STATE OF ALASKA
ALASKA OIL AND GAS CONSERVATION COMMISSION
333 West 7th Avenue
Anchorage Alaska 99501

Re: THE APPLICATION OF ExxonMobil Alaska Production Inc. for an order for classification of a new oil pool and to prescribe pool rules for development of the Thomson Oil Pool within the Pt. Thomson Field, Pt. Thomson Unit, East Harrison Bay, Beaufort Sea, Alaska	)	Docket Number: CO-15-008
	)	Conservation Order No. 719
	)	Corrected
	)	
	)	Point Thomson Field
	)	Point Thomson Unit
	)	Thomson Oil Pool
	)	
	)	November 9, 2015

IT APPEARING THAT:

1. By application received July 16, 2015, ExxonMobil Alaska Production Inc. (ExxonMobil), as operator of the Point Thomson Unit (PTU) and on behalf of ExxonMobil, BP Exploration (Alaska) Inc., ConocoPhillips Alaska, Inc., and 21 other owners having a total combined working interest of less than 1 percent, requested an order defining a new oil pool, the Point Thomson-Thomson Oil Pool (Thomson Oil Pool), within the PTU and prescribing rules governing the development and operation of that pool, including an annual average allowable gas-offtake rate of 1.1 billion standard cubic feet per day (BSCFD).
2. Pursuant to 20 AAC 25.540, the Alaska Oil and Gas Conservation Commission (AOGCC) scheduled a public hearing for September 1, 2015. On July 20, 2015, the AOGCC published notice of that hearing on the State of Alaska's Online Public Notice website and on the AOGCC's website, electronically transmitted the notice to all persons on the AOGCC's email distribution list, and mailed printed copies of the Notice of Public Hearing to all persons on the AOGCC's mailing distribution list. On July 21, 2015, the notice was published in the ALASKA DISPATCH NEWS.
3. On July 23, 2015, the AOGCC published notice of that the location of the hearing had changed on the State of Alaska's Online Public Notice website and on the AOGCC's website, electronically transmitted the notice to all persons on the AOGCC's email distribution list, and mailed printed copies of the Notice of Public Hearing to all persons on the AOGCC's mailing distribution list. On July 24, 2015, the notice was published in the ALASKA DISPATCH NEWS.
4. No comments on the application were received.
5. The hearing commenced at 9:00 AM on September 1, 2015, in the Alaska State Legislature Building, Legislative Information Office located at 716 West 4th Avenue, Anchorage, Alaska.
6. Testimony was received from representatives of ExxonMobil.
7. The record was held open until September 8, 2015, to allow the operator to respond to requests made during the hearing.

8. The AOGCC received the requested additional information from ExxonMobil on September 8, 2015, and the record was closed.

FINDINGS:

1. Operator and Owners: ExxonMobil is the operator of the leases in the portion of the PTU that is currently proposed for development. ExxonMobil, BP Exploration (Alaska) Inc., ConocoPhillips Alaska, Inc., and 21 other partners are working interest owners, and the State of Alaska, Department of Natural Resources (DNR) is the landowner of the Affected Area, which is located within the North Slope Borough, approximately 50 miles east of Prudhoe Bay along Alaska's northern coastline.

2. Affected Area: The proposed Thomson Oil Pool, which underlies state lands onshore and state waters offshore, is shown on Figure 1, below.[1] This pool will be developed initially from the onshore Central Pad drill site (Central Pad), which is located in Section 34, Township 10N, Range 23E, Umiat Meridian (UM). ExxonMobil's development plans include construction of a second onshore gravel drill site (termed the "West Pad") in Section 36, Township 10N, Range 22E, UM, and likely a third onshore gravel drill site (termed the "East Pad") that is currently planned for Section 6 or 7 of Township 9N, Range 24E, UM.

