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June 30, 2017 ER-2017-OUT-167



JUN 3 0 2017

Ms. Chantal Walsh Director, Division of Oil & Gas Alaska Department of Natural Resources (DNR) 550 W. 7th Avenue, Ste. 1100 Anchorage, Alaska 99501-3560

DIVISION OF OIL AND GAS

Dear Director Walsh,

ExxonMobil Alaska Production Inc., as Point Thomson Unit (PTU) Operator and on behalf of the PTU Working Interest Owners (WIOs), hereby submits the enclosed PTU Expansion Planning Plan of Development (POD), in accordance with Paragraph 4.6.2 of the Point Thomson Settlement Agreement, dated March 29, 2012.

This POD covers the period April 2, 2017 through December 31, 2019, or the effective date of an Expansion Project POD or Major Gas Sale (MGS) POD, if an Expansion Project commitment or MGS sanction occurs earlier as set forth in Paragraph 4.6.2. The POD supplements the work plans as described in Paragraphs 4.1.1 through 4.1.4 for the Initial Production System. In addition, the POD outlines work completed to date and work planned during the POD period for evaluation and potential selection of a development option for the Point Thomson Reservoir through a Point Thomson Expansion Project, consistent with the terms of the Settlement Agreement.

While the preferred future development for the Point Thomson resource would be through an MGS project, such as a State LNG project, the WIOs are submitting this Expansion Planning POD since an MGS project was not sanctioned by June 1, 2016.

ExxonMobil will continue to work to make gas from PTU available to any MGS project (including a State LNG project) under bilateral, mutually-agreed and commercially reasonable terms.

Questions can be directed to Luke Motteram at 907-564-3697 or through email at luke.a.motteram@exxonmobil.com.

Sincerely,

Cory E. Quarles

CEQ/lam/rlr

Attachment

cc w/attachment: Darrell Becker, ExxonMobil

Damian Bilbao, BP Exploration (Alaska) Inc.

Keith Breiner, ExxonMobil

Rebecca Kruse, DNR/DO&G, PTU WIO

Andy Mack, DNR Commissioner Jon Schultz, ConocoPhillips Alaska Mark Wiggin, DNR Deputy Commissioner



# Point Thomson Unit Plan of Development (POD) 7/1/2017

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#### Introduction

This Point Thomson Unit Expansion Planning Plan of Development (POD) is submitted to the Alaska Department of Natural Resources by ExxonMobil Alaska Production Inc., Point Thomson Unit (PTU) operator, under Paragraph 4.6.2 of the Settlement Agreement, dated March 29, 2012.

This POD covers the period April 2, 2017 through December 31, 2019, or the effective date of an Expansion Project POD or Major Gas Sale (MGS) POD, if an Expansion Project commitment or MGS sanction occurs earlier as set forth in Paragraph 4.6.2. The POD outlines work completed to date and work plans during the POD period, for evaluation and potential selection of an option for development of the Point Thomson Reservoir through a Point Thomson Expansion Project, consistent with the terms of the Settlement Agreement. The work plans described in this POD do not indicate that the PTU Working Interest Owners (WIOs) have committed to any Point Thomson Expansion Project. The Expansion Planning POD also supplements the work plans set forth in Paragraphs 4.1.1 through 4.1.4 for the Initial Production System.

# **Field Development Status**

The Point Thomson Unit (PTU or Unit) is located along the coast of the Beaufort Sea on the eastern Alaska North Slope. Existing Unit infrastructure and potential additional development within the PTU is located approximately: 22 miles east of the Badami development; 60 miles east of Prudhoe Bay; three miles west of the Staines River; and 60 miles west of Kaktovik.

The primary resource is natural gas, with entrained condensate, contained within high pressure sands of the Thomson reservoir, which is predominantly offshore and underlies State water and land. Delineated by 22 wells drilled in and around the Unit since the early 1970s, the Thomson reservoir represents a significant portion (approximately 25%) of known and recoverable natural gas resources on the North Slope. As such, PTU is positioned to underpin any Alaska North Slope MGS project.

