



Senate Resources Committee

22 February 2012

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Director
Division of Oil and Gas





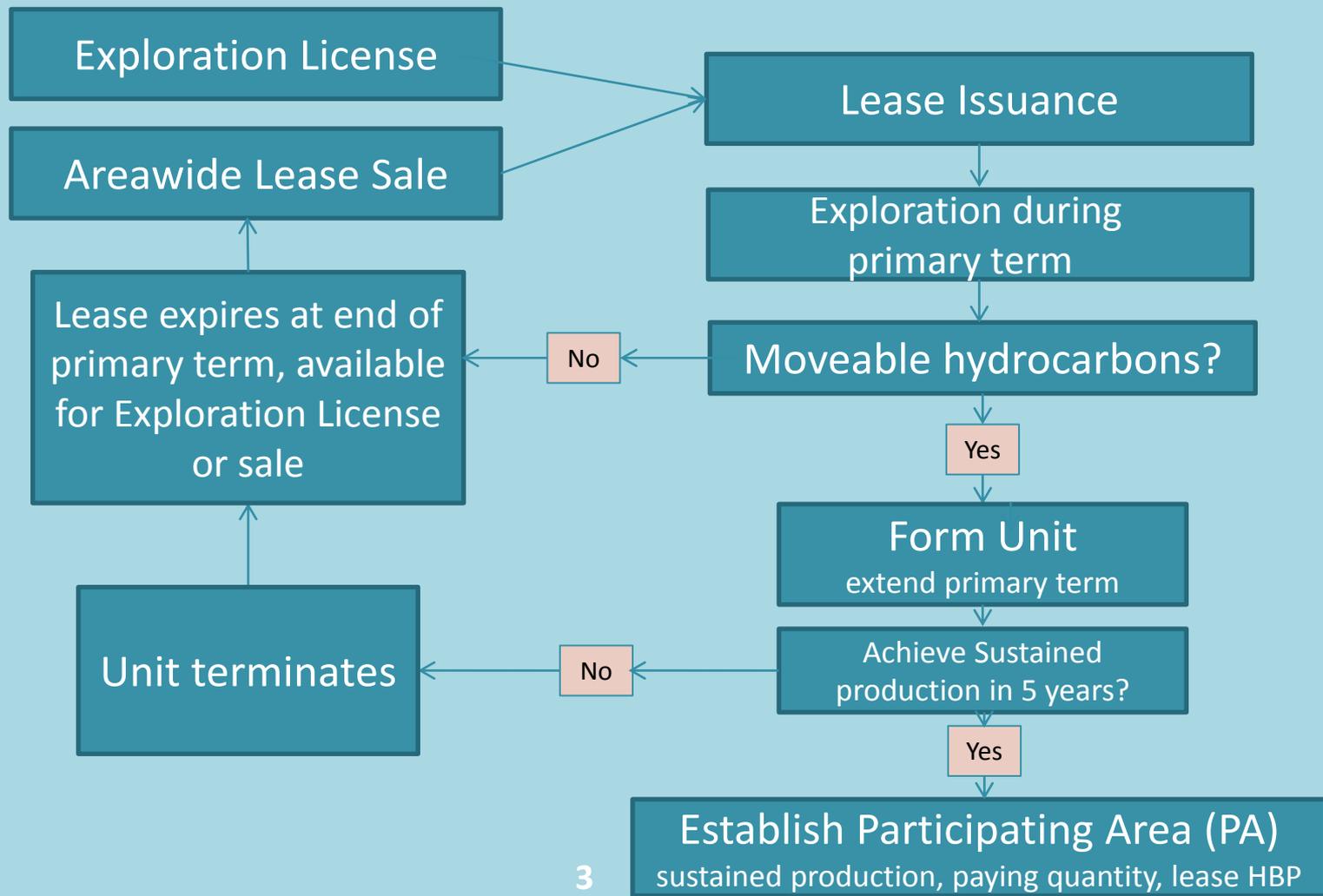
Land Management: Life of the Lease

- Areawide Lease Sale/Exploration License
 - Primary term commences
- Exploration during primary term
 - If producible hydrocarbons are demonstrated by drilling and testing of a well, candidate for unitization
- Unitization
 - Primary term of lease extended 5 years
 - Work scope
- Establish Participating Area (PA)
 - Capable of producing in paying quantities
 - Subject to a Plan of Development (POD)