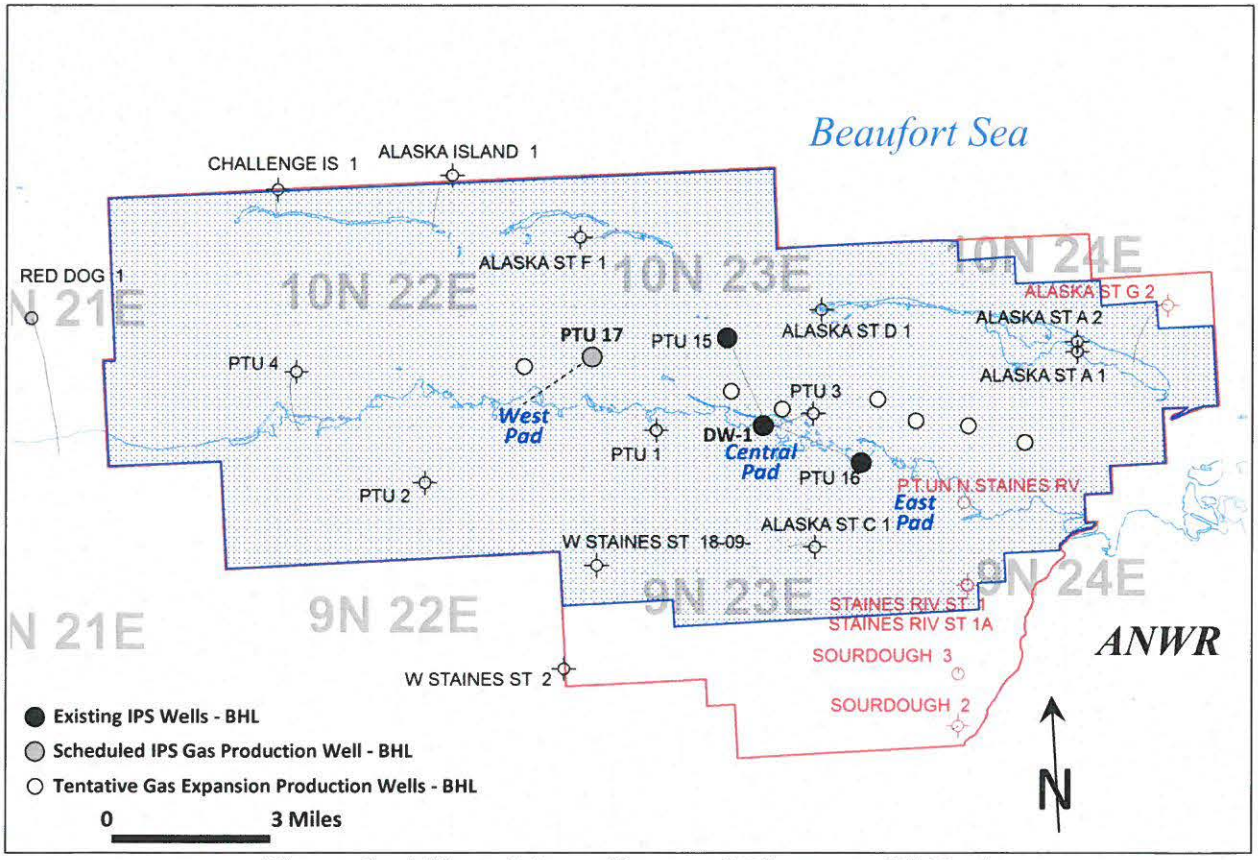

Figure 1. Affected Area, Proposed Thomson Oil Pool
(The approximate outline of the Affected Area is indicated by the blue line.[1] Confidential wells are shown in red.)

[1] This map is presented for illustration purposes only. For a more precise depiction of the Affected Area, refer to the legal description presented on pages 9, 10, and 11 of this order.

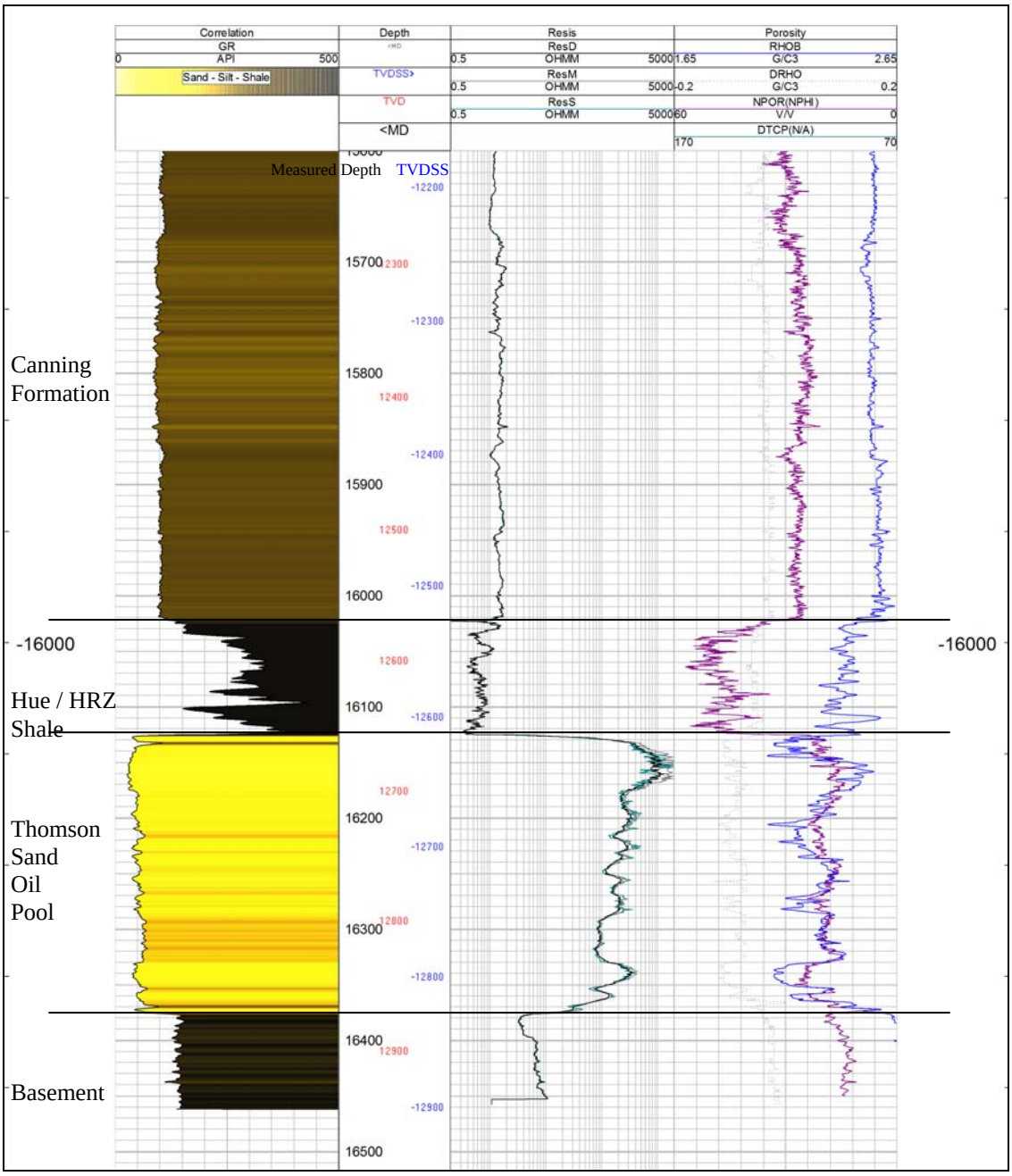

Figure 2. PTU No. 15 – Type Well Log for Thomson Oil Pool[2]

[2] Figure 2 is for illustration purposes only. Refer to the well log measurements recorded in exploratory well PTU No. 15 for the precise representation of the proposed Thomson Oil Pool. The horizontal grid lines in this figure represent increments of ten feet measured depth. The acronym TVDSS refers to true vertical depth subsea (true vertical depth below sea level).

