

OOOGURUK UNIT

APPROVAL OF THE APPLICATION FOR
THE THIRD EXPANSION OF
THE OOOGURUK-NUIQSUT PARTICIPATING AREA

Findings and Decision of the Director
of the Division of Oil and Gas
Under Delegation of Authority
from the Commissioner of the State of Alaska
Department of Natural Resources

July 11, 2018

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I. INTRODUCTION AND DECISION SUMMARY

On December 30, 2015, Caelus Energy Alaska (Caelus), the Operator of the Oooguruk Unit (OU), on behalf of itself and the other Working Interest Owner (WIO), submitted an application for approval of expansion (Third Expansion) of the Nuiqsut Participating Area (ONPA) to the State of Alaska (State), Department of Natural Resources (DNR), Division of Oil and Gas (Division) (Application). The Third Expansion augments the Division's previously approved first and second expansions of the ONPA on May 14, 2013, and April 4, 2014, respectively. On February 9, 2016, Caelus and the Division held a joint technical meeting to discuss the Third Expansion. Subsequently, Caelus supplemented its submission by providing Exhibits C, D, E, and F for the proposed Third Expansion. After discussion with Division staff, Caelus submitted revised Exhibits on January 23, 2018. The Third Expansion encompasses portions of nine (9) State oil and gas leases that lie within the boundary of the OU, as shown in Exhibits C and D, Attachments 1 and 2, respectively, comprising of an area of approximately 18,631 acres.

A participating area "must be expanded to include acreage reasonably estimated through use of geological, geophysical, or engineering data to be capable of producing or contributing to the production of hydrocarbons in paying quantities, and must be contracted to exclude acreage reasonably proven through the use of geological, geophysical, and engineering data to be incapable of producing hydrocarbons in paying quantities, subject to approval by the commissioner." 11 AAC 83.351(c).

Caelus submitted confidential and public information in the Application. The confidential economic, geological, geophysical, and engineering data indicate that the acreage proposed for inclusion in the ONPA is producing or contributing to production of hydrocarbons in paying quantities, or is reasonably estimated to be capable of producing or contributing to production of hydrocarbons in paying quantities.

The Division finds that the Third Expansion of the ONPA, as set out in this decision, promotes conservation of all natural resources, promotes the prevention of economic and physical waste, provides for the protection of all parties of interest, including the State, and protects the public interest. AS 38.05.180(p); 11 AAC 83.303. I approve the Application in accordance with the criteria set out in 11 ACC 83.303 under the terms and conditions of Section IV (as set forth below). The effective date of the Third Expansion of the ONPA is June 1, 2008.

II. APPLICATION AND LEASE SUMMARY

In 2002, Pioneer Natural Resources Inc. (Pioneer) acquired a stake in the Armstrong Resources-operated Northwest Kuparuk prospect in the Beaufort Sea. This prospect is currently known as Oooguruk. In late 2013, Pioneer sold its interest in OU to Caelus.

Caelus submitted the Application under 11 AAC 83.351 and Article 9.4 of the Oooguruk Unit Agreement. The Application, as supplemented by later submission, includes Exhibit C (Attachment 1), Exhibit D (Attachment 2), Exhibit E (Attachment 3), and Exhibit F (Attachment 4). Exhibit C displays the unit tract numbers, legal descriptions, lease numbers, working interest ownership, royalty ownership, overriding royalty interest ownership, and unit tract participation factors for the ONPA. Exhibit D is a map of the ONPA. Exhibit E displays the allocation of unit expense to each unit tract within the participating area. Exhibit F displays the

allocation of unit expense to each participating area within the unit, then further allocates the unit production and costs to each tract within the participating area, and is required for any tract which includes net profits share leases (NPSL).

In conjunction with the Application and the foregoing Exhibits, Caelus seeks approval from the Division of the revised allocations for the unit production and costs among the tracts and leases, including NPSLs, comprising the three OU participating areas.

Caelus holds 70 percent and Eni Petroleum US LLC (Eni) holds 30 percent of the working interests in all depths in ADLs 389950, 38952, 389958, and 389959. ADLs 355036, 355037, and 355038, are segmented by depth: the Upper Interval from the surface down to the stratigraphic equivalent of 8373 feet measured depth and the Lower Interval, below 8373 feet. Caelus holds 70 percent and Eni holds 30 percent of the working interest in the Upper Interval of these leases, but not the Lower Interval. The stratigraphic limits of proposed expansion are ONPA lie entirely within the Upper Interval.

The existing ONPA includes 16,987 acres; the expansion will add an additional 1,600 acres as described in detail in Attachment 1 and 2. Below is a table of the expansion areas.

Table 1: Leases Proposed for Expansion

Unit Tract №	Lease №	Legal Description	Expansion Acres
4	389956	T. 14 N., R. 7 E., Umiat Meridian Section 22, S/2 SE/4	80.00
5	389955	T. 14 N., R. 7 E., Umiat Meridian Section 23, Protracted, S/2 SW/4	80.00
6	389958	T. 14 N., R. 7 E., Umiat Meridian Section 26, Protracted, N/2 NW/4	80.00
14	355037	T. 13 N., R. 7 E., Umiat Meridian Section 5, Protracted, NW/4 NW/4, N/2 SW/4 Section 8, Protracted, SE/4 SW/4, S/2 SE/4 Section 16, Protracted, SE/4SW/4, S/2 SE/4 Section 18, Protracted, NE/4 NE/4, S/2 NE/4, NE/4 SE/4 From the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth + 100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992. (Segment 1)	640.00
16	355039	T. 13 N., R. 7 E., Umiat Meridian Section 20, Protracted, N/2 Section 21, Protracted, N/2 NW/4 Limited to the interval from the surface down to the stratigraphic equivalent of 8,373' (driller's total depth + 100') which is the equivalent of 8,402' (wireline logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11-T13N-R7E, U.M. (Segment 1)	400.00
17	389959	T. 14 N., R. 7 E., Umiat Meridian Section 27, Protracted, E/2 NW/4 Section 28, Protracted, SW/4 SE/4	200.00
18	389960	T. 14 N., R. 7 E., Umiat Meridian Section 32, Protracted, SE/4 NE/4, S/2 SW/4	120.00

III. DISCUSSION OF DECISION CRITERIA

The DNR Commissioner (Commissioner) reviews applications related to units, including participating area formations, expansions, and contractions, under 11 AAC 83.303-395. By memorandum dated September 30, 1999, the Commissioner approved a revision of Department Order 003 and delegated this authority to the Division Director. The Division's review of the Application is based on the criteria set out in 11 AAC 83.303(a) and (b). A discussion of the subsection (b) criteria, as they apply to the Application, is set out directly below, followed by a discussion of the subsection (a) criteria. Analysis and discussion of subsection (b) requirements precedes and supports the findings under subsection (a).

A. Decision Criteria Considered Under 11 AAC 83.303(b)

1. Environmental Costs and Benefits

Approval of the ONPA Third Expansion has no direct environmental impact. This decision is an administrative action and does not authorize any on-the-ground activity. DNR considers environmental issues during the lease sale process and develops lease stipulations to mitigate the potential environmental, social, and cultural impacts from lease operations. The Unit Operator must obtain approval of a plan of operations from the State and permits from various agencies on State leases before drilling wells or initiating development activities to explore and produce reservoirs within the unit area. 11 AAC 83.346. Potential effects on the environment are analyzed when permits to conduct exploration or development in the unit area are reviewed. Caelus has obtained the required permits for the expanded ONPA wells and is operating under an approved plan of operations and plan of development (POD). The OU development uses a compact drilling site and existing infrastructure at the Kuparuk River Unit (KRU) to process production.