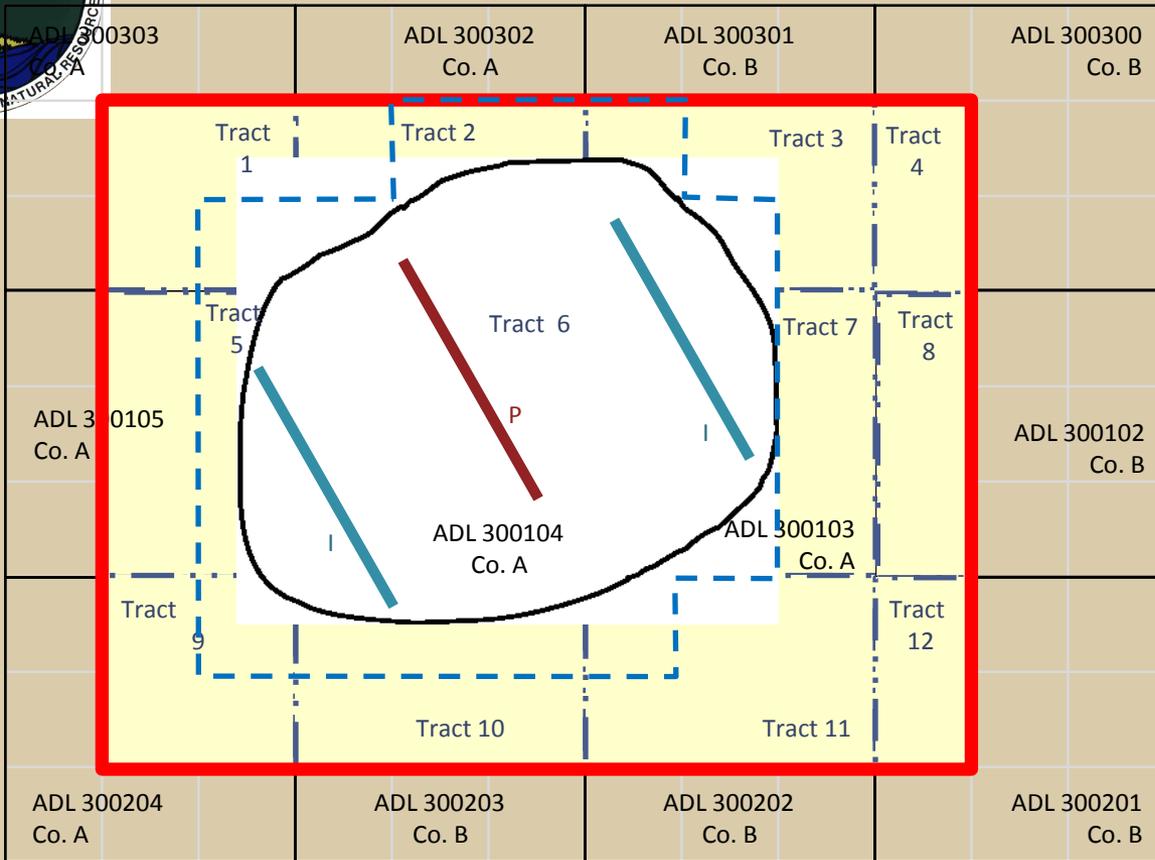


Land Management: Life of Lease





How a Unit Works



- Producer Well
- Injector Well
- Reservoir
- PA Boundary
- Unit Boundary
- Unit Tract
- Lease Boundary
- Section Boundary

Prod. Allocation	
Tract	%
1	<1
2	14
3	12
4	0
5	6
6	41
7	20
8	0
9	<1
10	6
11	<1
12	0

Unitization provides for the efficient development of the reservoir while protecting each lessee's interest in their fair share of the hydrocarbons produced. It also extends the life of a lease even though a well may not be drilled on it.





Land Management: When is a PA formed?

- A PA is formed once the unitized reservoir is on “sustained production”: wells are producing into a pipeline or other means of transportation to market
- Separate PA required for each producing horizon
- Approval of a PA includes approval of allocation factors
 - Sets out proportions of costs and revenues paid and received by working interest owners
 - Approval meets 11 AAC 83.303: Protect all parties





What is a Plan of Development (POD)?

- Once a PA is formed, a POD is required under 11 AAC 83.343
 - Must be filed for approval if a PA is proposed, or reservoir sufficiently delineated to initiate development activities
 - POD is submitted annually for review and approval
 - If POD deemed insufficient for approval, DNR may propose modifications. If Operator agrees to modifications, POD approved.
 - If not accepted by Operator, and no approved POD, current POD may expire.
 - **Development activities must be conducted under an approved POD**





POD Requirements

11 AAC 83.343(a)(1-4)

- Describes what the POD must include
 - 1) long-range proposed development activities for the unit, including plans to delineate all underlying oil or gas reservoirs, bring the reservoirs into production, and maintain and enhance production once established
 - 2) plans for the exploration or delineation of any land in the unit not included in a PA;
 - 3) details of the proposed operations for at least one year following submission of the plan; and
 - 4) the surface location of proposed facilities necessary for unit operations (pads, roads, camps, etc.).