3. Exploration and Delineation History: The PTU No. 1 well discovered the Thomson Sand reservoir in 1977. Since that time, 17 additional wells have penetrated the reservoir or its equivalent subsurface horizon within the PTU area.[3] Information from these wells and from seven overlapping seismic surveys was used to determine the geologic structure, reservoir distribution, and the area that will be affected by condensate-gas production and re-injection of residual produced gas. Production test, drill-stem test, down-hole sampling, core, and well log data were used to establish reservoir properties, fluid properties, and gas-oil and oil-water contacts for this proposed pool.

4. Pool Identification: The proposed Thomson Oil Pool is the accumulation of hydrocarbons underlying the Affected Area that is common to, and correlates with, the interval between 16,126 and 16,377 feet measured depth (MD), which is equivalent to -12,614 and -12,828 feet true vertical depth below mean sea level (also termed true vertical depth subsea and represented herein by the acronym TVDSS[4]) on the VISION/Scope™ Measured Depth Log recorded in well PTU No. 15.

5. Pool Classification: Well tests conducted on the Thomson Sand reservoir in PTU-area wells yielded gas-oil ratio (GOR) values that range from about 850 to 15,750 standard cubic feet of gas per stock tank barrel of oil (scf/stb).[5] ExxonMobil's testimony stated that the initial producing GOR for PTU gas expansion project wells is expected to be less than 20,000 scf/stb. GOR values less than 100,000 scf/stb oblige the AOGCC to classify wells producing from the Thomson Sand as oil wells.[6] Accordingly, the AOGCC classifies the hydrocarbon accumulation within the Thomson Sand reservoir as an oil pool.

6. Geology:

   (a) Stratigraphy: The Thomson Oil Pool encompasses the early Cretaceous-aged Thomson Sand, which lies unconformably atop pre-Mississippian-aged basement rocks comprising dolomite, argillite, quartzite, and phyllite. Fractured and/or karsted dolomite appears restricted to the northern part of the field, and this rock may serve as a secondary reservoir in communication with the Thomson Sand. The rocks that underlay the Affected Area for this order are expected to be predominantly phyllite and quartzite.

   The sediments that comprise the Thomson Sand reservoir were derived from basement rocks that were exposed in the northern and northeastern portions of the Point Thomson Field and bordered to the southwest by a sea. Eroded sediments were transported down-gradient toward the southwest and progressively deposited in alluvial fan, fan-delta, and marine shoreface environments. Wave and current activity extensively reworked these sediments and distributed them in southeast-trending bands arranged subparallel to the shoreline. From northeast (proximal) to southwest (distal), these bands generally consist of alluvial fan breccia, conglomerate, conglomerate with

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[3] Twenty-two wells have been drilled in and near the PTU. Of those 22 wells, 18 penetrated the Thomson Sand or equivalent horizon. Of those 18 wells, 16 penetrated the Thomson Sand, which is absent in the remaining two wells because of erosion.

[4] To avoid confusion, when depths presented represent true vertical depth subsea, the footage will be preceded by a minus sign and followed by the acronym TVDSS (e.g., 12,000 feet true vertical subsea will be depicted as -12,000 feet TVDSS).

[5] AOGCC, 1984, Statistical Report, Reservoir Data for Wells Alaska State A-1 and Pt. Thomson Unit No. 1, p. 103; PTU 15 Well History File 209-014, p. 275; PTU 16 Well History File 209-015, p. 195.

[6] Regulation 20 AAC 25.990(45): "oil well" means a well that produces predominantly oil at a gas-oil ratio of 100,000 scf/stb or lower, unless on a pool-by-pool basis the AOGCC establishes another ratio.

minor sandstone, sandstone, silty sandstone, and siltstone. In general, coarser-grained, proximal lithologies are dominated by carbonate clasts, with quartz and ductile grains becoming increasingly prominent in the more distal areas that lie to the southwest.

ExxonMobil informally divides the Thomson Sand into an upper member and a lower member based on core descriptions and well log correlations. The lower member is dominantly progradational, whereas the upper member is dominantly retrogradational.

The Thomson Sand is unconformably overlain by siltstone, mudstone, and shale assigned to the Canning Formation, Hue Shale, and HRZ, in descending stratigraphic order. Erosion thinned the Hue and HRZ shale intervals toward the northeast, and completely removed these intervals from the northern and eastern portions of the PTU.

(b) Structure: The structure of the proposed Thomson Oil Pool is a gently dipping, four-way anticlinal closure. Based on well and 3D-seismic control, the top of the pool lies about -12,500 feet TVDSS, and the structure extends to a depth of about -14,500 feet TVDSS within the PTU area.

(c) Faults: The Thomson anticlinal closure is cut by several, north- and north-northeast-trending, normal faults. The vertical displacement of faults observed within the Thomson Sand interval averages about 65 to 95 feet, with a maximum of about 200', but none of these faults appear to completely displace the Thomson Sand or create isolated compartments within it. None of the faults are expected to act as flow barriers.