2. Geological, Geophysical, and Engineering Characteristics

The proposed Third Expansion of ONPA is based upon drilling results that have demonstrated the presence of productive Nuiqsut Reservoir sands to the north, northwest, and southwest beyond the original ONPA boundary. Caelus has been able to optimize its well designs and drilling trajectories to extend the drilling reach from the offshore drill site (ODS) island beyond the original ONPA boundary into the requested ONPA expansion area. The development wells drilled into the expansion area have demonstrated the capability of producing or contributing to the production of hydrocarbons in paying quantities from the Nuiqsut reservoir. Caelus has submitted sufficient confidential geological, geophysical, and engineering data in the form of well data, maps, digital grids, and cross sections for volumetric calculations to further support the expansion of the ONPA and properly allocate production.

Geology of Nuiqsut Interval, Upper Jurassic Kingak Formation

Regional Structural Setting

The Nuiqsut Sandstone of Late Jurassic age is present along a broad south to southeast plunging antiform that is divided by a series of NW-SE trending faults that form separate fault-bounded Nuiqsut oil accumulations. The extent of the Nuiqsut reservoir sandstone to the northwest is

limited due to erosional truncation by the Base Cretaceous Unconformity (BCU) or the Lower Cretaceous Unconformity (LCU). The Nuiqsut interval becomes more distal to the south and, therefore, less permeable as the interval becomes more silt- and clay-dominated.

Nuiqsut Regional Depositional Setting

The Nuiqsut Sandstone is one of three oil-bearing intervals within the Jurassic Kingak Formation in the Colville Delta area. From oldest to youngest, these reservoir intervals are the Nechelik, Nuiqsut, and Alpine sandstones. The regional depositional setting of these three Upper Jurassic intervals can be interpreted from both seismic and regional well control. Interpretation of the data indicate these shallow marine sediments were deposited from a northern source area as lower shoreface progradational and aggradational coarsening upward units on a broad, very low gradient marine shelf on a south-facing passive margin over a period of approximately 20 million years. In the OU area, sedimentation on the shelf was dominated by mud and clay deposition due to limited accommodation space and relatively low rates of sediment input. The Nuiqsut sandstone is preserved in this particular area due to reservoir quality sandstones that are in proximity to the sediment source and localized variations in topography, as a result of syndepositional faulting, along with localized erosion. The cleanest and best sands form at the top of the overall coarsening upward sequences, where not truncated by the LCU or BCU.

Nuiqsut Reservoir Characteristics

Reservoir and fluid properties for Nuiqsut Reservoir have been determined through the analyses of exploration well test data, conventional and sidewall core data, and well log data within the ONPA. The Nuiqsut reservoir sandstones consist of very fine to fine-grained, quartz-rich sandstone with up to 15 percent siderite and glauconite. The reservoir quality degrades as the clay content increases in the sands. Nuiqsut reservoir porosities range 10–20 percent and average to approximately 15 percent. Permeabilities range 0.1–50 millidarcies, averaging 15 millidarcies. Estimated water saturation varies with facies and permeability, generally ranging 40–60 percent for a typical reservoir quality sandstone.

3. Prior Exploration and Development Activities of the Proposed ONPA Expansion Area

Between 1970 and 1998, fifteen exploration wells were drilled by several companies in the Colville Delta/Oooguruk area. Some wells tested oil bearing sands in the Nuiqsut intervals, but at that time, the companies concluded that development was uneconomical. The Texaco Colville Delta 1 well, drilled in 1985, produced 25 °API gravity oil at an average test rate of 273 Barrels Oil Per Day (BOPD) with a maximum rate of 1,075 BOPD. The Texaco Colville Delta 2 well, drilled in 1986, produced 24 °API gravity oil at a final average test rate of 485 BOPD. The Texaco Colville Delta 3 well, also drilled in 1986, produced 27 °API gravity oil at an average test rate of 290 BOPD. The Kalubik 1 well, drilled by ARCO in 1992, tested 23 °API gravity oil in the Nuiqsut sandstone at a rate of 336 BOPD.

In the winter of 2003, Pioneer drilled three exploration wells: Ivik 1, Oooguruk 1, and Natchiq 1. Pioneer fracture-stimulated and tested the Ivik 1 well, which produced oil at an initial rate of 1,300 BOPD. During a four-day test, the Nuiqsut sandstone averaged 964 BOPD.

Rotary sidewall cores were taken across the Nuiqsut interval in both the Ivik 1 and the Oooguruk 1 wells. Analyses of oil samples recovered from the Ivik 1 and Oooguruk 1 wells indicate Nuiqsut oil ranges 19–24 °API gravity, with a viscosity of 4.5–6.5 centipoise. Nuiqsut oil is heavier than 39 °API gravity produced from the Jurassic Alpine Field and is closer in oil gravity to the Kuparuk River Field. Nuiqsut oil also contains 2–4 percent wax by weight. Solution Gas Oil Ratio ranges 250–400 standard cubic feet of gas per stock tank barrel of oil. Original reservoir pressure in the Nuiqsut is 3,250 psi at 6,350 feet true vertical depth subsea. Bubble point pressure is roughly 1,900 psi.

In 2008, Pioneer drilled and completed one horizontal production well (ODSN-40) in the Oooguruk Nuiqsut Reservoir. Tract Operations were approved by the Division for the production of this well in addition to three wells in the overlying Kuparuk interval prior to the approval of the ONPA in August 2009. Pioneer initiated production from the ODSN-40 well within the Oooguruk Nuiqsut PA on August 12, 2008.

The Alaska Oil and Gas Conservation Commission (AOGCC) approved pool rules for the Oooguruk Nuiqsut Reservoir on March 25, 2008 (Conservation Order 597). The stated plans were to develop the Nuiqsut Reservoir with 30 to 39 horizontal wells, split evenly between producers and injectors. Wells are spaced 1,500 feet apart and with horizontal sections up to 9,000' in length.

The AOGCC approved Area Injection Order 34 for the Oooguruk Nuiqsut Reservoir on May 19, 2010, authorizing Water Alternating Gas injection into the Oooguruk-Nuiqsut Oil Pool for the purposes of pressure maintenance and enhanced oil recovery. Injection start-up in the ODSN-38 well began in 2010.

Since coming online in 2008, a total of 28 development wells have been drilled in the ONPA, including 17 production and 11 injection wells. The Nuiqsut reservoir at OU has produced a cumulative oil volume of 23.3 million barrels. As of December 2017, production from the Nuiqsut reservoir is 11,500 BOPD from 13 producing wells.

Through continued development drilling and re-interpretation of seismic data, Caelus has determined that the truncation of the Nuiqsut reservoir along the northwestern portion of the ONPA is located farther to the northwest than Caelus had originally predicted. The recent development wells (ODSN-02, ODSN-04, ODSN-19, ODSN-03, ODSN-10, and ODSN-01A) that Caelus successfully drilled in the northwest part of the OU demonstrate this and also justify the expansion of the ONPA to the northwest.

Expansion of the PA boundary to the southwest portion of the ONPA is supported by the successful Extended Reach Drilling and production from the ODSN-48, ODSN-43, and ODSN-22 development wells.

Conclusion

Caelus has demonstrated through production, well, and engineering data that the proposed expansion area is capable of producing or contributing to the production of hydrocarbons in paying quantities and the acreage is justified for inclusion in the ONPA.

The revision of the ONPA includes all quarter-quarter sections partially or totally within a 1,500-foot radius of the productive section of each operable ONPA well. This defines the estimated areal extent of the existing waterflood pattern drainage area. The allocation of production within the drainage area is based on original oil in place.

The Division reviewed Caelus's geological, geophysical, and engineering data and found that the data submitted justifies the inclusion of the proposed acreage in the ONPA and that tract participations are consistent with ongoing production with expected future development.