North Slope Units and PAs February, 2012

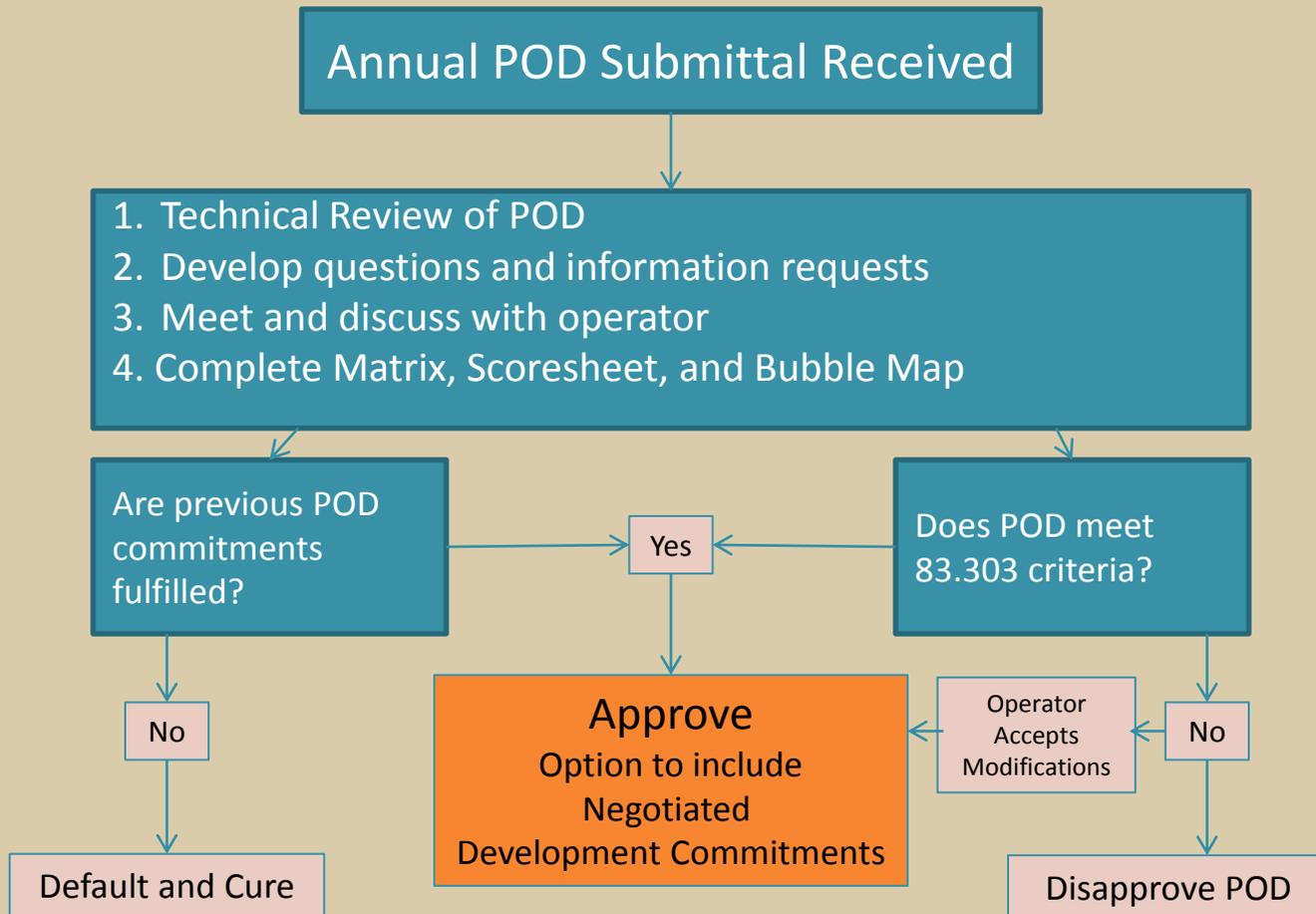
18 Existing SOA Units, 42 PAs, 2 Units Proposed