(d) Trap Configuration and Seals: Well log and seismic information indicate that hydrocarbon distribution within the proposed Thomson Oil Pool is influenced by both structural and stratigraphic elements. A broad, east-southeast-trending anticlinal closure provides primary control for the accumulation. Internal facies changes within the Thomson Sand interval strongly influence reservoir quality and the distribution of hydrocarbons, especially in the southern and western portions of the PTU.

The Thomson Sand is overlain by a thick, laterally extensive section of siltstone, mudstone, and shale assigned, in descending stratigraphic order, to the Canning Formation, Hue Shale, and HRZ Shale. These intervals provide the top seal for the proposed Thomson Oil Pool. In the northern and northeastern parts of the PTU, where the Hue and HRZ intervals are either absent or are very thin, mudstone and siltstone assigned to the lower Canning Formation provides a top seal.

The Thomson Sand is underlain predominantly by thick Pre-Mississippian-aged dolomite, phyllite, and quartzite basement rocks that are fractured in part and may provide some contribution to production.

(e) Reservoir Compartmentalization: Flow tests and reservoir pressure measurements indicate that the Thomson Oil Pool is not separated into isolated compartments within the Affected Area.

(f) Permafrost Base: Permafrost base is about -1,800 feet TVDSS within the Affected Area.

7. Reservoir Properties: ExxonMobil informally subdivides the Thomson Sand reservoir into six petrofacies based on grain size, sorting, cementation, and ductile-grain content. These petrofacies are: cemented breccia and conglomerate, open-framework conglomerate,

bimodal conglomerate, clean sandstone, silty sandstone, and siltstone. Each of these petrofacies plots within a well-defined area on a chart of core porosity versus core permeability, and—for reservoir modeling purposes—each petrofacies has a distinct equation that is used to transform porosity measurements to estimated permeability values.

Petrofacies	Porosity	Permeability[7]	Average Sw in Gas Cap	Reservoir Quality
Open Framework Conglomerate	Up to 28%	100+ mD to 10+ D	5%	Excellent
Bi-Modal Conglomerate	~14%	1 mD to 10 D	25%	Good
Conglomerate & Breccia – Cemented ($CaCO_3$ > 10%)	< 8%	< 0.1 mD	90%	Poor
Sandstone – Clean (generally <10% ductile grains)	~24%	100+ mD to < 10 D	15%	Very good
Sandstone – Silty (generally >15% ductile grains)	~12%	< 10 mD	70%	Poor
Siltstone	-	< 10 mD	70%	Poor
Pre-Miss. Basement	~1%	H: 1mD; V: 78 mD[8]	-	Poor

8. Reservoir Fluid Properties: Within the Point Thomson Field, the accumulation within the Thomson Sand comprises a nearly 500-foot thick, high-pressure, condensate-gas "cap" (gas cap) and an underlying, 37-foot thick rim of viscous oil.[9] Relict oil saturation exists within the gas cap due to multiple oil migration events. Relict oil saturation increases downward, toward the gas-oil contact. Average oil saturation within the gas cap is approximately 10%. Condensate yield for the reservoir is estimated to be about 60 to 65 stock tank barrels (stb) per 1 million standard cubic feet of gas (MMSCF).

   The oil rim consists of 10° to 18° API gravity oil that has a viscosity of about two centipoise at reservoir conditions. The lower portion of the oil rim consists of an oil-water transition zone, where both oil and water are partially mobile.

9. Reservoir Fluid Contacts: For the proposed Thomson Oil Pool, the gas-oil contact is placed at –12,975 feet TVDSS from drill stem test results, Modular Dynamic Tests, and fluid samples from wells PTU 15 and PTU 16. The oil-water contact is estimated at –13,012 feet TVDSS based on fluid samples from PTU 16 and confidential well tests and well log data.[10] The elevations of these contacts are believed to be constant throughout the Affected Area, and the entire hydrocarbon accumulation is considered to be in pressure communication. In

[7] The abbreviation mD signifies millidarcies, and D signifies Darcies. Permeability values provided in this table represent air permeability.
[8] Based on core analyses, ExxonMobil assigns these general reservoir properties to fractured Pre-Mississippian basement rocks: 1% porosity, 1mD horizontal permeability, and 78 mD vertical permeability.
[9] Estimated from MDT pressure and fluid samples obtained in well PTU 16 supported by additional data from confidential wells
[10] Records for several exploratory wells located in the eastern portion of the Point Thomson area are held confidential indefinitely because of their close proximity to unleased acreage in the Arctic National Wildlife Refuge.

shallower portions of the proposed pool, condensate-gas-bearing Thomson Sand directly overlies fractured, Pre-Mississippian basement rock.

10. Reservoir Pressure and Temperature: The proposed Thomson Oil Pool is abnormally geo-pressured: average reservoir pressure is about 10,100 psi at ExxonMobil's specified pressure datum of -12,700 feet TVDSS (a pore-pressure gradient of about 0.795 psi/ft).[11] Reservoir temperature ranges from about 220° to 230° F.

11. In-Place Volumes: ExxonMobil's geologic and reservoir model suggests that the original gas in place for the PTU is about 8 trillion cubic feet (TCF). The 37-foot thick, viscous-oil rim is estimated to contain about 160 million barrels of original oil in place.

12. Proposed Gas Offtake Rate: The PTU Working Interest Owners (WIOs) requested an annual average allowable gas offtake rate of 1.1 BSCFD for input to the Alaska Liquefied Natural Gas (AKLNG) project and to fuel PTU operations.

13. Alternative Development Plans Considered: At the hearing, ExxonMobil presented evidence as to how the reservoir simulation model was built and showed simulation results for its proposal and several other development options including alternative offtake rates and various cases involving full field gas cycling ahead of major gas sales. The results showed that ultimate recovery from the Thomson Oil Pool was relatively insensitive to the development method and that the differences were arguably within the margin of error of the simulation model based on the current understanding of the reservoir.