4. Plans for Development

The Division approved the OU Twelfth POD on June 26, 2018, effective for the period September 1, 2018 through August 31, 2019. Caelus suspended drilling operations in April 2016 "due to market conditions," however it conducted eight well workovers during the Eleventh POD period. Caelus has no plans for drilling additional wells during the current POD period, however it has plans to conduct ODSN well workovers which include casing repairs and recompletions with new electric submersible pumps during the Twelfth POD period. Caelus will also continue facility maintenance and optimization activities to maximize production.

5. The Economic Costs and Benefits to the State and Other Relevant Factors

The Third Expansion of the ONPA as approved in this decision will provide economic benefits to the State through royalty payments and taxes on production if the activities planned under 2018 or subsequent POD result in recovery of hydrocarbons in the expanded ONPA. Because the acreage is already producing or contributing to production, though, there is no additional direct royalty benefit for that acreage.

B. Decision Criteria Considered Under 11 AAC 83.303(a)

1. Promote Conservation of All Natural Resources

The unitization of oil and gas reservoirs and the formation, expansion, and contraction of participating areas within a unit area to develop oil and gas reservoirs are well-accepted means of maximizing the efficient recovery of oil and gas and minimizing adverse impacts on the surface and other resources. Expansion of the ONPA within an existing unit, with development occurring under the terms of the unit agreement, and approved POD and through existing OU and KRU facilities, promotes efficient, integrated development of the State's oil and gas resources, and minimizes impacts to the area's cultural, biological, and environmental resources.

2. Promote the Prevention of Economic and Physical Waste

Expansion of the ONPA allows for continued development of the Oooguruk Nuiqsut Reservoir. Approval of the Application by this decision will prevent economic and physical waste because the approval will allocate production revenue under the approved tract allocations, equitably allocating production revenues among the WIOs and the State. Approval of the Third Expansion of the ONPA will not result in economic waste given the current well spacing, market demand, and anticipated production rates.

3. The Protection of All Parties of Interest, Including the State

A participating area “must be expanded to include acreage reasonably estimated through use of geological, geophysical, or engineering data to be capable of producing or contributing to the production of hydrocarbons in paying quantities and must be contracted to exclude acreage reasonably proven through the use of geological, geophysical, and engineering data to be incapable of producing hydrocarbons in paying quantities, subject to approval by the commissioner.” 11 AAC 83.351(c).

The Division reviewed confidential geophysical, geological, and engineering data to determine the portion of the acreage proposed for inclusion in the revised ONPA. Caelus has demonstrated that all of the acreage proposed for the ONPA expansion is “reasonably estimated” to be capable of producing or contributing to production of hydrocarbons in paying quantities. In addition, the Division has considered the revised production and cost formula for allocation of costs between the participating areas and the tract participation factors for the allocation of costs within each of the participating areas. The production allocation factors have been adjusted to reflect the drainage area of the wells currently producing, and the allocation of cost has been adjusted to reflect share of unit costs proportionally between each participating area. The Division finds that the revised allocation of production and costs equitably allocates production and costs among the leases comprising the OU PAs.

The people of Alaska have an interest in the development of the State’s oil and gas resources to maximize the economic and physical recovery of the resources. AS 38.05.180(a). Approval of the expanded ONPA under annually updated and approved PODs will provide for continued review and approval of Caelus’s plans to develop the ONPA and OU in a manner which will maximize economic and physical recovery of oil and gas.

IV. FINDINGS AND DECISION

A. The Conservation of All Natural Resources

1. Expansion of the ONPA will provide for continued development of the participating area under the OU Agreement and will maximize the efficient recovery of oil and gas and minimize the adverse impacts on the surface and other resources, including hydrocarbons, gravel, sand, water, wetlands, and valuable habitat.

B. The Prevention of Economic and Physical Waste

1. Caelus submitted geological, geophysical, and engineering data to the Division in support of the Application. Division technical staff determined that the Third Expansion of the ONPA area is “reasonably estimated” to be capable of producing or contributing to production in paying quantities.
2. The available geological, geophysical, and engineering data justify including the lands described in Attachment 1.
3. The production of hydrocarbons through the existing KRU production and processing facilities reduces the incremental environmental impact of the additional production.

Using existing facilities will avoid unnecessary duplication of development efforts on and beneath the surface.

C. The Protection of All Parties of Interest, Including the State

1. The economic, geological, geophysical, and engineering data that Caelus provided reasonably justify the inclusion of the acreage into the revised ONPA under the terms of the applicable regulations governing formation, expansion, and operation of oil and gas units and participating areas (11 AAC 83.301-395) and the terms and conditions under which these lands were leased from the State. Further, the expansion of the ONPA adequately and equitably protects the public interest and is in the State's best interest.
2. The ONPA revision provides for the equitable division of produced hydrocarbons under a POD designed to maximize physical and economic recovery from the reservoir within the participating area. The Division approves Caelus's proposed formula for allocation of the unit hydrocarbon production among those leases in the expanded ONPA.
3. Whenever a participating area (or revision thereof) is approved pursuant to 11 AAC 83.351, Exhibits C, D, E, and F (when relevant) must be timely filed in accordance with the Division's instructions. These Exhibits constitute supporting documents for the purposes of filing NPSL reports prescribed by 11 AAC 83.245. The Division approves Caelus's submission of revised ONPA Exhibits C and D, reflecting the approved revision of the ONPA. Further, the Oooguruk working interest owners shall file Revised NPSL reports (Volume/Value report (VV), Account (AC), and Production Tax Lease Allowance Report (PT) forms) no later than 60 days after the date of this decision or the reports will be subject to Administrative Fee pursuant to 11 AAC 245(h). The VV Form must be revised back to September 1, 2008 and the (AC Form and the PT Form must be revised back to the date of the first capital expenditure. These reports are subject to audit under AS 38.05.036.
4. Caelus shall submit revised operator reports and the lessees shall submit revised royalty reports back to the month of first production from the ONPA September 1, 2008. From this date forward production must be allocated to ONPA as set forth in the approved ONPA tract allocation schedule. Caelus and the lessees shall submit the revised reports within 60 days after the approval of the revision of the ONPA.

For the reasons discussed in this Findings and Decision, subject to conditions set forth above in section IV.C.3, I hereby approve the Third Expansion for ONPA.

An eligible person affected by this decision may appeal it, in accordance with 11 AAC 02. Any appeal must be received within 20 calendar days after the date of "issuance" of this decision, as defined in 11 AAC 02.040(c) and (d) and may be mailed or delivered to Andrew T. Mack, Commissioner, Department of Natural Resources, 550 W. 7th Avenue, Suite 1400, Anchorage, Alaska 99501; faxed to 1-907-269-8918, or sent by electronic mail to dnr.appeals@alaska.gov. This decision takes effect immediately. An eligible person must first appeal this decision in accordance with 11 AAC 02 before appealing this decision to Superior Court. A copy of 11 AAC 02 may be obtained from any regional information office of the Department of Natural Resources.

If you have any questions regarding this decision, please contact Kevin Pike with the Division at (907) 269-8799 or by email at Kevin.Pike@alaska.gov.