- Akjaq Unit (Proposed)
- Arctic Fortitude Unit
- Badami Unit
 - Badami Sands PA
- Bear Tooth Unit (Federal)
- Beechey Point Unit
- Colville River Unit
 - Alpine, Nanuq Nanuq, Nanuq Kuparuk, Fiord Kuparuk, Fiord Nechelik, Qannik PAs
- Dewline Unit
- Duck Island Unit
 - Eider, Endicott, Sag Delta North PAs
- Greater Moose's Tooth Unit (Federal)
- Kachemach Unit
- Kuparuk River Unit
 - Kuparuk, Meltwater, Tabasco, Tarn, West Sak, NEWS PAs
- Liberty Unit (Federal)
- Milne Point Unit
 - Kuparuk, Schrader Bluff, Sag River PAs
- Nikaitchuq Unit
 - Schrader Bluff PA
- Northstar Unit
 - Northstar PA
- Oooguruk Unit
 - Kuparuk, Nuiqsut, Torok PA's
- Placer Unit
- Prudhoe Bay Unit
 - Aurora, Borealis, Gas Cap, Lisburne, Midnight Sun, Niakuk, Combined Niakuk North Prudhoe Bay, Oil Rim, Orion, Polaris, Pt McIntyre, West Beach, West Niakuk, Raven PAs
- Putu Unit
- Qugruk Unit
- Southern Miluveach Unit
- Telemark Unit (Proposed)
- Tofkat Unit





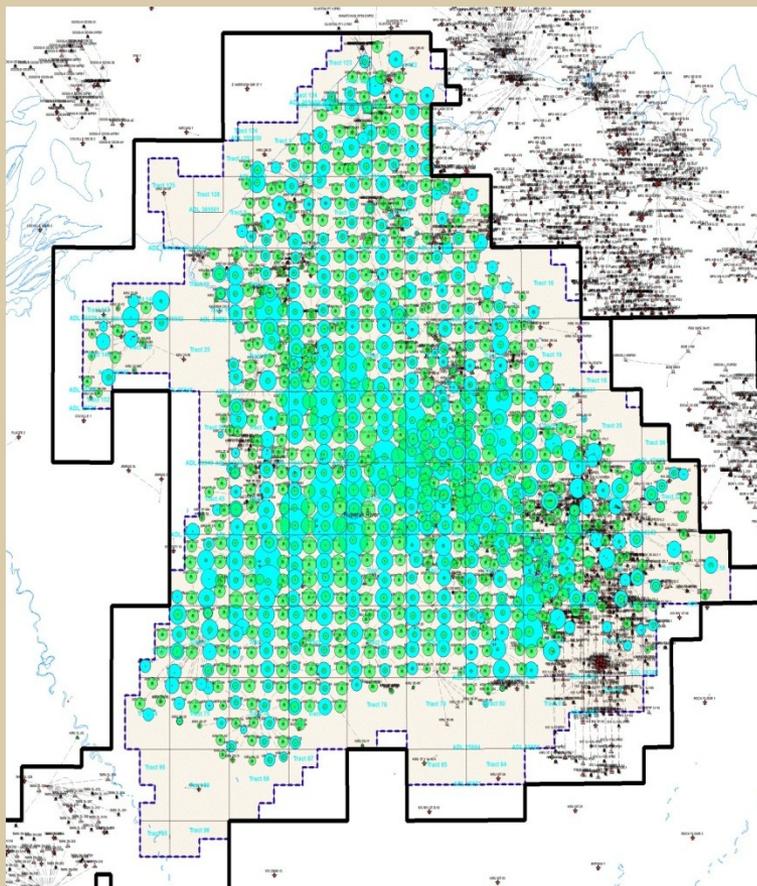
POD Process





Evaluating PODs on a complex unit - DOG Evaluation Tools

Bubble Map



Score sheet

Unit Name: _____ POD Decision _____ Decision Due By Date: _____
 PA Name: _____ Include Bubble Map as attachment, (drainage radius of all wells in all PAs) Form Submitted Date: _____
 GG & E Narrative Summary (ADGCC Pool Statistics, 2010) _____
 Geology: _____

Cum Production Stats:							
OCIP CONFIDENTIAL							
Cum Oil Produced to Date: (YE 2010)	MMSTB						
% Recovery to Date:							
Cum Voidage Replacement to date (YE 2010)	MRBI/MRBP						

Average Daily Production:		2008	2009	2010	2011	2012	2013
Oil	MSTB/D						
Water	MSTB/D						
Gas	MMSCF/D						
Average Water Cut	%						
Average Current GOR	SCF/STB						
Original GOR	SCF/STB						
Average Current Reservoir Pressure	psi						
Original Reservoir Pressure	psi						
Bubble Point Pressure	psi						

Average Daily Injection:		2008	2009	2010	2011	2012	2013
Water	MSTB/D						
Gas	MMSCF/D						

