fortress MtCretaceous100nananana	RESERVOIR NAMEAGEMIXTURE CUMULATIVE REMAINING ORIGINAL (%)FACOILSeabee FmCretaceous10013na13nanaWalakpa sandstoneCretaceous50nananandndNanushuk GpCretaceous100na8282ndndTorok/Fortress MtCretaceous100nanananana	RESERVOIR NAMEAGEMIXTURE CUMULATIVE REMAINING ORIGINAL (%)FACOILCUMULATIVE RE CUMULATIVE RE (%)Seabee FmCretaceous10013na13na13na17.9Walakpa sandstoneCretaceous50nananand3.7510013nanand117.9Nanushuk GpCretaceous100na8282ndndnananaTorok/Fortress MtCretaceous100nanananananana	RESERVOIR NAMEAGEMIXTURE CUMULATIVE REMAINING ORIGINAL (%)FACOILCUMULATIVE REMAINING OR CUMULATIVE REMAINING OR CUMULATIVE REMAINING OR Seabee FmSeabee FmCretaceous10013na13na13na13Walakpa sandstoneCretaceous50nananand17.958Walakpa SandstoneCretaceous50nananandnd3.7512.5Nanushuk GpCretaceous100na8282ndndna389Torok/Fortress MtCretaceous100nanananananana	RESERVOIR NAMEAGEMIXTURE CUMULATIVE REMAINING ORIGINAL (%)FACOILCUMULATIVE REMAINING ORIGINALSeabee FmCretaceous10013na13nananana17.95875.9Walakpa sandstoneCretaceous50nananandnd3.7512.516.25Nanushuk GpCretaceous100na8282ndndna389389Torok/Fortress MtCretaceous100nananananananana	RESERVOIR NAMEAGEMIXTURE CUMULATIVE REMAINING ORIGINAL (%)FACOILCUMULATIVE REMAINING ORIGINAL (%)FACSeabee FmCretaceous10013na13nananana17.95875.9ndWalakpa sandstoneCretaceous50nananandnd3.7512.516.25ndNanushuk GpCretaceous100na8282ndndnananandndTorok/Fortress MtCretaceous100nananananananananana	RESERVOIR NAMEAGEMIXTURE CUMULATIVE REMAINING ORIGINAL (%)FACOILCUMULATIVE REMAINING ORIGINAL CUMULATIVE REMAINING ORIGINALFACGASSeabee FmCretaceous10013na13nana13na17.95875.9ndndWalakpa sandstoneCretaceous50nananandnd3.7512.516.25ndndNanushuk GpCretaceous100na8282ndndnananand600Torok/Fortress MtCretaceous100nananananananananananandnd	RESERVOIR NAME  AGE  MIXTURE CUMULATIVE REMAINING ORIGINAL (%)  FAC  OIL  CUMULATIVE REMAINING ORIGINAL (%)  FAC  GAS  OIL    Seabee Fm  Cretaceous  100  13  na  13  na  na  17.9  58  75.9  nd  nd  13    Walakpa sandstone  Cretaceous  50  na  na  na  nd  nd  3.75  12.5  16.25  nd  nd  na  na<	RESERVOIR NAME  AGE  MIXTURE CUMULATIVE REMAINING ORIGINAL (%)  FAC  OIL  CUMULATIVE REMAINING ORIGINAL  FAC  GAS  OIL  GAS    Seabee Fm  Cretaceous  100  13  na  13  na  na  17.9  58  75.9  nd  nd  13  75.9    Walakpa sandstone  Cretaceous  50  na  na  nd  nd  3.75  12.5  16.25  nd  nd  na  16.25  Na  Na  16.25  389  389  nd  600  82  389  389  nd  nd  na  nd  nd	RESERVOIR NAME  AGE  MIXTURE CUMULATIVE REMAINING ORIGINAL (%)  FAC  OIL  CUMULATIVE REMAINING ORIGINAL (%)  FAC  GAS  OIL  GAS  BOE    Seabee Fm  Cretaceous  100  13  na  13  na  na  17.9  58  75.9  nd  nd  13  75.9  12.65    Walakpa sandstone  Cretaceous  50  na  na  nd  nd  3.75  12.5  16.25  nd  nd  na  16.25  2.71    Nanushuk Gp  Cretaceous  100  na  82  82  nd  nd  na  389  389  nd  600  82  389  64.83    Torok/Fortress Mt  Cretaceous  100  na  nd  nd	RESERVOIR NAMEAGEMIXTURE CUMULATIVE REMAINING ORIGINAL (%)FACOILCUMULATIVE REMAINING ORIGINAL CUMULATIVE REMAINING ORIGINAL NameFACOILGASBOETOTAL BOESeabee FmCretaceous10013na13nana17.95875.9ndnd1375.912.6525.65Walakpa sandstoneCretaceous50nananandnd3.7512.516.25ndndna16.252.712.71Nanushuk GpCretaceous100na8282ndndna389389nd6008238964.83146.83Torok/Fortress MtCretaceous100nananananananananananandndndndndndndndnd	