Sincerely,



Chantal Walsh,
Director
Division of Oil and Gas

Date July 11, 2018

V. ATTACHMENTS

1. Exhibit C
2. Exhibit D
3. Exhibit E
4. Exhibit F

**Attachment One – Revised Exhibit C:
Oooguruk-Nuiqsut Participating Area Tract Descriptions**

Exhibit C
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Unit Tract #	Lessor & Lease No.	Working Interest Owner	Working Interest	Effective Date	Description	Acreage	Royalty	TOTAL ORR Burden	Unit Tract Participation (OOIP)
4	State of AK ADL 389956	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	T14N, R7E, UMIAT MERIDIAN Sec 22: Protracted, S/2 SE/4	80.00	16.66667% BPO	1.93333% BPO	0.23530%
								3.33333% APO See Details Below	
5	State of AK ADL 389955	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	T14N, R7E, UMIAT MERIDIAN Sec. 23: Protracted, S/2 SW/4	80.00	16.66667% BPO	1.93333% BPO	0.03079%
								3.33333% APO See Details Below	
6	State of AK ADL 389958	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	T14N, R7E, UMIAT MERIDIAN Sec 25: Protracted, SE/4 SE/4, W/2 SE/4, SW/4, S/2 NW/4, NW/4 NW/4 Sec 26: Protracted, All Sec 35: Protracted, All Sec 36: Protracted, All	2,320.00	16.66667%* BPO	1.93333% BPO	17.30640%
								3.33333% APO See Details Below	
7	State of AK ADL 389954	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	T14N, R8E, UMIAT MERIDIAN Sec 31: Protracted, W/2 SE/4, SW/4, S/2 NW/4, NW/4 NW/4	347.25	16.66667%* BPO	1.93333% BPO	0.23025%
								3.33333% APO See Details Below	
9	State of AK ADL 389950	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	T13N, R8E, UMIAT MERIDIAN Sec 5: Protracted, SW/4, SW/4 NW/4 Sec 6: Protracted, All Sec 7: Protracted, All Sec 8: Protracted, W/2	1,773.00	16.66667%* BPO	1.93333% BPO	4.14594%
								3.33333% APO See Details Below	
11	State of AK ADL 389952	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	T13N, R8E, UMIAT MERIDIAN Sec 17: Protracted, NW/4 NW/4 Sec 18: Protracted, N/2, NE/4 SW/4, W/2 SW/4	471.00	16.66667%* BPO	1.93333% BPO	0.00000%
								3.33333% APO See Details Below	
13	State of AK ADL 355036	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-83	T13N, R7E, UMIAT MERIDIAN Sec 1: Protracted, All Sec 2: Protracted, All Sec 3: Protracted, All Sec 10: Protracted, All Sec 11: Protracted, All Sec 12: Protracted, All Sec 13: Protracted, All Sec 14: Protracted, All Sec 15: Protracted, All	5,760.00	12.5%* 30% NPS	Total 5.02139% See Details Below	33.65898%
	UPPER INTERVAL	Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth +100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)							

Exhibit C
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Unit Tract #	Lessor & Lease No.	Working Interest Owner	Working Interest	Effective Date	Description	Acreage	Royalty	TOTAL ORR Burden	Unit Tract Participation (OOIP)
14	State of AK ADL 355037 UPPER INTERVAL	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth +100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)	70.000000% 30.000000%	8-1-83	T13N, R7E, UMIAT MERIDIAN Sec 4: Protracted, All Sec 5: Protracted, E/2, N/2 SW/4, NW/4 Sec 8: Protracted, E/2 E/2, SW/4 SE/4, SE/4 SW/4 Sec 9: Protracted, All Sec 16: Protracted, All Sec 17: Protracted, All Sec 18: Protracted, E/2 NE/4, SW/4 NE/4, NE/4 SE/4	3,520.00	12.5%* 30% NPS	Total 5.076738% See Details Below	28.09625%
15	State of AK ADL 355038 UPPER INTERVAL	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth +100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)	70.000000% 30.000000%	8-1-83	T13N, R7E, UMIAT MERIDIAN Sec 22: Protracted, NE/4, NE/4 SE/4, NE/4 NW/4 Sec 23: Protracted, All Sec 24: Protracted, W/2 E/2, W/2 Sec 25: Protracted, NW/4 NW/4 Sec 26: Protracted, NE/4, E/2 NW/4, NW/4 NW/4	1,680.00	12.5%* 30% NPS	Total 5.076738% See Details Below	1.82816%
16	State of AK ADL 355039 UPPER INTERVAL	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth +100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)	70.000000% 30.000000%	8-1-83	T13N, R7E, UMIAT MERIDIAN Sec 20: Protracted, N/2 Sec 21: Protracted, N/2 NW/4	400.00	12.5%* 30% NPS	Total 5.076738% See Details Below	1.61566%
17	State of AK ADL 389959	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	9-1-02	T14N, R7E, UMIAT MERIDIAN Sec 27: E/2, SW/4, E/2 NW/4 Sec 28: S/2 SE/4 Sec 33: All Sec 34: All	1,920.00	16.66667%*	4.250000% See details below	12.43891%
18	State of AK ADL 389960	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	9-1-02	T14N, R7E, UMIAT MERIDIAN Sec 32: Protracted, SE/4 NE/4, SE/4, S/2 SW/4.	280.00	16.66667%	4.250000% See details below	0.41336%
Total						18,631.25			100.000000%

*The state's royalty interest in ADL 355036, ADL 355037, ADL 355038, ADL 389950, ADL 389952, ADL 389954, ADL 389958, and 389959 is subject to that certain Final Findings and Determination of the Commissioner of DNR dated February 1, 2006 (modifying royalty under the leases in response to the Oooguruk Development Royalty Modification Application filed on May 20, 2005).

Exhibit C
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

WORKING INTEREST OWNERS:

Caelus Natural Resources Alaska, LLC
 3700 Centerpoint Dr., Suite 500
 Anchorage, AK 99503

Eni Petroleum US LLC
 1201 Louisiana St., Suite 3500
 Houston, TX 77002-5609

Tracts 4, 5, 6, 7, 9 & 11 are burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages :

Tracts 4, 5, 6, 7, & 11	William D. Armstrong 1421 Blake Street Denver, CO 80202	1.55680%
	Jesse V. Sommer 4531 West Geddes Avenue Littleton, CO 80128	0.04633%
	Edgar Kerr 6750 Lemon Gulch Dr. Castle Rock, CO 80108	0.04633%
	Jeffery A. Lyslo 91 Buckthorn Drive Littleton, CO 80127	0.04633%
	Reed LJGC, LLC P.O. Box 411 Franktown, CO 80116	0.04633%
	Matthew X. Furin 2001 South Madison Denver, CO 80210	0.04633%
	Richard C. Geesaman 820 Pine Street, Gold Hill Boulder, CO 80302	0.01335%
	Stuart W. Gustafson P.O. Box 1466 La Conner, WA 98257	0.02317%
	Maeco Family Trust P.O. Box 5 Edmonds, WA 98020	0.02317%
	GMT North Slope Royalty Exploration Company LLC 1560 Broadway, Suite 800 Denver, CO 80202	0.08000%
	Chester E. Paris 1208 Mesa Court Golden, CO 80403	0.00520%

The overriding royalty interests noted above affecting Tracts 4, 5, 6, 7, 9 and 11 are set forth in and subject to that certain Development Agreement dated effective November 1, 2002 between Armstrong Resources, LLC and Pioneer Natural Resources Alaska, Inc.

Exhibit C
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Tract 13 is burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages:

Tract 13	XH, LLC	0.25210%
Segment 1	1601 Elm Street, Suite 4700 Dallas, TX 75201	
	Eni Petroleum US LLC 1201 Louisiana, Suite 3500 Houston, TX 77002	0.51429%
	Caelus Natural Resources Alaska, LLC 3700 Centerpoint Dr., Suite 500 Anchorage, AK 99503	1.20000%
	ConocoPhillips Alaska, Inc. 700 G Street Anchorage, AK 00501	2.50000%
	William D. Armstrong ** 1421 Blake Street Denver, CO 80202	0.40400%
	GMT North Slope Royalty Exploration Company LLC ** 1560 Broadway, Suite 800 Denver, CO 80202	0.07400%
	Jesse V. Sommer ** 4531 West Geddes Avenue Littleton, CO 80128	0.01200%
	Edgar Kerr ** 6750 Lemon Gulch Dr. Castle Rock, CO 80108	0.01200%
	Jeffery A. Lyslo ** 91 Buckthorn Drive Littleton, CO 80127	0.01200%
	Reed LIGC, LLC ** P.O. Box 411 Franktown, CO 80116	0.01200%
	Matthew X. Furin ** 2001 South Madison Denver, CO 80210	0.01200%
	Stuart W. Gustafson ** P.O. Box 1466 La Conner, WA 98257	0.00600%
	Macco Family Trust ** P.O. Box 5 Edmonds, WA 98020	0.00600%

Exhibit C
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Chester E. Paris ** 1208 Mesa Court Golden, CO 80403	0.00500%
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** These Overriding Royalty Interests (ORRI) are borne exclusively by Eni Petroleum US LLC and are considered Other Burdens as defined in Article 4.4 of the Oooguruk Unit Operating Agreement and not borne by Caelus Natural Resources Alaska, LLC.