Well activity	2008	2009	2010	2011	2012	2013
Well Status	# Active wells					
Producer (active as of year end)						
Injector (active as of year end)						
Shut in (through entire year)						

Drilling Activity

New Wells

CTD

Workovers

Sidetracks

Facilities (current capacities)	Oil	Gas	Water
Current POD Pertinent Issues (Bullet Points)			

Recovery Factor (Inc? Dec? Causes)

Field Decline

Infrastructure

Facility issues

Pipeline issues

Well issues

Data

Core

Logging

Well test data

Seismic

Facilities

Plan Forward

Explore

Seismic

Drilling / Workover

Maintenance and Repair

Production





Case Studies for PODS

- **Conoco's Kuparuk Unit**
 - Discovered: 1969
 - Cumulative Production: 2.45 billion barrels (AOGCC, Dec 2011)
 - PA List
 - Kuparuk River, Meltwater, Tabasco, Tarn, West Sak, and Northeast West Sak
- **BP's Milne Point**
 - Discovered: 1969
 - Cumulative Production: 301 million barrels (AOGCC, Dec 2011)
 - PA List
 - Kuparuk River PA, Sag River PA, Schrader Bluff PA, Ugnu
- **BP's Prudhoe Bay and satellites**
 - Discovered: 1967
 - Cumulative Production: 12.22 billion barrels (AOGCC, Dec 2011)
 - PA List
 - Aurora, Borealis, Combined Niakuk, Gas Cap PA, Lisburne, Midnight Sun, North Prudhoe Bay, Oil Rim PA, Orion, Pt. McIntyre, Polaris, Raven PA, West Beach