The GRZ-Nanushuk(.) contains 175 million BOE of recoverable oil and gas. Only the Tarn oil pool and Walakpa gas pool are being produced. The Pebble-GRZ-Torok source rock unit west of Prudhoe Bay is a stack of three related Lower Cretaceous organic-rich rock units, the pebble shale unit (Pebble), the gamma-ray zone (GRZ), and the lower part of the Torok Formation. Within this stack, the GRZ is richest (see Peters and others, this session). The petroleum migrated up foreset beds or by way of faults to updip Cretaceous reservoir rocks during the Early Cretaceous. Remigration occurred during the formation of the Umiat structure.

Following previous studies (Claypool and Magoon, 1985; GeoMark, 1997), the pebble shale unit, GRZ, and Torok source rock intervals are considered to be a single source rock unit because this conformable package of Lower Cretaceous strata has a similar kerogen composition (Magoon and Bird, 1988), and is likely to produce low sulfur (0.1 wt.% S) oil. The largest known accumulation charged by the Pebble-GRZ-Torok oil is Tarn field (Masterson, 2001) whose bulk composition (37°API, 0.1 wt.% S) is considered representative of this source rock unit. The GRZ-Nanushuk(.) is a separate petroleum system because burial of the source rock unit occured in the Early retaceous.