14. Reservoir Development and Management: ExxonMobil proposes to develop the Thomson Oil Pool initially as a limited gas-cycling project, known as the Initial Production System (IPS), in order to gain information about condensate yield and reservoir connectivity. Gas will be produced at the rate of about 200 MMSCFD, and it will be routed to the Central Processing Facility, where up to 10,000 barrels of condensate per day will be extracted for sales. Some of the residual, produced gas will be used to fuel the PTU facilities, and the remainder will be injected back into the Thomson Sand reservoir to maintain pressure and conserve resources. This portion of the project is expected to begin production in early 2016.

    Beginning in or about 2025 ExxonMobil and the other WIOs expect to have the opportunity to start selling gas from the Thomson Oil Pool as part of the AKLNG project currently being planned. When major gas sales begin, the IPS wells will be converted to gas producers and additional production wells will be drilled in order to give the Thomson Oil Pool the capacity to meet the requested 1.1 BSCFD gas offtake rate.

    ExxonMobil currently has no plans to develop the oil rim. Achieving significant oil production from this 37-foot thick interval would be difficult—even using horizontal drilling technology—because the high viscosity oil contained within this relatively thin interval would initially yield only minimal oil production followed rapidly by breakthrough of overlying gas, underlying water, or both. Ultimate oil recovery would be very low, and separate facilities would be required to process the viscous oil.

15. Gas-Oil Ratio Limit Waiver: ExxonMobil requests a waiver from the gas-oil ration limits of 20 AAC 25.240(a) for the development wells in the Thomson Oil Pool.

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[11] Regulation 20 AAC 25.990(2): "abnormally geo-pressured strata" means subsurface zones where the pore pressure exceeds a gradient of 0.50 psi/ft.

CONCLUSIONS:

1. Pool Rules for the development of the Thomson Oil Pool in the PTU are appropriate.
2. Per 20 AAC 25.990(45), the hydrocarbon accumulation within Thomson Sand is properly classified as an oil pool.
3. ExxonMobil's IPS project will provide reservoir pressure and condensate yield information that will promote more effective resource recovery.
4. During the IPS project, re-injection of residual produced gas into the Thomson Oil Pool will preserve reservoir energy and increase ultimate recovery.
5. Significant oil production from the 37-foot thick, viscous-oil rim that lies at the base of the proposed pool is not feasible with current technology.
6. Monitoring reservoir performance will ensure proper management of the pool. Annual reports and technical review meetings will keep the AOGCC apprised of reservoir performance, promote greater ultimate recovery and prevent the waste of resources.
7. Analyzing the results of the IPS project will provide valuable insight into the performance of the Thomson Oil Pool that will be necessary for optimizing future development of the Thomson Oil Pool.
8. Annular pressure management is necessary to prevent failure of well integrity and uncontrolled release of fluids or pressure and to minimize threats to human safety and the environment.
9. A GOR limitation waiver is appropriate. During the IPS a waiver under 20 AAC 25.240(b)(1) is appropriate because an ongoing EOR project will be in place. Once major gas sales begin modelling has shown ultimate recovery to be relatively insensitive to the manner of development and thus a waiver of the GOR limits imposed by 20 AAC 25.240(a) will not promote waste or harm ultimate recovery.

NOW, THEREFORE, IT IS ORDERED:

The development and operation of the Thomson Oil Pool is subject to the following rules and the statewide requirements under 20 AAC 25 to the extent not superseded by these rules:

Affected Area: Umiat Meridian

Township, Range	Description
T10N, R24E	Sections S/2 of 25, 26 to 36
T10N, R23E	Sections 25 to 36