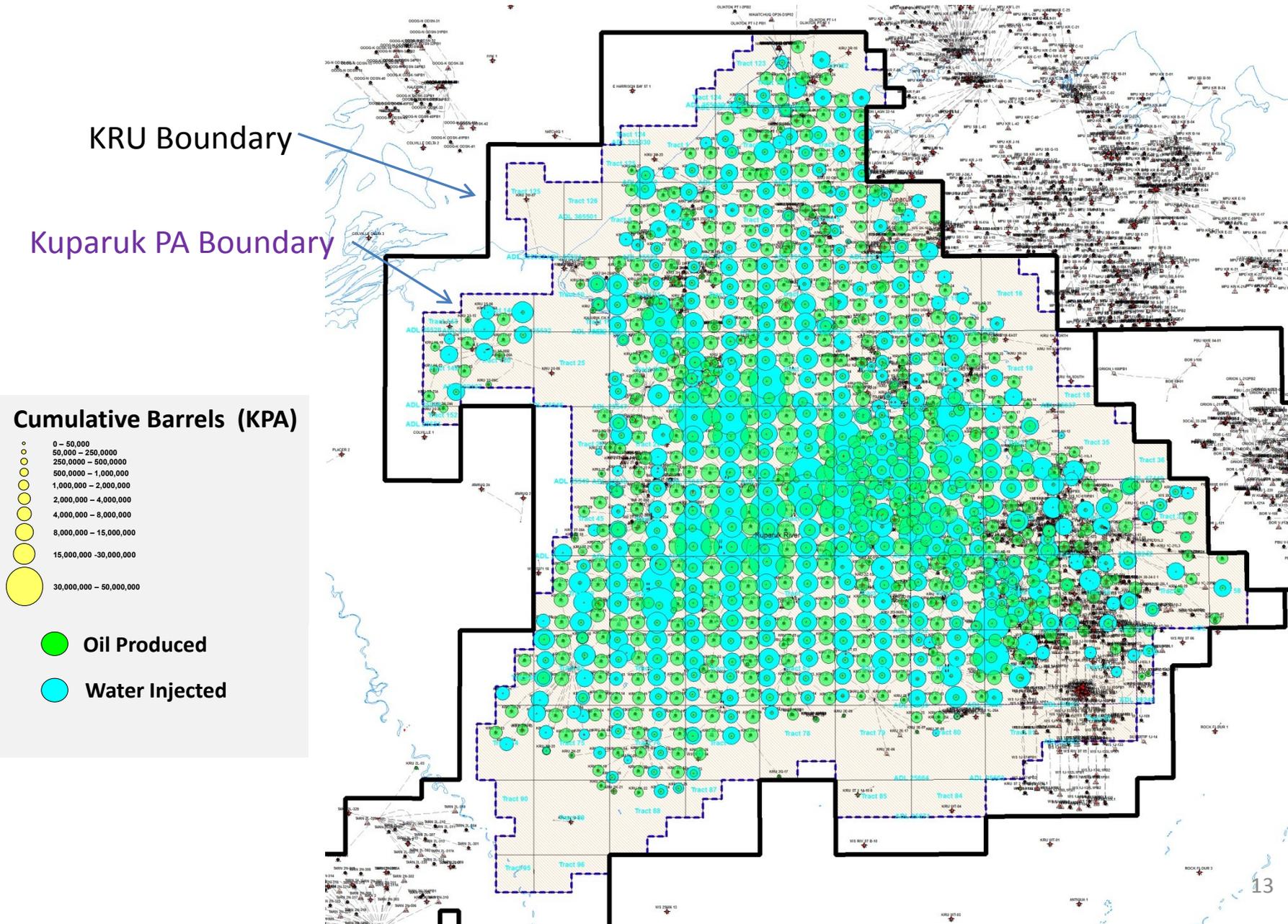


Conoco's Kuparuk River Unit POD

PA	POD Review Topics	Field Activity
Kuparuk PA	<ul style="list-style-type: none"> Development drilling in West Sak, NEWS, Kuparuk PA Infill drilling - CTD, Sidetracks Impacts to operations: surface casing corrosion, subsidence Gas management, impact to production Expansion in 2011 	<ul style="list-style-type: none"> Shark's Tooth (Kuparuk PA) Dedicated CTD unit Negotiating gas supply from PBU Development drilling and outboard injectors
Tarn PA	<ul style="list-style-type: none"> Multiple new wells planned Expansion in 2011 	<ul style="list-style-type: none"> Rotary wells and sidetracks and first CTD 2 grass roots wells
West Sak & NEWS	<ul style="list-style-type: none"> Continued studies on MBEs 	<ul style="list-style-type: none"> VRWAG Workovers