From 2012-2016, ExxonMobil constructed the Point Thomson Initial Production System (IPS), a high pressure (10,000 psi) gas cycling project utilizing industry-first reciprocal injection compressors, initiating production from the Thomson reservoir and delivering condensate for sale. The separated gas is compressed and injected back, or "cycled" into the reservoir, with condensate transported through the Point Thomson Export Pipeline (PTEP) for delivery to the Trans-Alaska Pipeline System (TAPS) common carrier pipeline. The scope of the IPS Project includes infrastructure, wells and facilities designed to cycle 200 million standard cubic feet per day (mmscfd) of natural gas and deliver up to 10,000 barrels per day (bpd) of condensate to TAPS.

Start-up of the IPS facility occurred April 2, 2016 with gas and condensate production from the PTU-15 well on Central Pad. Gas reinjection into the Thomson reservoir via the PTU-16 well on Central Pad commenced April 16, 2016.

In May, the PTU-15 production well was converted to gas injection service. Gas and condensate production from the PTU-17 well located on West Pad commenced May 28, 2016. First gas reinjection into PTU-15 occurred June 5, 2016.

Production exceeded 200 mmscfd of gas cycling and 10,000 bpd condensate on December 20, 2016.

## **IPS Operations**

#### 1. POD Requirements

The following sections supplement the work plans for the IPS, set forth in Paragraphs 4.1.1 through 4.1.4 of the Settlement Agreement. With start-up of the IPS facilities on April 2, 2016, the PTU-15, PTU-16 and PTU-17 (West Pad) wells have been placed on Continuous Operations to cycle 200 mmscfd gas from the Thomson Sand and deliver 10,000 bpd condensate to TAPS. Data and information regarding production, well and reservoir performance, IPS facility performance and transportation system operations have been collected to assist in further development planning and decisions.

## 2. Reservoir Management

The reservoir management strategy for the Thomson Sand is to re-inject produced gas to maintain reservoir pressure for condensate recovery and conserve the gas for future development. The IPS also provides information about gas condensate production and reservoir connectivity to assist in subsequent development plans.

Well and reservoir performance to date has been in line with expectations. Early pressure and production data support reservoir connectivity as predicted by reservoir models. Initial bottomhole pressures recorded during drilling of the IPS wells exhibited consistent gradients, indicating static communication between the wells. Interference during initial production from PTU-17 in late May 2016 was observed at the downhole pressure gauge in PTU-15. A response at the downhole pressure gauge in PTU-16 was also observed in July 2016 during initial injection into PTU-15. This is indicative of dynamic communication between the wells and good connectivity across the reservoir.

Producing condensate yield calculated from metered gas and condensate volumes has been consistent with expectations, approximately 50 barrels per mmscf of gas.

Reservoir surveillance plans include the collection of surface wellhead and downhole pressure and temperature data to monitor reservoir pressure, well productivity and injectivity. Casing annulus pressures will continue to be recorded to monitor integrity of the wells.

Pressure and temperature data will be complemented by well production and injection rates, together with metered condensate, gas and water volumes. The information will be used to calculate gas-condensate ratio, water cut and voidage replacement for the field.

# 3. Drilling

No additional IPS wells are anticipated or planned in the POD period.

#### 4. Facilities

The IPS Central Pad processing facilities have achieved production at and greater than design rates of 200 mmscfd cycled gas and 10,000 bpd condensate. There is unlikely to be significant excess capacity available based on facilities performance data acquired to date with injection compressors operating

with recycle valves fully closed. Paragraph 4.1.1.4 of the Settlement Agreement provides that after IPS Project Start-up, the WIOs shall identify and pursue debottlenecking work to increase the capacity of the installed facilities. Opportunities to optimize operating variables, such as the first stage separator pressure and temperature, and increase condensate production will be evaluated during the course of ongoing operations.

Utility systems have not demonstrated a constraint to production to date. Based on observed excess capacity, utilities are not anticipated to be a limiting factor in any further optimization.

Production to date has been impacted by gas injection compressor availability and reliability. Several redesign and realignment efforts have been implemented to improve gas injection uptime while better understanding the operation of these industry-first compressors.

Continued operation of the IPS facilities is planned during the POD period.