Township, Range	Description
T10N, R24E & T10N, R23E	TRACT C30-114 (BF-114): A PORTION OF BLOCKS 799 AND 800 AS SHOWN ON THE "LEASING AND NOMINATION MAP" FOR THE FEDERAL/STATE BEAUFORT SEA OIL AND GAS LEASE SALE, DATED 1/30/79, MORE PARTICULARLY DESCRIBED AS FOLLOWS:THOSE LANDS LYING NORTHERLY OF THE SOUTH BOUNDARY OF SECTIONS 23 AND 24, T10N, R23E; U.M., AK., AND LYING NORTHERLY OF THE SOUTH BOUNDARY OF SECTIONS 19 AND 20, T10N, R24E; U.M., AK., IN BLOCK 799 (BEING THE NORTHERLY PORTION) LISTED AS STATE AREA ON THE "SUPPLEMENTAL OFFICIAL O.C.S. BLOCK DIAGRAM" APPROVED 10/4/79, CONTAINING 1081.11 HECTARES, AND THOSE LANDS LYING NORTHERLY OF THE SOUTH BOUNDARY OF SECTIONS 20, 21, AND 22, T10N, R24E; U.M., AK., AND LYING WESTERLY OF 146 DEGREES 00'00" WEST LONGITUDE IN BLOCK 800 LISTED AS STATE AREA ON THE "SUPPLEMENTAL OFFICIAL O.C.S. BLOCK DIAGRAM" APPROVED 10/4/79, CONTAINING 916.21 HECTARES.(GENERAL LOCATION: T10N, R23E; T10N, R24E; U.M., AK.) CONTAINING APPROXIMATELY 4935.47 ACRES, MORE OR LESS.
T10N, R23E	THAT PORTION OF TRACT 65-020, "TRACT 65-020 ENCOMPASSES ALL THOSE LANDS IN THE S1/2 OF BLOCK 754 OCS OFFICIAL PROTRACTION DIAGRAM NR 6-4 APPROVED 4/29/79, CONTAINING 1152 HECTARES, AND THOSE LANDS LYING NORTHERLY OF THE SOUTH BOUNDARY OF SECTIONS 20, 21, 22 AND 23, T. 10 N., R. 23 E., UMIAT MERIDIAN, ALASKA IN BLOCK 798 (BEING IN THE NORTHERLY PORTION), LISTED AS STATE AREA ON THE "SUPPLEMENTAL OFFICIAL OCS BLOCK DIAGRAM" APPROVED 10/4/79, CONTAINING 1109.94 HECTARES.", LYING SOUTHERLY OF SECTIONS 14, 15, 16 AND 17, T. 10 N., R. 23 E., U.M.., ALASKA IN OCS BLOCK 798. THIS TRACT CONTAINS 1,909.74 ACRES, (772.85 HECTARES), MORE OR LESS.
T10N, R23E	THAT PORTION OF TRACT 65-020, "TRACT 65-020 ENCOMPASSES ALL THOSE LANDS IN THE S1/2 OF BLOCK 754 OCS OFFICIAL PROTRACTION DIAGRAM NR 6-4 APPROVED 4/29/79, CONTAINING 1152 HECTARES, AND THOSE LANDS LYING NORTHERLY OF THE SOUTH BOUNDARY OF SECTIONS 20, 21, 22 AND 23, T. 10N., R. 23 E., UMIAT MERIDIAN, ALASKA IN BLOCK 798 (BEING IN THE NORTHERLY PORTION), LISTED AS STATE AREA ON THE "SUPPLEMENTAL OFFICIAL OCS BLOCK DIAGRAM"APPROVED 10/4/79, CONTAINING 1109.94 HECTARES", LYING IN THE S1/2 OF OCS BLOCK 754, AND LYING NORTHERLY OF SECTIONS 20, 21, 22 AND 23, T. 10N., R. 23E., U.M., ALASKA IN OCS BLOCK 798. CONTAINING 3,684.31 ACRES, (1,490.00 HECTARES), MORE OR LESS.

Township, Range	Description
T10N, R23E & T10N, R22E	TRACT C30-110 (BF-110): A PORTION OF BLOCKS 753 AND 797 AS SHOWN ON THE "LEASING AND NOMINATION MAP" FOR THE FEDERAL/STATE BEAUFORT SEA OIL AND GAS LEASE SALE, DATED 1/30/79, MORE PARTICULARLY DESCRIBED AS FOLLOWS: THOSE LANDS LOCATED IN THE S1/2 OF BLOCK 753, BEING A PORTION OF BLOCK753 ON THE AFORESAID LEASING AND NOMINATION MAP, CONTAINING 1152.00 HECTARES, AND THOSE LANDS LYING NORTHERLY OF THE SOUTH BOUNDARY OF SECTIONS 23 AND 24, T10N, R22E; U.M., AK., AND LYING NORTHERLY OF THE SOUTH BOUNDARY OF SECTIONS 19 AND 20, T10N, R23E; U.M., AK., IN BLOCK 797 (BEING THE NORTHERLY PORTION) LISTED AS STATE AREA ON THE "SUPPLEMENTAL OFFICIAL O.C.S. BLOCK DIAGRAM" APPROVED 10/4/79, CONTAINING 1133.95 HECTARES.(GENERAL LOCATION: T10N, R22E; T10N, R23E; U.M., AK.) THIS TRACT CONTAINS 5648.68 ACRES MORE OR LESS.
T10N, R22E	Sections 25 to 36
T10N, R22E	T. 10N., R. 22E., UMIAT MERIDIAN, ALASKA TRACT 65-017 IS A PORTION OF OCS BLOCKS 752 AND 796 AS SHOWN ON THE "LEASING AND NOMINATION MAP" FOR THE FEDERAL/STATE BEAUFORT SEA OIL AND GAS LEASE SALE, DATED 1/30/79, AND MORE PARTICULARLY DESCRIBED AS FOLLOWS: TRACT 65-017 ENCOMPASSES ALL THOSE LANDS IN THE S1/2 OF BLOCK 752, OCS OFFICIAL PROTRACTION DIAGRAM NR 6-4 APPROVED 4/29/75, CONTAINING 1152 HECTARES, AND THOSE LANDS LYING NORTHERLY OF THE SOUTH BOUNDARY OF SECTIONS 20, 21, 22 AND 23, T. 10N., R. 22E., UMIAT MERIDIAN, ALASKA IN BLOCK 796 (BEING THE NORTHERLY PORTION) LISTED AS STATE AREA ON THE "SUPPLEMENTAL OFFICIAL OCS BLOCK DIAGRAM" APPROVED 10/4/79, CONTAINING 1153.17 HECTARES. THIS TRACT CONTAINS 5696.18 ACRES MORE OR LESS (2305.17 HECTARES MORE OR LESS).
T10N, R22E & T10N, R21E	TRACT 65-016 ENCOMPASSES ALL THOSE LANDS IN THE S1/2 OF BLOCK 751, OCS OFFICIAL PROTRACTION DIAGRAM NR 6-4 APPROVED 4/29/75, CONTAINING 1152.00 HECTARES, AND THOSE LANDS LYING NORTHERLY OF THE SOUTH BOUNDARY OF SECTIONS 23 AND 24, T. 10N., R. 21E., UMIAT MERIDIAN, ALASKA AND LYING NORTHERLY OF THE SOUTH BOUNDARY OF SECTIONS 19 AND 20, T. 10N., R. 22E., UMIAT MERIDIAN, ALASKA IN BLOCK 795 (BEING THE NORTHERLY PORTION) LISTED AS STATE AREA ON THE "SUPPLEMENTAL OFFICIAL OCS BLOCK DIAGRAM" APPROVED 10/4/79, CONTAINING 1167.58 HECTARES", LYING WITHIN T. 10 N., R. 22 E., U.M., ALASKA, AND THE E1/2E1/2 OF SECTIONS 1,12, 13 AND 24, T. 10 N., R. 21 E., U.M., ALASKA. THIS TRACT CONTAINS 2,779.16 ACRES (1,124.69), MORE OR LESS.
T10N, R21E	Sections 25, 26, 35, 36