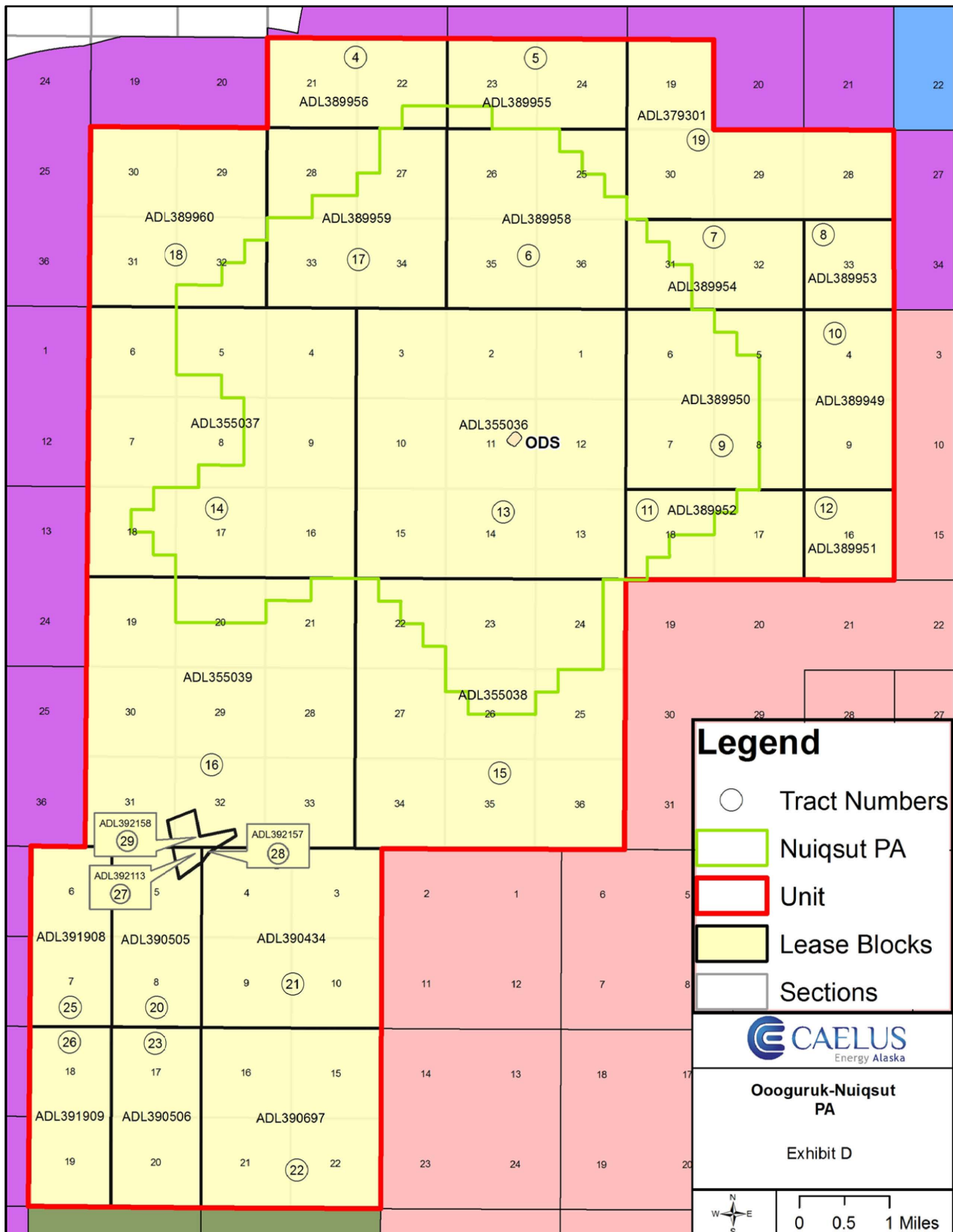
Tracts 14-16 are burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages :

Tracts 14-16 Segment 1	0.09355%
Anadarko Petroleum Corporation P.O. Box 1330 Houston, TX 77251-1330	
David L. Herbaly, as Co-Trustee of the Elmer L. Herbaly Family Trust U/A/D May 24, 2004, as amended 1420 W Canal Ct Ste 150 Littleton, CO 80120	0.67500%
David L. Herbaly as Trustee of the David L. Herbaly Revocable Trust dated May 24, 2004 1420 W Canal Ct Ste 150 Littleton, CO 80120	0.67500%
XH, LLC 1601 Elm Street, Suite 4700 Dallas, TX 75201	0.12605%
George Alan Joyce, Jr. 3528 Eisenhower Lane Plano, TX 75023	0.15000%
Eni Petroleum US LLC 1201 Louisiana, Suite 3500 Houston, TX 77002	0.25714%
Caelus Natural Resources Alaska, LLC 3700 Centerpoint Dr., Suite 500 Anchorage, AK 99503	0.60000%
ConocoPhillips Alaska, Inc. 700 G Street Anchorage, AK 99501	2.50000%

Tracts 17 & 18 are burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages :

Tracts 17 & 18	4.25000%
Anadarko Petroleum Corporation P.O. Box 1330 Houston, TX 77251-1330	