## **Major Gas Sales**

The preferred future development for this resource is through an MGS project, such as a State LNG project.

The WIOs remain committed to support any viable MGS project. However, since an MGS project was not sanctioned by June 1, 2016, the WIOs are submitting this Expansion Planning POD as set forth in the Settlement Agreement.

## **POD Requirements**

Under Paragraph 4.6.2 of the Settlement Agreement, if an MGS project has not been sanctioned by June 1, 2016, the WIOs must begin engineering and permitting of a Point Thomson Expansion Project. Thereafter, the WIOs must submit a Future POD that includes work plans for evaluation and selection of an option for development of the Point Thomson Reservoir through a Point Thomson Expansion Project. Consistent with these terms, the following sections outline engineering and permitting work undertaken on a Point Thomson Expansion (PTEx) Project, and work plans for activities during the POD period for evaluation and selection of a PTEx Project. This POD scope addresses information set forth in Paragraph 4.6.4 of the Settlement Agreement:

- (a) Data acquisition and technical evaluations and qualifications to support the development plan;
- (b) Well planning, including identification of the number of drill wells, well locations, and completion plans;
- (c) Project design basis and engineering plans for infrastructure, well pads, and process facilities;
- (d) Acquisition of permits and other approvals to accommodate drilling, construction, production transportation, and operations;
- (e) Operation and maintenance considerations;
- (f) Construction and start-up, including estimated timing to complete the work activities;
- (g) Logistics; and
- (h) Safety, security, health and environmental considerations.

In addition to the work activities set forth in this POD, each WIO will need to undertake economic evaluations and other business assessments in determining whether to proceed with an expansion option. The work scope contained in the POD would allow for, but does not ensure the WIOs will commit to the PTEx project.

## **Engineering and Permitting Work on PTEx Project Planning**

#### 1. Evaluation of Gas Injection into Prudhoe Bay

The WIOs evaluated expansion project development options consistent with the Settlement Agreement provisions. This included leveraging work completed on Point Thomson gas export in support of the Alaska LNG Project sponsored by ExxonMobil, BP, ConocoPhillips and the Alaska Gasline Development Corporation (AK LNG), past cycling studies, and previous evaluations of injecting gas from Point Thomson into the Prudhoe Bay Unit (PBU) reservoir. Integrating these work products, along with considerations that included a potential future North Slope MGS, led to a decision to progress evaluation of gas injection into the PBU reservoir.

The PTEx concept that is being evaluated would produce gas from Point Thomson, export the condensate via the TAPS network and deliver the gas for injection into the PBU Ivishak reservoir for pressure support and enhanced oil recovery. Various drilling and facility configurations were included in this evaluation. A gas rate of 920 mmscfd is the current project design basis. This rate reflects preferred operation during the period of injection into Prudhoe Bay while also installing necessary infrastructure for a potential MGS.

#### 2. PTEx Project Overview

The following description is the current project concept for evaluating PTEx.

PTEx would expand existing IPS facilities and infrastructure to enable peak production of greater than 50,000 bpd of condensate through the existing PTEP and into TAPS. PTEx would produce approximately 920 mmscfd of dehydrated and conditioned gas for injection into the PBU Ivishak reservoir via existing compression facilities at PBU. A 62.5 mile, 32" diameter Point Thomson Gas Line (PTGL) constructed between Point Thomson and Prudhoe Bay would transport the natural gas. Most of the process equipment for the IPS would be mothballed once the PTEx facility is built, while the majority of the IPS utilities systems would be fully integrated into the expansion project. PTEx contemplates drilling of three new wells (two new Central Pad production wells and one additional disposal well) with the two IPS injection wells converted to producers.

The existing Central Pad is currently 50 acres in size and contains IPS facilities, infrastructure, and wells. The equipment and area on the Central Pad would be used for PTEx to the extent practicable. An expansion of the southwest portion of Central Pad would be the tentative location of the PTEx process facilities and associated infrastructure.

There are three existing wells on Central Pad: PTU-15 and PTU-16 (which are currently being used for gas injection) and DW-1 (a disposal well). For PTEx, PTU-15 and PTU-16 would be converted to producer wells. Two new production wells and one new disposal well would be drilled at Central Pad.