Township, Range	Description
T10N, R21E	T. 10 N., R. 21 E., UMIAT MERIDIAN, ALASKA "TRACT 65-016 ENCOMPASSES ALL THOSE LANDS IN THE S1/2 OF BLOCK 751, OCS OFFICIAL PROTRACTION DIAGRAM NR6-4 APPROVED 4/29/75, CONTAINING 1152.00 HECTARES, AND THOSE LANDS LYING NORTHERLY OF THE SOUTH BOUNDARY OF SECTIONS 23 AND 24, T. 10 N., R. 21 E., UMIAT MERIDIAN, ALASKA AND LYING NORTHERLY OF THE SOUTH BOUONDARY OF SECTIONS 19 AND 20, T. 10 N., R. 22 E., UMIAT MERIDIAN, ALASKA IN BLOCK 795, BEING THE NORTHERLY PROTION)LISTED AS STATE AREA ON THE "SUPPLEMENTAL OFFICIAL OCS BLOCK DIAGRAM" APPROVED 10/4/79, CONTAINING 1167.58 HECTARES.", LYING WITHIN T. 10 N., R. 21 E.,U.M. ALASKA, EXCLUDING THE E1/2E1/2 OF SECTIONS 1,12,13 AND 24. THIS TRACT CONTAINS 2,952.62 ACRES, (1,194.89 HECTARES), MORE OR LESS.
T09N, R24E	Sections 2 to 9, N/2 of 10, SW/4 of 10, 15 (excluding ANWR), N/2 of 16, 17, 18, N/2 of 19, NW/4 of 20
T09N, R24E	SECTION 1: UNSURVEYED, ALL TIDE AND SUBMERGED LAND, EXCLUDING STATE OF ALASKA OIL AND GAS LEASE ADL 372256 AND THE ARCTIC NATIONAL WILDLIFE REFUGE, 15.80 ACRES
T09N, R23E	Sections 1 to 18, N/2 of 21, N/2 of 22, N/2 of 23, N/2 of 24
T09N, R22E	Sections 1 to 12

Rule 1 Field and Pool Name

The field is the Pt. Thomson Field. Hydrocarbons underlying the Affected Area and within the interval identified in Rule 2, below, constitute the Thomson Oil Pool.

Rule 2 Pool Definition

The Thomson Oil Pool is the accumulation of hydrocarbons underlying the Affected Area that is common to, and correlates with, the interval between 16,126 and 16,377 feet MD on the VISION/Scope™ Measured Depth Log recorded in reference well PTU No. 15.

Rule 3 Reservoir Pressure Monitoring

(a) A bottom-hole pressure survey shall be taken on each well prior to initial production or injection.

(b) The operator shall obtain the pressure surveys needed to manage the hydrocarbon recovery processes effectively subject to the annual plan outlined in Rule 9, below. At a minimum a pressure survey shall be acquired from at least one well on each drill site each year.

(c) The reservoir pressure datum will be -12,700' TVDSS.

(d) Pressure surveys may consist of stabilized static pressure measurements at bottom-hole or be extrapolated from surface measurements (single phase fluid conditions), pressure fall-off measurements, pressure buildup measurements, multi-rate test results, drill stem test results, and open-hole formation tests or other methods approved by the AOGCC.

(e) A Reservoir Pressure Report, Form 10-412, shall be utilized for all surveys; all relevant data shall be attached to the report. The data submitted shall include, at a minimum, rate, pressure, depth, fluid gradient, temperature, and all other well conditions necessary for a complete analysis of each survey being conducted.

(f) The results and data from any special reservoir pressure monitoring tests or surveys shall also be submitted in accordance with paragraph (e) of this rule.

Rule 4 Gas-Oil Ratio Exemption

Wells producing from the Thomson Oil Pool are exempt from the GOR limits of 20 AAC 25.240(a).

Rule 5 Annual Reservoir Review

(a) An annual reservoir surveillance report must be filed by April 1st of each year and include future development plans, reservoir depletion plans, and surveillance information for the prior calendar year, including:

(i) The voidage balance, by month, of produced fluids and injected fluids and the cumulative status for each producing interval;

(ii) A reservoir pressure map at datum, and a summary and analysis of the reservoir pressure surveys within the pool;

(iii) The results and, where appropriate, an analysis of production and injection log surveys, tracer surveys, observation well surveys, and any other special monitoring;

(iv) A review of pool production allocation factors and issues over the prior year.

(v) A review of the progress of the enhanced recovery project; and

(vi) A reservoir management summary, including results of any reservoir simulation studies.

(b) By June 1st of each year, the operator shall schedule and conduct a technical review meeting with the AOGCC to discuss the annual reservoir surveillance report and items that may require action within the coming year. The AOGCC may audit the technical data and analyses relating to the surveillance report's conclusions and reservoir depletion plans.