Kuparuk River Unit (KRU) Bubble Map



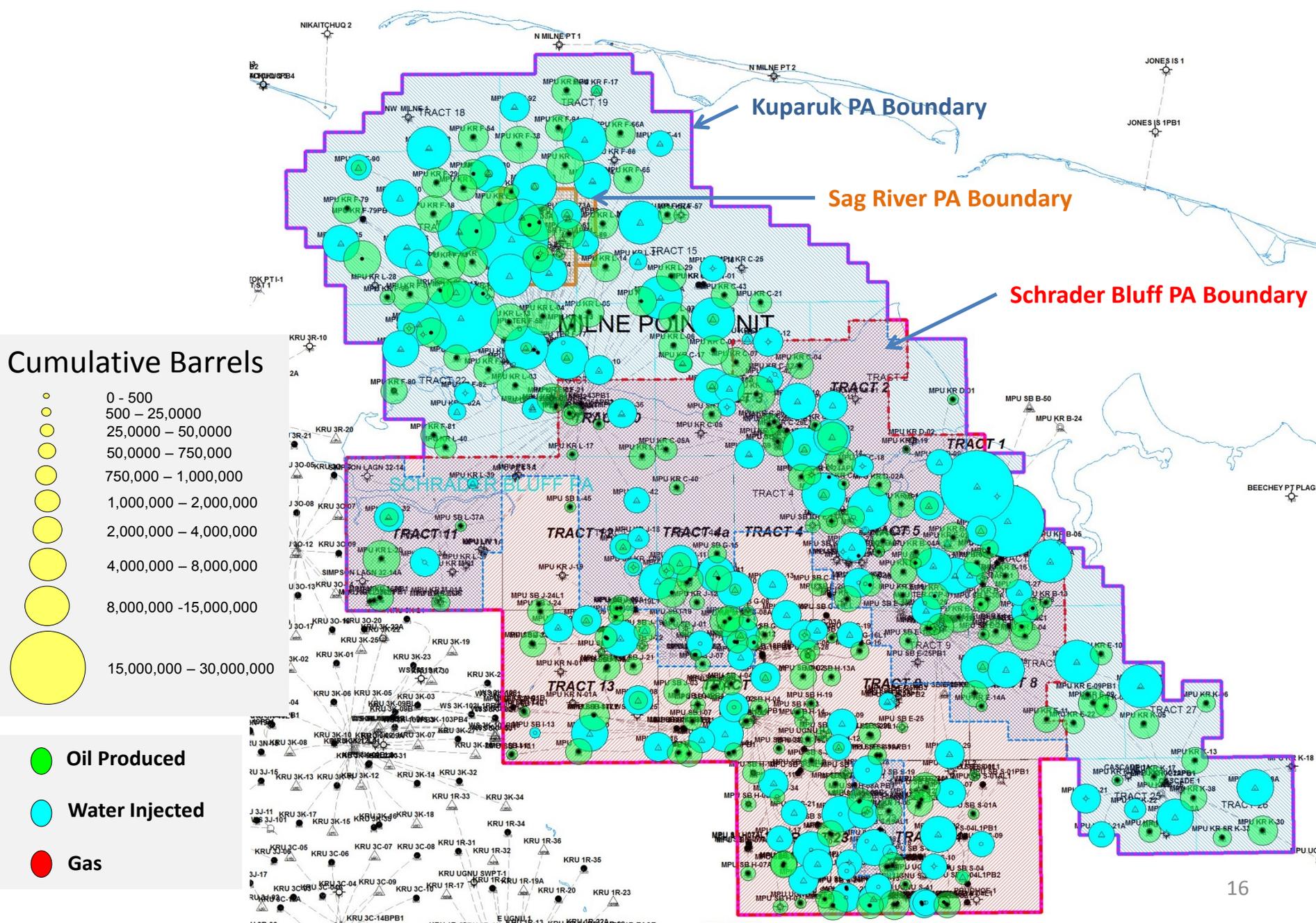


BP's Milne Point Unit

PA	POD Review Topics	Field Activity
Kuparuk PA	<ul style="list-style-type: none">▪ EOR/USWAG/LoSal▪ Drill rig availability/optimization▪ Mechanical issues/gas injection▪ Workovers	<ul style="list-style-type: none">▪ Repro Seismic 4D▪ Rotary rig secured▪ 4 wells planned
Schrader Bluff PA	<ul style="list-style-type: none">▪ ESP failures▪ MBEs	<ul style="list-style-type: none">▪ Rate of failure declining▪ Continued studies and tests to remediate MBE wells
Ugnu (Pilot Program)	<ul style="list-style-type: none">▪ 5 year pilot program▪ CHOPS	<ul style="list-style-type: none">▪ Pilot facilities on-line▪ Expect 4 Wells on production



MPU Cumulative Production and Injection (All Zones)