Produced natural gas would be delivered from West and Central Pad to the Central Processing Facility (CPF). Condensate would be separated and stabilized before being metered and pumped into the

existing export pipeline (PTEP). Produced water would be separated and injected into one of the EPA Underground Injection Control (UIC) Class I waste disposal wells. Separated gas would be dehydrated and conditioned before delivery to PBU through the new PTGL.

PTEx would use infrastructure from the IPS project including main, essential and standby power generating equipment, permanent personnel camps, associated water and waste disposal facilities, office, shop and warehouse space to support drilling and permanent operations. Diesel and methanol storage tanks would also be located at the Central Pad. Space for drilling operations would be allotted on the Central Pad, including space to support tubular storage, cuttings storage, grind and injection equipment (for injection of cuttings into the disposal well) or cuttings storage, and a bulk mud plant.

## 3. Permitting

During 2016 and 2017, prior to POD submission, the project team leveraged permitting work completed for Point Thomson gas export in support of AK LNG Pre-FEED as well as permitting work accomplished for the IPS Project. A meeting was held with the US Army Corps of Engineers to initiate dialogue and describe elements of a PTEx Project compared to previous material related to Point Thomson facilities associated with AK LNG.

## 4. Commercial Agreements

During 2016 and 2017, prior to POD submission, the WIOs initiated work to identify commercial agreements that would be needed to inject gas from Point Thomson into the PBU reservoir.

#### 5. Construction, Start-up and Logistics

During 2016 and 2017, prior to POD submission, IPS Project construction and logistics Lessons Learned, along with plans developed for Point Thomson gas export to AK LNG, were leveraged to evaluate PTU expansion options and further evaluate the concept of injecting PTU gas into the PBU reservoir. Given tight weather windows and seasonal work activities, managing North Slope work hours and logistics is a significant driver of project success at Point Thomson.

# 6. Operations & Maintenance (O&M)

During 2016 and 2017, prior to POD submission, existing Operations Personnel were consulted to incorporate O&M aspects into the evaluation of development options. Multiple Lessons Learned sessions were conducted that included Project and Operations Personnel from the IPS.

# 7. Safety, Security, Health & Environmental

During 2016 and 2017, prior to POD submission, existing Safety, Security, Health and Environmental (SSH&E) and Operations Integrity Management System (OIMS) procedures were leveraged in the evaluation of development options.

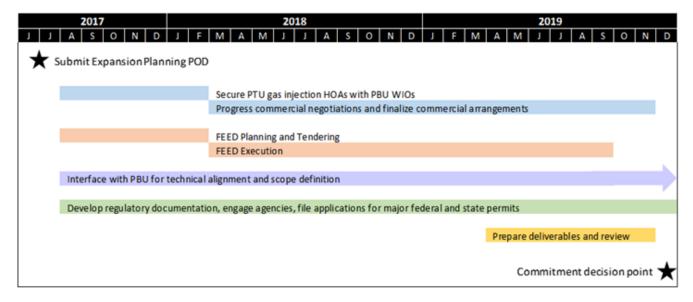
## Work Plans during the POD Period for Evaluation and Selection of a PTEx Project

#### 1. Overview of Activities and Schedule

Activities to support evaluation and potential selection of a development option during the POD period are as follows:

- Negotiate and develop commercial arrangements with PBU WIOs to inject PTU gas into the PBU reservoir. Securing Heads of Agreement (HOAs) or other necessary commercial arrangements with PBU for injection of PTU gas will be necessary to allow FEED activities to move forward.
- 2) FEED Planning, Tendering and Execution
- 3) Interface with PBU for technical alignment and scope definition
- 4) Develop regulatory documentation, engage agencies, and file applications for major federal and state permits
- 5) Prepare deliverables for review and decision

Actual schedule could vary based on progress and achievement of the described work activity.