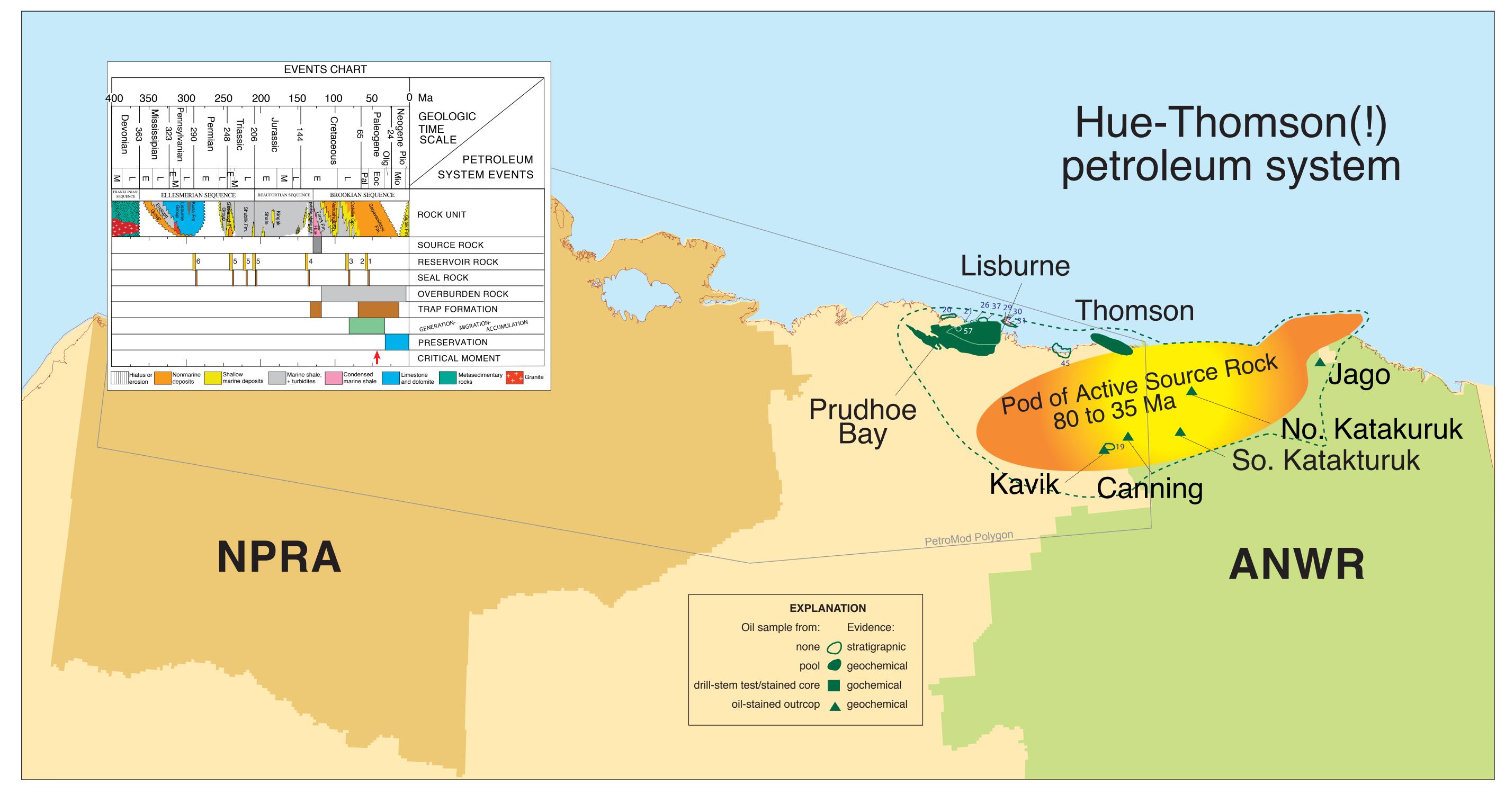
OIL SOURCE ROCK	SAMPLE ID	
mix HRZ Lisburne	SOUTH BARROW	
mix HRZ Lisburne	SOUTH BARROW	
mix HRZ Lisburne	SOUTH BARROW	
mix HRZ Lisburne	SOUTH BARROW	
mix Lisburne HRZ	WALAKPA	•
mix Lisburne HRZ	WEST DEASE	
mix Lisburne HRZ	WEST DEASE	
HRZ	CAPE SIMPSON SEEP	
HRZ	FISH CREEK SEEP	
HRZ	GUBIK TEST	2
HRZ	Seismic Shot Point 53	
HRZ	SIMPSON TEST	
HRZ	SIMPSON TEST	
HRZ	UMIAT TEST	2
HRZ Torok	EAST SIMPSON TEST	
HRZ Torok	EAST SIMPSON TEST	
HRZ Torok	EAST SIMPSON TEST	
Torok HRZ	OIL-SIMPSON CORE	
Torok HRZ	SOUTH HARRISON BAY	
Torok/HRZ	UMIAT TEST	2
Torok	Umiat #5	
Torok	UMIAT (CORE TST 1) NO	). (
Torok	UMIAT (RUBY 1) NO. 4	
Torok	UMIAT (RUBY 1) NO. 4	
Torok	UMIAT (RUBY 1) NO. 4	
Torok?	SEABEE	1

# Alaskan North Slope Petroleum Systems by L.B. Magoon<sup>1</sup>, P.G. Lillis<sup>2</sup>, K.J. Bird<sup>1</sup>, C. Lampe<sup>3</sup>, K.E. Peters<sup>1</sup>

1, U.S. Geological Survey, Menlo Park, California 2, U.S. Geological Survey, Denver, Colorado 3, Integrated Exploration Systems, Juelich, Germany

Oil samples from oil-stained cores and drill-stem tests from wells where hydrocarbons originated from the gamma ray zone (GRZ) and lower Torok Formation