**Attachment Two – Revised Exhibit D:
Oooguruk-Nuiqsut Participating Area Map**



**Attachment Three – Revised Exhibit E:
Ooguruk-Nuiqsut Participating Area Expense Allocation**

Exhibit E
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Unit Tract #	Lessor & Lease No.	Working Interest Owner	Working Interest	Effective Date	Description	Acres	Royalty	TOTAL ORR Burden	PA Expense
4	State of AK ADL 389956	Caelus Natural Resources Alaska, LLC Emi Petroleum US LLC	70.000000% 30.000000%	8-1-02	T14N, R7E, UMIAT MERIDIAN Sec 22: Protracted, S/2 SE/4	80.00	16.66667%	BPO 1.93333% APO 3.33333% See Details Below	0.23530%
5	State of AK ADL 389955	Caelus Natural Resources Alaska, LLC Emi Petroleum US LLC	70.000000% 30.000000%	8-1-02	T14N, R7E, UMIAT MERIDIAN Sec. 23: Protracted, S/2 SW/4	80.00	16.66667%	BPO 1.93333% APO 3.33333% See Details Below	0.03079%
6	State of AK ADL 389958	Caelus Natural Resources Alaska, LLC Emi Petroleum US LLC	70.000000% 30.000000%	8-1-02	T14N, R7E, UMIAT MERIDIAN Sec 25: Protracted, SE/4 SE/4, W/2 SE/4, SW/4, S/2 NW/4, NW/4 NW/4 Sec 26: Protracted, All Sec 35: Protracted, All Sec 36: Protracted, All	2,320.00	16.66667%*	BPO 1.93333% APO 3.33333% See Details Below	17.30640%
7	State of AK ADL 389954	Caelus Natural Resources Alaska, LLC Emi Petroleum US LLC	70.000000% 30.000000%	8-1-02	T14N, R8E, UMIAT MERIDIAN Sec 31: Protracted, W/2 SE/4, SW/4, S/2 NW/4, NW/4 NW/4	347.25	16.66667%*	BPO 1.93333% APO 3.33333% See Details Below	0.23025%
9	State of AK ADL 389950	Caelus Natural Resources Alaska, LLC Emi Petroleum US LLC	70.000000% 30.000000%	8-1-02	T13N, R8E, UMIAT MERIDIAN Sec 5: Protracted, SW/4, SW/4 NW/4 Sec 6: Protracted, All Sec 7: Protracted, All Sec 8: Protracted, W/2	1,773.00	16.66667%*	BPO 1.93333% APO 3.33333% See Details Below	4.14594%
11	State of AK ADL 389952	Caelus Natural Resources Alaska, LLC Emi Petroleum US LLC	70.000000% 30.000000%	8-1-02	T13N, R8E, UMIAT MERIDIAN Sec 17: Protracted, NW/4 NW/4 Sec 18: Protracted, N/2, NE/4 SW/4, W/2 SW/4	471.00	16.66667%*	BPO 1.93333% APO 3.33333% See Details Below	0.00000%
13	State of AK ADL 355036	Caelus Natural Resources Alaska, LLC Emi Petroleum US LLC	70.000000% 30.000000%	8-1-83	T13N, R7E, UMIAT MERIDIAN Sec 1: Protracted, All Sec 2: Protracted, All Sec 3: Protracted, All Sec 10: Protracted, All Sec 11: Protracted, All Sec 12: Protracted, All Sec 13: Protracted, All Sec 14: Protracted, All Sec 15: Protracted, All	5,760.00	12.5%* 30% NPS	Total 5.02139% See Details Below	33.65898%

UPPER INTERVAL
Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth +100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)

Exhibit E
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Unit Tract #	Lessor & Lease No.	Working Interest Owner	Working Interest	Effective Date	Description	Acres	Royalty	TOTAL ORR Burden	PA Expense
14	State of AK ADL 355037 UPPER INTERVAL	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth + 100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)	70.000000% 30.000000%	8-1-83	T13N, R7E, UMIAT MERIDIAN Sec 4: Protracted, All Sec 5: Protracted, E/2, N/2 SW/4, NW/4 Sec 8: Protracted, E/2 E/2, SW/4 SE/4, SE/4 SW/4 Sec 9: Protracted, All Sec 16: Protracted, All Sec 17: Protracted, All Sec 18: Protracted, E/2 NE/4, SW/4 NE/4, NE/4 SE/4	3,520.00	12.5%* 30% NPS	Total 5.076738% See Details Below	28,09625%
15	State of AK ADL 355038 UPPER INTERVAL	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth + 100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)	70.000000% 30.000000%	8-1-83	T13N, R7E, UMIAT MERIDIAN Sec 22: Protracted, NE/4, NE/4 SE/4, NE/4 NW/4 Sec 23: Protracted, All Sec 24: Protracted, W/2 E/2, W/2 Sec 25: Protracted, NW/4 NW/4 Sec 26: Protracted, NE/4, E/2 NW/4, NW/4 NW/4	1,680.00	12.5%* 30% NPS	Total 5.076738% See Details Below	1,82816%
16	State of AK ADL 355039 UPPER INTERVAL	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth + 100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)	70.000000% 30.000000%	8-1-83	T13N, R7E, UMIAT MERIDIAN Sec 20: Protracted, N/2 Sec 21: Protracted, N/2 NW/4	400.00	12.5%* 30% NPS	Total 5.076738% See Details Below	1,61566%
17	State of AK ADL 389959	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	9-1-02	T14N, R7E, UMIAT MERIDIAN Sec 27: E/2, SW/4, E/2 NW/4 Sec 28: S/2 SE/4 Sec 33: All Sec 34: All	1,920.00	16.66667%*	4.250000% See details below	12,43891%
18	State of AK ADL 389960	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	9-1-02	T14N, R7E, UMIAT MERIDIAN Sec 32: Protracted, SE/4 NE/4, SE/4, S/2 SW/4.	280.00	16.66667%	4.250000% See details below	0,41336%
Total						18,631.25			100,000000%

*The state's royalty interest in ADL 355036, ADL 355037, ADL 355038, ADL 355039, ADL 389950, ADL 389952, ADL 389954, ADL 389958, and 389959 is subject to that certain Final Findings and Determination of the Commissioner of DNR dated February 1, 2006 (modifying royalty under the leases in response to the Oooguruk Development Royalty Modification Application filed on May 20, 2005).

Exhibit E
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

WORKING INTEREST OWNERS:

Caelus Natural Resources Alaska, LLC
 3700 Centerpoint Dr., Suite 500
 Anchorage, AK 99503

Eni Petroleum US LLC
 1201 Louisiana St., Suite 3500
 Houston, TX 77002-5609

Tracts 4, 5, 6, 7, 9 & 11 are burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages :

Tracts 4, 5, 6, 7, & 11	William D. Armstrong 1421 Blake Street Denver, CO 80202	1.55680%
	Jesse V. Sommer 4531 West Geddes Avenue Littleton, CO 80128	0.04633%
	Edgar Kerr 6750 Lemon Gulch Dr. Castle Rock, CO 80108	0.04633%
	Jeffery A. Lyslo 91 Buckthorn Drive Littleton, CO 80127	0.04633%
	Reed LIGC, LLC P.O. Box 411 Franktown, CO 80116	0.04633%
	Matthew X. Furin 2001 South Madison Denver, CO 80210	0.04633%
	Richard C. Geesaman 820 Pine Street, Gold Hill Boulder, CO 80302	0.01335%
	Stuart W. Gustafson P.O. Box 1466 La Conner, WA 98257	0.02317%
	Maeco Family Trust P.O. Box 5 Edmonds, WA 98020	0.02317%
	GMT North Slope Royalty Exploration Company LLC 1560 Broadway, Suite 800 Denver, CO 80202	0.08000%
	Chester E. Paris 1208 Mesa Court Golden, CO 80403	0.00520%

The overriding royalty interests noted above affecting Tracts 4, 5, 6, 7, 9 and 11 are set forth in and subject to that certain Development Agreement dated effective November 1, 2002 between Armstrong Resources, LLC and Pioneer Natural Resources Alaska, Inc.

Exhibit E
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Tract 13 is burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages :

Tract 13 Segment 1	XH, LLC 1601 Elm Street, Suite 4700 Dallas, TX 75201	0.25210%
	Eni Petroleum US LLC 1201 Louisiana, Suite 3500 Houston, TX 77002	0.51429%
	Caelus Natural Resources Alaska, LLC 3700 Centerpoint Dr., Suite 500 Anchorage, AK 99503	1.20000%
	ConocoPhillips Alaska, Inc. 700 G Street Anchorage, AK 00501	2.50000%
	William D. Armstrong ** 1421 Blake Street Denver, CO 80202	0.40400%
	GMT North Slope Royalty Exploration Company LLC ** 1560 Broadway, Suite 800 Denver, CO 80202	0.07400%
	Jesse V. Sommer ** 4531 West Geddes Avenue Littleton, CO 80128	0.01200%
	Edgar Kerr ** 6750 Lemon Gulch Dr. Castle Rock, CO 80108	0.01200%
	Jeffery A. Lyslo ** 91 Buckthorn Drive Littleton, CO 80127	0.01200%
	Reed LIGC, LLC ** P.O. Box 411 Franktown, CO 80116	0.01200%
	Matthew X. Furin ** 2001 South Madison Denver, CO 80210	0.01200%
	Stuart W. Gustafson ** P.O. Box 1466 La Conner, WA 98257	0.00600%
	Macco Family Trust ** P.O. Box 5 Edmonds, WA 98020	0.00600%