# 2. FEED – Technical Evaluation and Well Planning

If funded, FEED would progress PTEx technical and execution definition for facilities, construction planning, logistics, operations and maintenance, along with interfaces at PBU and updated cost estimation, providing necessary input to allow the WIOs to decide whether to commit to PTEx consistent with the Settlement Agreement milestones. The FEED phase would include development of P&IDs, module design and layouts. The FEED work scope includes development of the necessary details pertaining to Construction, Start-up and Logistics, Operations & Maintenance, SSHE, and Data Acquisition.

Additionally, the FEED phase would address completion of a subsurface and drilling basis that optimizes well placement and provides a preliminary well design, well count, execution schedule, and completion plan. Technology qualifications for drilling may be needed, including the design and testing of high density gravel pack carrier fluid options, qualification status of a mill to produce 9-5/8" SM2535 production tubing, and qualification of an open-hole gravel pack packer.

## 3. Permitting

The PTEx schedule reflects the preparation and filing of applications for major Federal and State permits, authorizations, certificates or rights of way associated with construction of the project. These include a Draft Department of Army (Section 404/10) application and other major State applications for filing, as well as supporting documents to facilitate agency evaluation of those applications and any related NEPA review. Supporting documents include the Project Description and Environmental Report. Additional meetings with State and Federal agencies would take place as part of that process.

## 4. Commercial Agreements

The WIOs will need to have a clear understanding of the commercial arrangements for gas injection at PBU. Sufficient clarity and certainty regarding terms, either through a Heads of Agreements (HOAs) or otherwise, will be necessary to allow FEED funding and the work activity to move forward. Achieving commercial agreement is a key requirement for supporting an Owner decision to advance PTEx. In addition, those commercial arrangements would likely need to be in place to allow for PTU gas to be available for commitment to an MGS project, which would include a State LNG project.

#### 5. Construction, Start-up and Logistics

During FEED, a Construction Plan is planned to be defined that outlines key activities, sequencing, and durations. A Logistics Plan will be developed that addresses how people and material will be transported to and from site. This plan includes the number and timing of personnel at site, integration of module fabrication with work completed at site, and tie-ins to existing infrastructure/facilities.

## 6. Operations & Maintenance (O&M)

During the POD Period, an O&M Plan will be developed to provide input to constructability, RAM (Reliability, Availability and Maintainability), and simultaneous operations / brownfield planning activities. O&M planning addresses people and material logistics, support contracts, inspections/maintenance schedules, adequacy of communications, etc. Interfacing with IPS Operations personnel would be critical to developing a plan to allow efficiently moving to operating an expansion facility.

## 7. Safety, Security, Health & Environmental

SSH&E and OIMS Plans are planned to be developed during the POD period to support Project planning. Integration or interface with existing plans or procedures implemented for PTU Operations would be addressed where applicable through bridging or interface documents

Emergency preparedness and response would also be addressed in FEED to ensure a plan is in place for the preparation, training, and resources that would provide for rapid and thorough response to emergency situations.

## 8. Data Acquisition

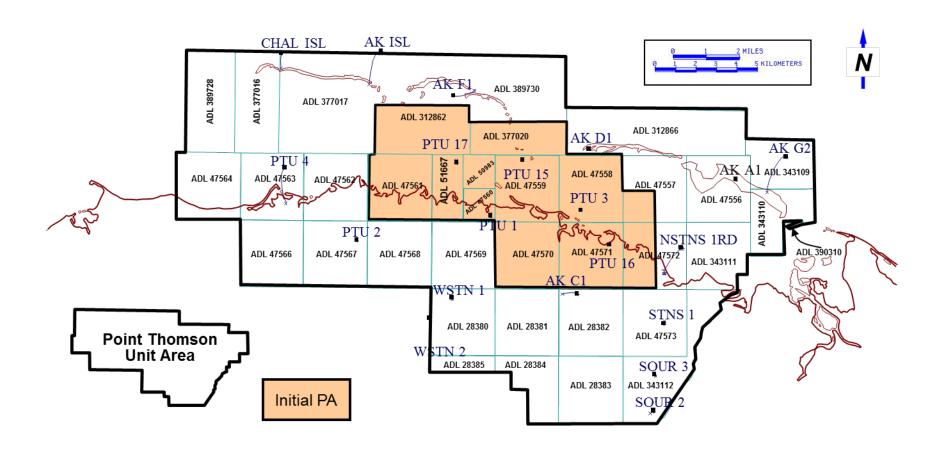
Data acquisition and analysis associated with IPS operations is addressed in the Reservoir Management section.