U		<b>y</b>	,						
1		ADDITIONAL SAMPLE ID	TOP (FT)	BOT (FT)	STY	ROCK UNIT	LAT	LONG	<b>API NUMBER</b>
	20	DST#3; UP ZN FLOW	1556	1639	EN	Pebble shale	71.23250	-156.33670	50023200150000
	20	R226-017;INTALFLO	1629	1639	EN	PEBBLE SH	71.23250	-156.33670	50023200150000
	20	R226-018;FINALFLO	1629	1639	EN	PEBBLE SH	71.23250	-156.33670	50023200150000
	9	R117-014	2425	2425	œ	BARROW SD	71.26774	-156.61484	50023200030000
1		SAME AS R221-129	2070	2070	œ	PEBBLE SH	71.09934	-156.88439	50023200130000
1		R225-146	3720	3725	œ	BARROW SD	71.15907	-155.62919	50023200140000
1		R225-164	3805	3810	00	SAG RIVER SD	71.15907	-155.62919	50023200140000
		SIMPSON OIL SEEP			OL	Nanushuk Group			50279950010000
		FISH CRK SEEP 194			OL	Colville Group	70.30000	-151.93333	50103950010000
2		R141-028	1855	1855	œ	Colville Group	69.41944	-151.45722	50287100140000
		SAME=R165-035 S.S	45	45	OL	Nanushuk Group	70.95754	-155.35193	50279950030000
1		SIMPSON NO. 1	115	413	OL	NANUSHUK	70.95333	-155.36444	50279100320000
1		R135-014	400	400	00	NANUSHUK	70.95333	-155.36444	50279100320000
2		UMIAT NO. 2	103	544	OL	NANUSHUK	69.38333	-152.08111	50287100020000
	2	SAME AS R223-279	7175	7175	00	Sadlerochit Group	70.97847	-154.67382	50279200070000
	2	SAME AS R223-290	7248	7248	00	Sadlerochit Group	70.97847	-154.67382	50279200070000
	2	SAME AS R223-293	7260	7260	00	Sadlerochit Group	70.97847	-154.67382	50279200070000
		OIL; CORE TEST			OL	Nanushuk Group			50279950040000
λY	1	R106-219	7119	7207	EN	TOROK	70.42472	-151.73124	50103200070000
2		R220-104+109 OILS	390	940	00	NANUSHUK	69.38333	-152.08111	50287100020000
			32	1077	OL	Nanushuk	69.38361	-152.07972	50279100050000
VO. 3		UMIAT NO. 3	72	457	OL	NANUSHUK	69.38618	-152.08325	50287100030000
		UMIAT NO. 4	33	840	OL	Nanushuk	69.38830	-152.04312	50287100040000
		UMIAT NO. 4	33	840	OL	Nanushuk	69.38830	-152.04312	50287100040000
		UMIAT NO.4	299	299	OL	NANUSHUK	69.38830	-152.04312	50287100040000
1		=R198-586=R165-09	5366	5394	OL	TOROK	69.38014	-152.17536	50287200070000



# Oil and gas pools charged by the Hue Shale

									OIL	_	REC	OVERABLE OIL		REC	IN-PLACE	RECO	VERABLE GAS	S	REC	IN-PLACE
Hu	e N	MIXTURE	NO.	POOL NAME	FIELD NAME	DATE	<b>RESERVOIR NAME</b>		or	GAS (	CUMULATIVE	REMAINING	ORIGINAL	FAC	OIL	CUMULATIVE I	REMAINING	ORIGINAL	FAC	GAS
(Eas	st)	(%)				DISCOVERED		AGE	GAS	CAP	(10 <sup>6</sup> BBL)	(10 <sup>6</sup> BBL)	(10 <sup>6</sup> BBL)	(%)	(10 <sup>6</sup> BBL)	(10 <sup>9</sup> FT <sup>3</sup> )	(10 <sup>9</sup> FT <sup>3</sup> )	(10 <sup>9</sup> FT <sup>3</sup> )	(%)	(10 <sup>9</sup> FT <sup>3</sup> )
0		100H	45 B.	ADAMI	BADAMI UNIT	27-Mar-90	Badami ss (Canning Fm.)	Tertiary	OIL	nd	1.9	9	10.9	7	160	nd	100	100	nd	nd
Х		50H	24 FI	LAXMAN	POINT THOMSON UNIT	06-Sep-75	Flaxman sandstone	Tertiary	OIL	nd	nd	nd	nd	nd	nd	na	nd	nd	nd	nd
Х		100H	27 TI	HOMSON	POINT THOMSON UNIT	08-Dec-77	Thomson sandstone	Cretaceous	OIL	nd	na	nd	nd	nd	nd	na	nd	nd	nd	nd
0		100H	37 N	IAKUK	PRUDHOE BAY FIELD	07-Mar-85	Kuparuk Fm	Cretaceous	OIL	nd	52.4	nd	nd	nd	nd	45.8	nd	nd	nd	nd
0		28H	26 W	EST BEACH	PRUDHOE BAY FIELD	22-Jul-76	Kuparuk Fm	Cretaceous	OIL	nd	0.8	nd	0.8	nd	nd	3.5	nd	3.5	nd	nd
0		28H	57 S.	AMBUCCA	PRUDHOE BAY FIELD	20-Dec-97	Sag River/Ivishak Fms	Triassic	OIL	nd	na	nd	nd	nd	nd	na	nd	nd	nd	nd
х		28H	10 P	RUDHOE BAY	PRUDHOE BAY FIELD	19-Dec-67	Ivishak Fm/Shublik/Sag River Fms	Triassic	OIL	yes	2865.9	774.1	3640.0	52	7000.0	9527.5	?	7980.0	62	12880.0
0		28H	28 E	IDER	ENDICOTT FIELD	29-May-98	Ivishak Fm	Triassic	OIL	yes	0.3	nd	0.3	27-38	3.7	2.0	nd	2.0	nd	14.6
0		28H	20 G	WYDYR BAY	GWYDYR BAY	25-Nov-69	Ivishak Fm	Triassic	OIL	nd	na	nd	nd	nd	13.4	na	nd	nd	nd	280
0		28H	21 N	ORTH PRUDHOE BAY	PRUDHOE BAY FIELD	31-Mar-70	Ivishak Fm	Triassic	OIL	nd	0.6	nd	0.6	nd	nd	1.8	nd	1.8	nd	nd
0		28H	29 S.	AG DELTA NORTH IVISHAK	ENDICOTT FIELD	14-Feb-78	Ivishak Fm	Triassic	OIL	no	2.1	nd	2.1	nd	3.9	1.7	nd	1.7	nd	nd
Х		28H	11 LI	SBURNE	PRUDHOE BAY FIELD	19-Dec-67	Wahoo/Alapah/Lisburne Gp	Mississippian-Pennsylvanian	OIL	yes	37.8	nd	37.8	nd	504.0	321.6	nd	321.6	nd	840
0		28H	30 S.	AG DELTA NORTH ALAPAH	ENDICOTT FIELD	14-Feb-78	Lisburne Gp	Mississippian	OIL	no	nd	nd	nd	nd	1.0	na	nd	nd	nd	nd
0		28H	31 E	NDICOTT	ENDICOTT FIELD	14-Feb-78	Kekiktuk Cgl. (Endicott Group)	Mississippian	OIL	yes	110.7	57.3	168.0		nd	320.1	nd	224.0	nd	nd