Exhibit E
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Chester E. Paris ** 1208 Mesa Court Golden, CO 80403	0.00500%
** These Overriding Royalty Interests (ORRI) are borne exclusively by Eni Petroleum US LLC and are considered Other Burdens as defined in Article 4.4.of the Oooguruk Unit Operating Agreement and not borne by Caelus Natural Resources Alaska, LLC.	
<u>Tracts 14-16 are burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages :</u>	
Tracts 14-16	
Segment 1	
Anadarko Petroleum Corporation P.O. Box 1330 Houston, TX 77251-1330	0.09355%
David L. Herbaly, as Co-Trustee of the Elmer L. Herbaly Family Trust U/A/D May 24, 2004, as amended 1420 W Canal Ct Ste 150 Littleton, CO 80120	0.67500%
David L. Herbaly as Trustee of the David L. Herbaly Revocable Trust dated May 24, 2004 1420 W Canal Ct Ste 150 Littleton, CO 80120	0.67500%
XH, LLC 1601 Elm Street, Suite 4700 Dallas, TX 75201	0.12605%
George Alan Joyce, Jr. 3528 Eisenhower Lane Plano, TX 75023	0.15000%
Eni Petroleum US LLC 1201 Louisiana, Suite 3500 Houston, TX 77002	0.25714%
Caelus Natural Resources Alaska, LLC 3700 Centerpoint Dr., Suite 500 Anchorage, AK 99503	0.60000%
ConocoPhillips Alaska, Inc. 700 G Street Anchorage, AK 99501	2.50000%
<u>Tracts 17 & 18 are burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages :</u>	
Tracts 17 & 18	
Anadarko Petroleum Corporation P.O. Box 1330 Houston, TX 77251-1330	4.25000%

**Attachment Four – Revised Exhibit F:
Oooguruk-Nuiqsut Participating Area,
Allocation of Unit Area Expense**

Exhibit F
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Caelus Natural Resources Alaska, LLC, as the Oooguruk Unit Operator, estimates the total Unit economic reserves will be contributed 88.80% from the Nuiqsut PA, 10.00% from the Kuparuk PA and 1.20% from the Torok PA. The current Unit Plan of Development contemplates the drilling a total of 36 wells for Oooguruk development; 5 wells in the Kuparuk, 28 in the Nuiqsut and 3 wells in the Torok. On a relative well count basis 13.889% of the unit wells will be drilled to produce Kuparuk reserves, 77.778% of the unit wells will be drilled to produce Nuiqsut reserves and 8.333% of the unit wells will be drilled to produce Torok reserves. Caelus Natural Resources Alaska, LLC proposes that expenses be broadly captured in four different cost centers and such costs be allocated as follows:

1. Well Costs – Will be first allocated to the specific Participating Area into which the wells are drilled (Kuparuk PA, Nuiqsut PA or Torok PA) and then to each Tract within a PA by the PA Tract Participation factor.
2. Oooguruk Drill Site (ODS) - Costs including all drillsite facilities, (i.e. well-bay modules, flowline manifolds, etc.) will be first allocated to the specific Participating Area by relative well count and then to each Tract within a PA by the PA Tract Participation factor.
3. Flowline Costs – Costs include all downstream of the ODS, include sub-sea three-phase production, gas, water and diesel flowlines, shore crossing and above ground vertical support member supported flowlines and all facilities at the Onshore Tie-in Pad (OTP). These will be first allocated to the specific Participating Area by relative total reserves contribution and then to each Tract within a PA by the PA Tract Participation factor.
4. Gas Injection Costs - Costs include compression and injection equipment and will be first allocated exclusively to the Nuiqsut PA and then to each Tract within said PA by the PA Tract Participation factor.

Unit Tract	Lessor & Lease	Working Interest Owner	Working Interest	Effective Date	Description	Acreage	Royalty	TOTAL ORR Burden	Unit Tract OOIP Allocation	Relative Reserve Allocation (0.888 x Tract Allocation)	Well Count Allocation (28/36 x Tract Allocation)
4	State of AK ADL 389956	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	TL4N, R7E, UMIAT MERIDIAN	80.00	16.66667%	BPO	0.23530%	0.21%	0.183%
					Sec 22: Protracted, S/2 SE/4			APO 3.33333% See Details Below			
5	State of AK ADL 389955	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	TL4N, R7E, UMIAT MERIDIAN	80.00	16.66667%	BPO	0.03079%	0.03%	0.024%
					Sec. 23: Protracted, S/2 SW/4			APO 3.33333% See Details Below			
6	State of AK ADL 389958	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	TL4N, R7E, UMIAT MERIDIAN	2,320.00	16.66667%*	BPO	17.30640%	15.37%	13.461%
					Sec 25: Protracted, SE/4 SE/4, W/2 SE/4, SW/4, S/2 NW/4, NW/4 NW/4 Sec 26: Protracted, All Sec 35: Protracted, All Sec 36: Protracted, All			APO 3.33333% See Details Below			
7	State of AK ADL 389954	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	TL4N, R8E, UMIAT MERIDIAN	347.25	16.66667%*	BPO	0.23025%	0.20%	0.179%
					Sec 31: Protracted, W/2 SE/4, SW/4, S/2 NW/4, NW/4 NW/4			APO 3.33333% See Details Below			
9	State of AK ADL 389950	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	TL3N, R8E, UMIAT MERIDIAN	1,773.00	16.66667%*	BPO	4.14594%	3.68%	3.225%
					Sec 5: Protracted, SW/4, SW/4 NW/4 Sec 6: Protracted, All Sec 7: Protracted, All Sec 8: Protracted, W/2			APO 3.33333% See Details Below			

Exhibit F
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Unit Tract	Lessor & Lease	Working Interest Owner	Working Interest	Effective Date	Description	Acceage	Royalty	TOTAL ORR Burden	Unit Tract OOIIP Allocation	Relative Reserve Allocation (0.888 x Tract Allocation)	Well Count Allocation (28/36 x Tract Allocation)
11	State of AK ADL 389952	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-02	T13N, R8E, UMIAT MERIDIAN Sec 17: Protracted, NW/4 NW/4 Sec 18: Protracted, N/2, NE/4 SW/4, W/2 SW/4	471.00	16.66667%*	BPO 1.933333%	0.00000	0.00%	0.0000%
13	State of AK ADL 355036 UPPER INTERVAL	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth +100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)	70.000000% 30.000000%	8-1-83	T13N, R7E, UMIAT MERIDIAN Sec 1: Protracted, All Sec 2: Protracted, All Sec 3: Protracted, All Sec 10: Protracted, All Sec 11: Protracted, All Sec 12: Protracted, All Sec 13: Protracted, All Sec 14: Protracted, All Sec 15: Protracted, All	5,760.00	12.5%* 30% NPS	Total 5.02139% See Details Below	33.65898%	29.89%	26.179%
14	State of AK ADL 355037 UPPER INTERVAL	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth +100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)	70.000000% 30.000000%	8-1-83	T13N, R7E, UMIAT MERIDIAN Sec 4: Protracted, All Sec 5: Protracted, E/2, N/2 SW/4, NW/4 Sec 8: Protracted, E/2 E/2, SW/4 SE/4, SE/4 SW/4 Sec 9: Protracted, All Sec 16: Protracted, All Sec 17: Protracted, All Sec 18: Protracted, E/2 NE/4, SW/4 NE/4, NE/4 SE/4	3,520.00	12.5%* 30% NPS	Total 5.076738% See Details Below	28.09625%	24.95%	21.853%
15	State of AK ADL 355038 UPPER INTERVAL	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth +100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)	70.000000% 30.000000%	8-1-83	T13N, R7E, UMIAT MERIDIAN Sec 22: Protracted, NE/4, NE/4 SE/4, NE/4 NW/4 Sec 23: Protracted, All Sec 24: Protracted, W/2 E/2, W/2 Sec 25: Protracted, NW/4 NW/4 Sec 26: Protracted, NE/4, E/2 NW/4, NW/4 NW/4	1,680.00	12.5%* 30% NPS	Total 5.076738% See Details Below	1.82816%	1.62%	1.422%