Rule 6 Initial Production System Results Report

After five years of sustained production under the IPS or 12 months before gas sales from Pt. Thomson are scheduled to begin, whichever comes first, the operator shall submit a report to the AOGCC on the results and findings from conducting the IPS. The report shall include the following information:

(a) A description of what the operator expected the IPS to show about the performance of the Thomson Oil Pool and the fluids contained within before the IPS project began producing;

(b) A description of what the IPS actually showed about the performance of the Thomson Oil Pool and the fluids contained within;

(c) A discussion, with appropriate supporting information, on whether or not the IPS showed the Thomson Oil Pool to be compartmentalized;

(d) A discussion, with appropriate PVT data, on what the IPS showed about the reservoir fluid properties; and

(e) A discussion on whether or not the development method proposed in this order is still the best method to optimize ultimate recovery and prevent waste.

Rule 7 Annular Pressures

(a) At the time of installation or replacement, the operator shall conduct and document a pressure test of tubulars and completion equipment in each development well that is sufficient to demonstrate that planned well operations will not result in failure of well integrity, uncontrolled release of fluid or pressure, or threat to human safety.

(b) The operator shall monitor each development well daily to check for sustained pressure, except if prevented by extreme weather conditions, emergency situations, or unavoidable circumstances. Monitoring results shall be made available for AOGCC inspection.

(c) The operator shall notify the AOGCC within three working days after the operator identifies a well as having (i) sustained inner annulus pressure that exceeds 2, 000 psig for all development wells, or (ii) sustained outer annulus pressure that exceeds 1, 000 psig.

(d) The AOGCC may require the operator to submit in an Application for Sundry Approvals (Form 10-403) a proposal for corrective action or increased surveillance for any development well having sustained pressure that exceeds a limit set out in paragraph (c) of this rule. The AOGCC may approve the operator's proposal or require other corrective action or surveillance. The AOGCC may require corrective action be verified by a mechanical integrity test or other approved diagnostic tests. The operator shall give the AOGCC sufficient notice of the testing schedule to allow the AOGCC to witness the tests.

(e) If the operator identifies sustained pressure in the inner annulus of a development well that exceeds 45% of the burst pressure rating of the well's production casing for inner annulus pressure, or sustained pressure in the outer annulus that exceeds 45% of the burst pressure rating of the well's surface casing for outer annulus pressure, the operator shall notify the AOGCC within three working days and take corrective action. Unless well conditions require the operator to take emergency corrective action before AOGCC approval can be obtained, the operator shall submit in an Application for Sundry Approvals (Form 10-403) a proposal for corrective action. The AOGCC may approve the operator's proposal or require other corrective action. The AOGCC may also require corrective action be verified by mechanical integrity testing or other AOGCC approved diagnostic tests. The operator shall give the AOGCC sufficient notice of the testing schedule to allow the AOGCC to witness the tests.

(f) Except as otherwise approved by the AOGCC under (d) or (e) of this rule, before a shut-in well is placed in service, any annulus pressure must be relieved to a sufficient degree (1) that the inner annulus pressure at operating temperature will be below 2,000 psig, and (2) that the outer annulus pressure at operating temperature will be below

1,000 psig. A well subject to (c) but not (e) of this rule may reach an annulus pressure at operating temperature that is described in the operator's notification to the AOGCC under (c) of this rule, unless the AOGCC prescribes a different limit.

(g) For purposes of this rule,

i) "inner annulus" means the space in a well between tubing and production casing;

ii) "outer annulus" means the space in a well between production casing and surface casing; and

iii) "sustained pressure" means pressure that (A) is measurable at the casing head of an annulus, (B) is not caused solely by temperature fluctuations, and (C) is not pressure that has been applied intentionally.

Rule 8 Allowable Gas Offtake Rate

The maximum allowable annual average gas offtake rate from the Thomson Oil Pool is 1.1 billion standard cubic feet per day (BSCFD).

Rule 9 Administrative Action

Upon proper application, or its own motion, and unless notice and public hearing are otherwise required, the AOGCC may administratively waive the requirements of any rule stated herein or administratively amend this order as long as the change does not promote waste or jeopardize correlative rights, is based on sound engineering and geoscience principles, and will not result in an increased risk of fluid movement into freshwater.

DONE at Anchorage, Alaska and dated November 9, 2015.

Cathy P. Foerster
Chair, Commissioner

Daniel T. Seamount, Jr.
Commissioner

RECONSIDERATION AND APPEAL NOTICE

As provided in AS 31.05.080(a), within **20** days after written notice of the entry of this order or decision, or such further time as the AOGCC grants for good cause shown, a person affected by it may file with the AOGCC an application for reconsideration of the matter determined by it. If the notice was mailed, then the period of time shall be **23** days. An application for reconsideration must set out the respect in which the order or decision is believed to be erroneous.

The AOGCC shall grant or refuse the application for reconsideration in whole or in part within 10 days after it is filed. Failure to act on it within 10-days is a denial of reconsideration. If the AOGCC denies reconsideration, upon denial, this order or decision and the denial of reconsideration are **FINAL** and may be appealed to superior court. The appeal **MUST** be filed within **33** days after the date on which the AOGCC mails, **OR 30** days if the AOGCC otherwise distributes, the order or decision denying reconsideration, **UNLESS** the denial is by inaction, in which case the appeal **MUST** be filed within **40** days after the date on which the application for reconsideration was filed.

If the AOGCC grants an application for reconsideration, this order or decision does not become final. Rather, the order or decision on reconsideration will be the **FINAL** order or decision of the AOGCC, and it may be appealed to superior court. That appeal **MUST** be filed within **33** days after the date on which the AOGCC mails, **OR 30** days if the AOGCC otherwise distributes, the order or decision on reconsideration.

In computing a period of time above, the date of the event or default after which the designated period begins to run is not included in the period; the last day of the period is included, unless it falls on a weekend or state holiday, in which event the period runs until 5:00 p.m. on the next day that does not fall on a weekend or state holiday.