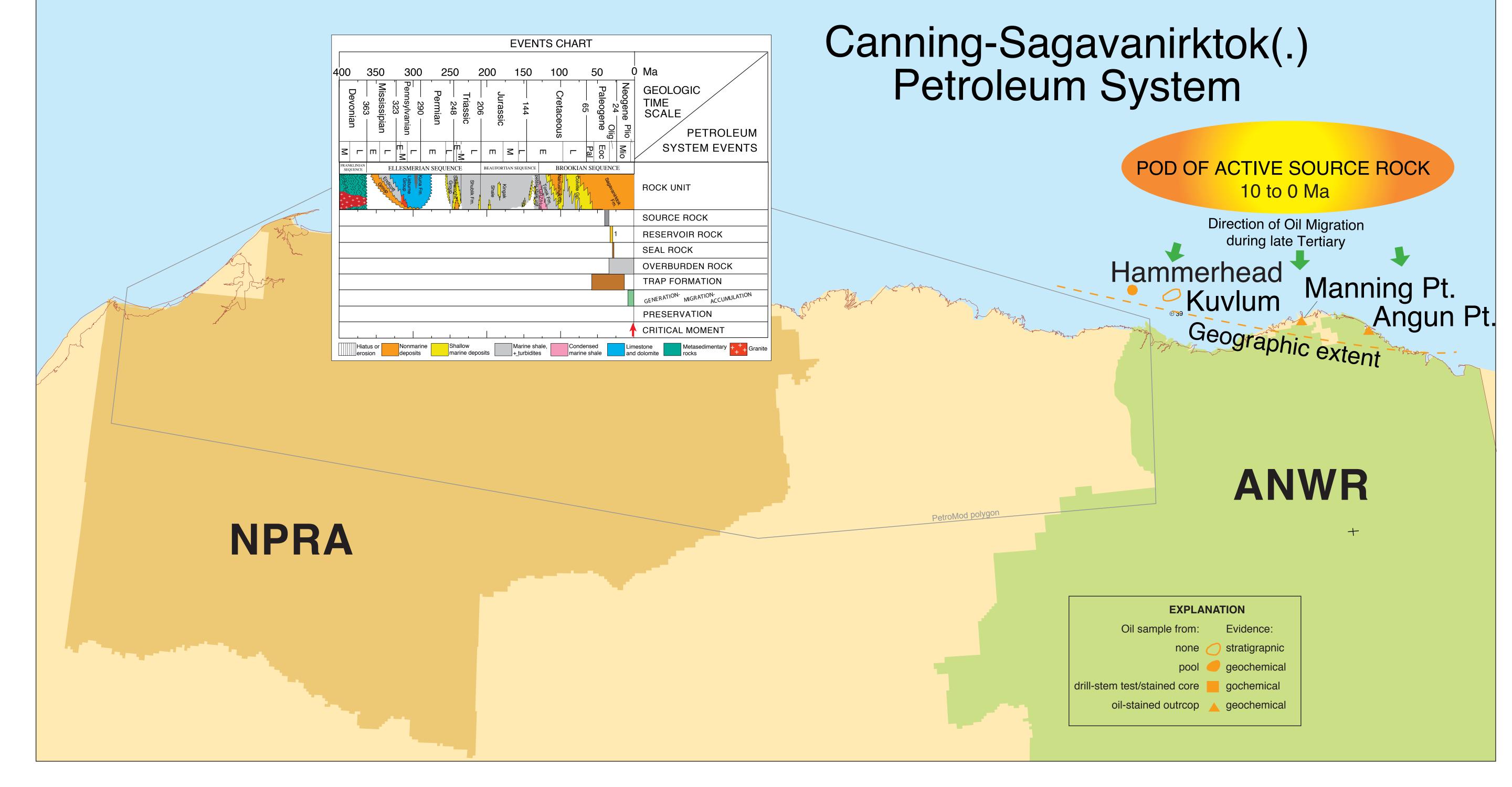
## Recoverable oil and gas by reservoir rock