Exhibit F
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Unit Tract	Lessor & Lease	Working Interest Owner	Working Interest	Effective Date	Description	Acceage	Royalty	TOTAL ORR Burden	Unit Tract OOIIP Allocation	Relative Reserve Allocation (0.888 x Tract Allocation)	Well Count Allocation (28/36 x Tract Allocation)
16	State of AK ADL 355039	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	8-1-83	T14N, R7E, UMIAT MERIDIAN Sec 20: Protracted, N/2 Sec 21: Protracted, N/2 NW/4	400.00	12.5%* 30% NPS	Total 5.076738% See Details Below	1.61566%	1.43%	1.257%
	UPPER INTERVAL	Upper Interval (i.e. the interval from the surface down to the stratigraphic equivalent of 8,373' (Driller's total depth +100') which is equivalent to 8,402' (Wireline Logger's total depth + 100') below the Kelly Bushing as shown on the Dual Laterolog Run #3 log dated April 5, 1992, in the ARCO-Kalubik #1 well located in Sec. 11, T.13 N., R. 7 E., U.M. known in the DNR computer records as "Segment 1" of the Lease.)									
17	State of AK ADL 389959	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	9-1-02	T14N, R7E, UMIAT MERIDIAN Sec 27: E/2, SW/4, E/2 NW/4 Sec 28: S/2 SE/4 Sec 33: All Sec 34: All	1,920.00	16.66667%*	4.250000% See details below	12.43891%	11.05%	9.675%
18	State of AK ADL 389960	Caelus Natural Resources Alaska, LLC Eni Petroleum US LLC	70.000000% 30.000000%	9-1-02	T14N, R7E, UMIAT MERIDIAN Sec 32: Protracted, SE/4 NE/4, SE/4, S/2 SW/4	280.00	16.66667%	4.250000% See details below	0.41336%	0.37%	0.322%
Total						18,631.25			100.000000%	88.80%	77.778%

*The state's royalty interest in ADL 355036, ADL 355037, ADL 355038, ADL 355039, ADL 389950, ADL 389952, ADL 389954, ADL 389958, and 389959 is subject to that certain Final Findings and Determination of the Commissioner of DNR dated February 1, 2006 (modifying royalty under the leases in response to the Oooguruk Development Royalty Modification Application filed on May 20, 2005).

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Nuiqsut Participating Area

WORKING INTEREST OWNERS:

Caelus Natural Resources Alaska, LLC
 3700 Centerpoint Dr., Suite 500
 Anchorage, AK 99503

Eni Petroleum US LLC
 1201 Louisiana St., Suite 3500
 Houston, TX 77002-5609

Tracts 4, 5, 6, 7, 9 & 11 are burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages:

Tracts 4, 5, 6, 7, & 11	William D. Armstrong 1421 Blake Street Denver, CO 80202	1.55680%
	Jesse V. Sommer 4531 West Geddes Avenue Littleton, CO 80128	0.04633%
	Edgar Kerr 6750 Lemon Gulch Dr. Castle Rock, CO 80108	0.04633%
	Jeffery A. Lyslo 91 Buckthorn Drive Littleton, CO 80127	0.04633%
	Reed LJGC, LLC P.O. Box 411 Franktown, CO 80116	0.04633%
	Matthew X. Furin 2001 South Madison Denver, CO 80210	0.04633%
	Richard C. Geesaman 820 Pine Street, Gold Hill Boulder, CO 80302	0.01335%
	Stuart W. Gustafson P.O. Box 1466 La Conner, WA 98257	0.02317%
	Maeco Family Trust P.O. Box 5 Edmonds, WA 98020	0.02317%
	GMT North Slope Royalty Exploration Company LLC 1560 Broadway, Suite 800 Denver, CO 80202	0.08000%
	Chester E. Paris 1208 Mesa Court Golden, CO 80403	0.00520%

The overriding royalty interests noted above affecting Tracts 4, 5, 6, 7, 9 and 11 are set forth in and subject to that certain Development Agreement dated effective November 1, 2002 between Armstrong Resources, LLC and Pioneer Natural Resources Alaska, Inc.

Exhibit F
Attached to and made a part of that certain Oooguruk Unit Agreement
Nuiqsut Participating Area

Tract 13 is burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages:

Tract 13	XH, LLC	0.25210%
Segment 1	1601 Elm Street, Suite 4700 Dallas, TX 75201	
	Eni Petroleum US LLC	0.51429%
	1201 Louisiana, Suite 3500 Houston, TX 77002	
	Caelus Natural Resources Alaska, LLC	1.20000%
	3700 Centerpoint Dr., Suite 500 Anchorage, AK 99503	
	ConocoPhillips Alaska, Inc.	2.50000%
	700 G Street Anchorage, AK 00501	
	William D. Armstrong **	0.40400%
	1421 Blake Street Denver, CO 80202	
	GMT North Slope Royalty Exploration Company LLC **	0.07400%
	1560 Broadway, Suite 800 Denver, CO 80202	
	Jesse V. Sommer **	0.01200%
	4531 West Geddes Avenue Littleton, CO 80128	
	Edgar Kerr **	0.01200%
	6750 Lemon Gulch Dr. Castle Rock, CO 80108	
	Jeffery A. Lyslo **	0.01200%
	91 Buckthorn Drive Littleton, CO 80127	
	Reed LIGC, LLC **	0.01200%
	P.O. Box 411 Franktown, CO 80116	
	Matthew X. Furrin **	0.01200%
	2001 South Madison Denver, CO 80210	
	Stuart W. Gustafson **	0.00600%
	P.O. Box 1466 La Conner, WA 98257	
	Maeco Family Trust **	0.00600%
	P.O. Box 5 Edmonds, WA 98020	

Exhibit F
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Nuiqsut Participating Area

Chester E. Paris ** 1208 Mesa Court Golden, CO 80403	0.005000%
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** These Overriding Royalty Interests (ORRI) are borne exclusively by Eni Petroleum US LLC and are considered Other Burdens as defined in Article 4.4.of the Oooguruk Unit Operating Agreement and not borne by Caelus Natural Resources Alaska, LLC.

Tracts 14-16 are burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages:

Tracts 14-16 Segment I		0.09355%
Anadarko Petroleum Corporation P.O. Box 1330 Houston, TX77251-1330		
David L. Herbaly, as Co-Trustee of the Elmer L. Herbaly Family Trust U/A/D May 24, 2004, as amended 1420 W Canal Ct Ste 150 Littleton, CO 80120		0.675000%
David L. Herbaly as Trustee of the David L. Herbaly Revocable Trust dated May 24, 2004 1420 W Canal Ct Ste 150 Littleton, CO 80120		0.675000%
XH, LLC 1601 Elm Street, Suite 4700 Dallas, TX 75201		0.12605%
George Alan Joyce, Jr. 3528 Eisenhower Lane Plano, TX 75023		0.150000%
Eni Petroleum US LLC 1201 Louisiana, Suite 3500 Houston, TX 77002		0.25714%
Caelus Natural Resources Alaska, LLC 3700 Centerpoint Dr., Suite 500 Anchorage, AK 99503		0.600000%
ConocoPhillips Alaska, Inc. 700 G Street Anchorage, AK 99501		2.500000%

Tracts 17 & 18 are burdened by Overriding Royalties ("ORRI") held by the following parties in the stated percentages:

Tracts 17 & 18		4.250000%
Anadarko Petroleum Corporation P.O. Box 1330 Houston, TX77251-1330		