Data and information that will be obtained during IPS operations regarding production, well, reservoir and facility performance will assist in evaluation of development plans and provide data to support expansion facility design.

Calibration of existing hydraulic models for the IPS wells, West Pad gathering line and PTEP with operational data would underpin process design data for the facility. Power loads of IPS infrastructure and utility systems performance would be used during FEED to determine any incremental additions required for expansion. Data from start-ups/shutdowns would be used for preliminary planning during FEED.

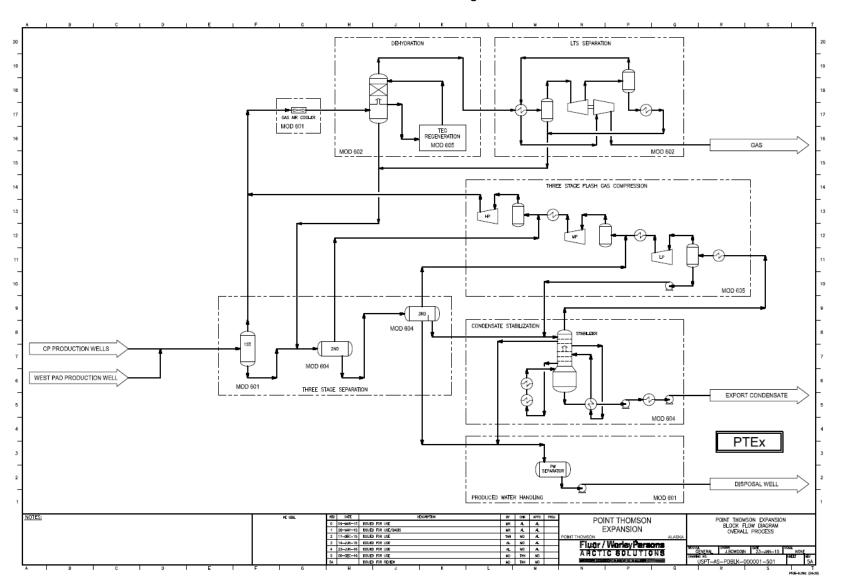


## **Attachment 1: Unit Map**



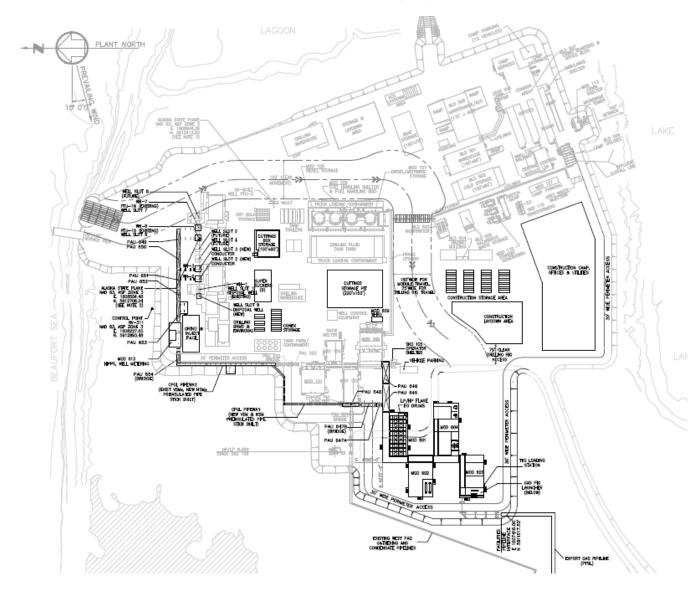
#### **Attachment 2: Facilities Schematics**

## Block Flow Diagram



## **Attachment 2: Facilities Schematics**

## PTU Central Pad plot plan



## **Attachment 2: Facilities Schematics**

3D Rendering of Proposed Central Pad and New Facilities (IPS in Monochrome)



**Attachment 3: Point Thomson Gas Line route** 