<b>EVENTS</b>				RECOVERABLE OIL			REC	IN-PLACE	RECOVE	RECOVERABLE GAS		REC IN-PLACE		RECOVERABLE					
CHART	<b>RESERVOIR NAME</b>	AGE		MIXTUR CU	IMULATIVE RE	EMAINING (	ORIGINAL	FAC	OIL	CUMULATIVE RE	MAINING C	RIGINAL	FAC	GAS	OIL	GAS	BOE	TOTAL BOE	BOE
NUMBER				(%)															
1	Badami ss (Canning Fm.)	Tertiary	OIL	100H	1.9	9	10.9	7	160	nd	100	nd	nd	nd	10.9	nd	nd	10.9	0.2
2	Flaxman sandstone	Tertiary	OIL	50H	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
3	Thomson sandstone	Cretaceous	OIL	100H	na	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
4	Kuparuk Fm	Cretaceous	OIL	28H	53.2	nd	53.2	nd	nd	49.3	nd	49.3	nd	nd	53.2	49.3	8.2	61.4	1.1
5	Ivishak Fm/Shublik/Sag River Fms	Triassic	OIL	28H	2868.9	774.1	3643.0	52	7021.1	9533.0	?	7985.5	62	13174.6	3643.0	7985.5	1330.9	4973.9	93.1
6	Lisburne Gp	Mississippian	OIL	28H	37.8	nd	37.8	nd	504.0	321.6	nd	321.6	nd	840	37.8	321.6	53.6	91.4	1.7
7	Kekiktuk Cgl. (Endicott Group)	Mississippian	OIL	28H	110.7	57.3	168.0		nd	320.1	nd	224.0	nd	nd	168.0	224.0	37.3	205.3	3.8
							3912.9					8580.4			3912.9	8580.4	1430.1	5343.0	100.0

Oil samples from oil-stained cores and drill-stem tests from wells where hydrocarbons originated from the Hue Shale

OIL SOURCE ROCK	SAMPLE ID		ADDITIONAL SAMPLE ID	TOP (FT)	BOT STY (FT)	<b>ROCK UNIT</b>	LAT	LONG	API NUMBER		
mix Shublik Hue Kingak	PRUDHOE BAY NO. 1		PRUDHOE BAY NO. 1	6875	7000 OL	CRETACEOUS UPR	70.32333	-148.54222	50029200010000		
mix Shublik Hue Kingak	PUT RIVER NO. D-3		PUT RIVER(23-14-1	10417	10535 OL	Sadlerochit	70.29583	-148.74917	50029200570000		
mix Shublik Hue Kingak	SAG RIVER STATE	1	R202-001	8483	8483 CC	SAG RIVER SD	70.25488	-148.34228	50029200020000		
mix Shublik Hue Kingak	SAG RIVER STATE	1	SAG RIVER NO. 1	8649	8649 OL	Sadlerochit Group	70.25488	-148.34228	50029200020000		
mix Shublik Hue Kingak	SAG RIVER STATE	1	SAG RIVER NO. 1	8895	8905 OL	Sadlerochit Group	70.25488	-148.34228	50029200020000		
mix Shublik Hue Kingak(?)	PRUDHOE BAY NO. 1		PRUDHOE BAY NO. 1	9505	9825 OL	LISBURNE	70.32333	-148.54222	50029200010000		
mix Shublik Hue	PRUDHOE BAY UNIT	R-1	R215-357	9169	9169 CC		70.34528	-148.90511	50029203530000		
mix Shublik Hue	PRUDHOE BAY UNIT	R-1	R215-378	9332	9332 CC		70.34528	-148.90511	50029203530000		

The Hue-Thomson(!), a 5.34 GBOE system includes the Prudhoe Bay area and the northern area of the ANWR (Magoon and others, 1999). The source rock for this petroleum system is the Cretaceous Hue Shale (Anders and Magoon, 1986; Anders and others, 1987; Magoon and others, 1987 see poster by Peters and others, this session). The Hue Shale crops out in a band that runs from southwest of the Ignek Valley to the north flank of the Sadlerochit Mountains, on the Jago River, and on the Niguanak high. The Hue Shale is penetrated by wells in the Kavik area, in the Thomson area, and to the east, rocks equivalent in age to part of the Hue Shale are present in the Aurora 1 well.



Oil and gas pools charged by the Canning Formation and recoverable oil and gas by reservoir rock

or GAS CUMULATIVE REMAINING

CANNING MIXTURE NO. POOL NAME FIELD NAME DATE

 
 (%)
 DISCOVERED FM OR GP RESERVOIR
 AGE
 GAS
 CAP
 (10<sup>6</sup> BBL)
 (10<sup>6</sup> BBL)

 0
 100
 51
 KUVLUM
 01-Oct-92
 Sagavanirktok Fm
 Tertiary
 OIL
 nd
 na
 350
x 100 40 HAMMERHEAD HAMMERHEAD 11-Oct-86 Sagavanirktok Fm Tertiary OIL nd na Canning-Sagavanirktok(.)is based on the distinctive Manning oil type, which includes oil from the Manning Point seep, Hammerhead accumulation, Angun Point seep, and Aurora 1 well (Magoon and others, 1999). The oil in this system is similar to the oil from Tertiary rocks in the MacKenzie Delta to the east. The source rock for this petroleum system is suspected to be organic-rich shale in the Mikkelsen Tongue of the Canning Formation in the offshore. The primary basis for the pod of mature source rock being located offshore is that the hydrocarbon occurrences are near the north ANWR shoreline and are in Eocene or younger sedimentary rocks. Vitrinite reflectance profiles in Point Thomson area wells, Aurora 1, and Belcher 1 all indicate a 0.6% Ro at 10,000-12,000 f depth. Thus, where the Mikkelsen Tongue of the Canning Formation is buried this deep, it is generating petroleum. In addition, the Hammerhead and Kuvlum fields are associated with listric faults that sole out to the north, suggesting that the hydrocarbons migrated from north to south. The geographic extent of this petroleum system is mapped on the southern edge of oil occurrences that were most likely charged from the north or immediately below these fields and seeps.

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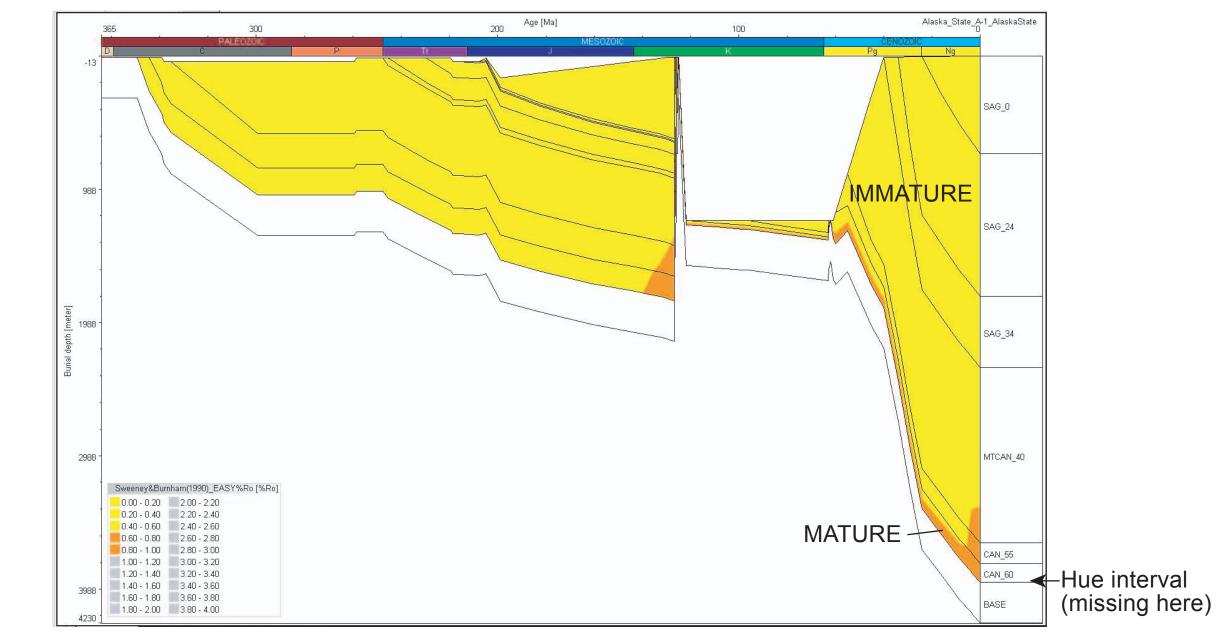
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Buial history for the Alaska A1 in Thomson pool. The Hue Shale inverval (missing) is mature



The thickness of the richest portion of the Hue Shale at the base of the section is based on outcrop and well information. The Hue Shale in the Ignek Valley section is thermally mature (1.0% Ro) and contains source rocks whose TOC exceeds 4 wt. % in the lower 300 feet of measured section (Magoon and others, 1987). The high gamma-ray values are included in this Ignek Valley section. The faulted section along the Jago River was measured by Palmer and others (1979) to be 150 feet thick, thermally immature (0.5 % Ro), and up to 12 wt. % TOC. Later, Molenaar determined that this Jago River section also included the high amma-ray zone.

Hue-Thomson(!) petroleum system are found in outcrop and in the subsurface, most notably in the Thomson sand. Many of the oil-stained sandstones within the ANWR are the Thomson sand as the oil in this reservoir included in this petroleum system.

The geographic extent of this system is determined by the distribution of the Hue Shale in the pod of mature source rock and the closely associated oil that is judged to have come from the Hue Shale. The southern boundary is determined by the present-day outcrop truncation edge of the Hue Shale and west of the Canning River b the distribution of oil in the Prudhoe Bay area. The eastern boundary is mapped from the Jago River oil and the presence of Hue Shale in the Aurora 1 well. The northern boundary follows the coastline because information is lacking as to the northern extent of the Hue Shale. The boundary hugs the northern limit of the Point Thomson field The oil and gas occurrences attributed to the because the Thomson sand contains oil from the Hue Shale and, beyond that, the Hue is missing due to submarine scouring. The name is based on the Hue source rock and is solely from the Hue Shale.

	REC	IN-PLACE	RECO	OVERABLE GA	IS	REC	IN-PLACE	RECOVERABLE	EVENTS	
ORIGINAL	FAC	OIL	CUMULATIVE	REMAINING	ORIGINAL	FAC	GAS	BOE	CHART	
(10 <sup>6</sup> BBL)	(%)	(10 <sup>6</sup> BBL)	(10 <sup>9</sup> FT <sup>3</sup> )	(10 <sup>9</sup> FT <sup>3</sup> )	(10 <sup>9</sup> FT <sup>3</sup> )	(%)	(10 <sup>9</sup> FT <sup>3</sup> )	(%)	NUMBER	_
350	nd	nd	na	nd	nd	nd	nd	100	1	
nd	nd	nd	na	nd	nd	nd	nd	nd	1	

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Oil samples from oil-stained outcrops where hydrocarbons were expelled from t Canning Formation source rock

OIL SOURCE ROCK SAMPLE ID ADDITIONAL SAMPLE ID TOP BOT STY ROCK UNIT LAT LONG API NUMBER MANNING POINT SEEP MANNING OIL SEEP CanningMANNING POINT SEEPMANNING OIL SEEPCanningANGUN OIL SEEPUNGOON OIL SEEP OL GUBIKSURFICIAL 70.11666 -143.51666 5002595001000 OL GUBIKSURFICIAL 69.91250 -142.39166 500759500300

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