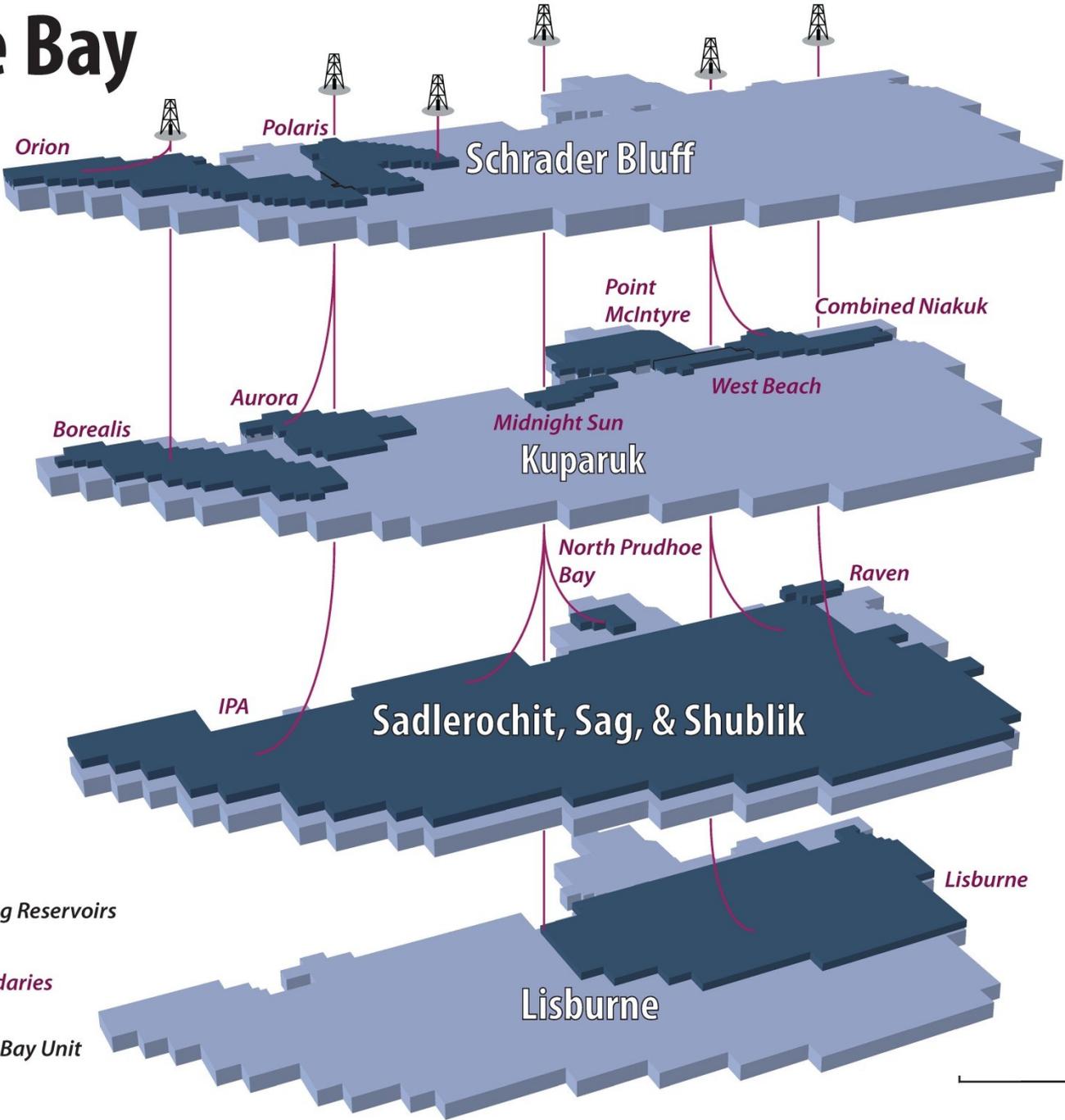


BP's Prudhoe Bay Unit

PA	POD Review Topics	Field Activity
IPA	<ul style="list-style-type: none"> Optimization of gas and water handling facilities Infrastructure maintenance, repairs and upgrades EOR/waterflood/GCWI/WAG 	<ul style="list-style-type: none"> Infill drilling and sidetracks-46 to 62 per year Wellwork-2000, including workovers, additional perforations, stimulations, well diagnostics
Borealis	<ul style="list-style-type: none"> Continued field development I-pad construction GPP 	<ul style="list-style-type: none"> 2 wells planned 2012 on Z-pad, 1 producer and 1 injector
Orion	<ul style="list-style-type: none"> Continued field development I-pad construction GPP 	<ul style="list-style-type: none"> No new development wells in 2012



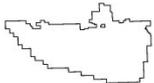
Prudhoe Bay Unit



Producing Reservoirs



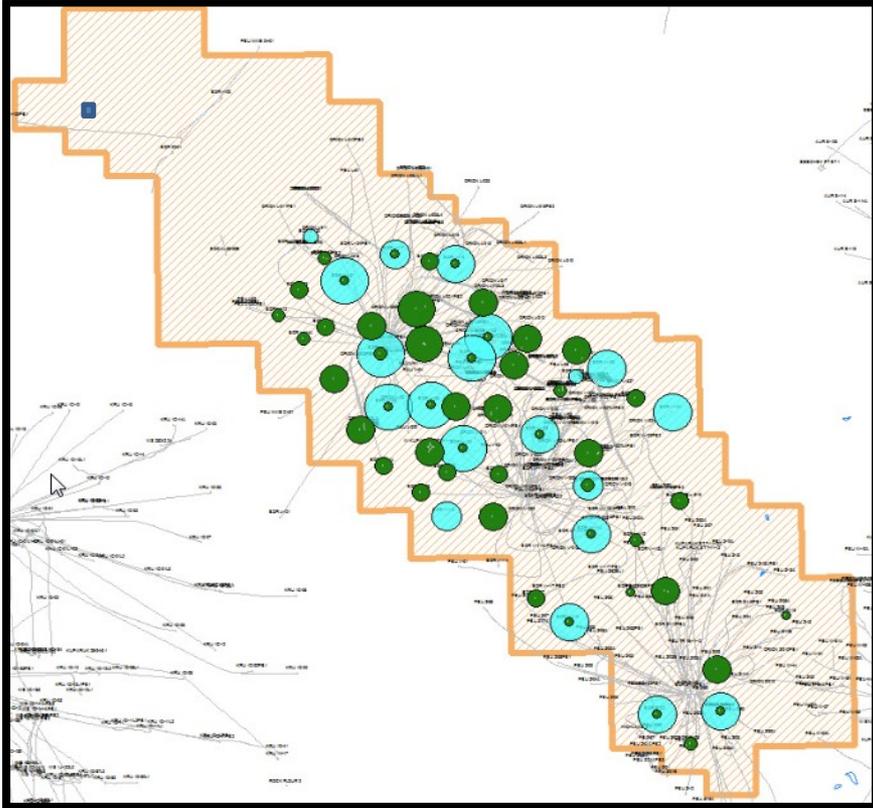
PA Boundaries



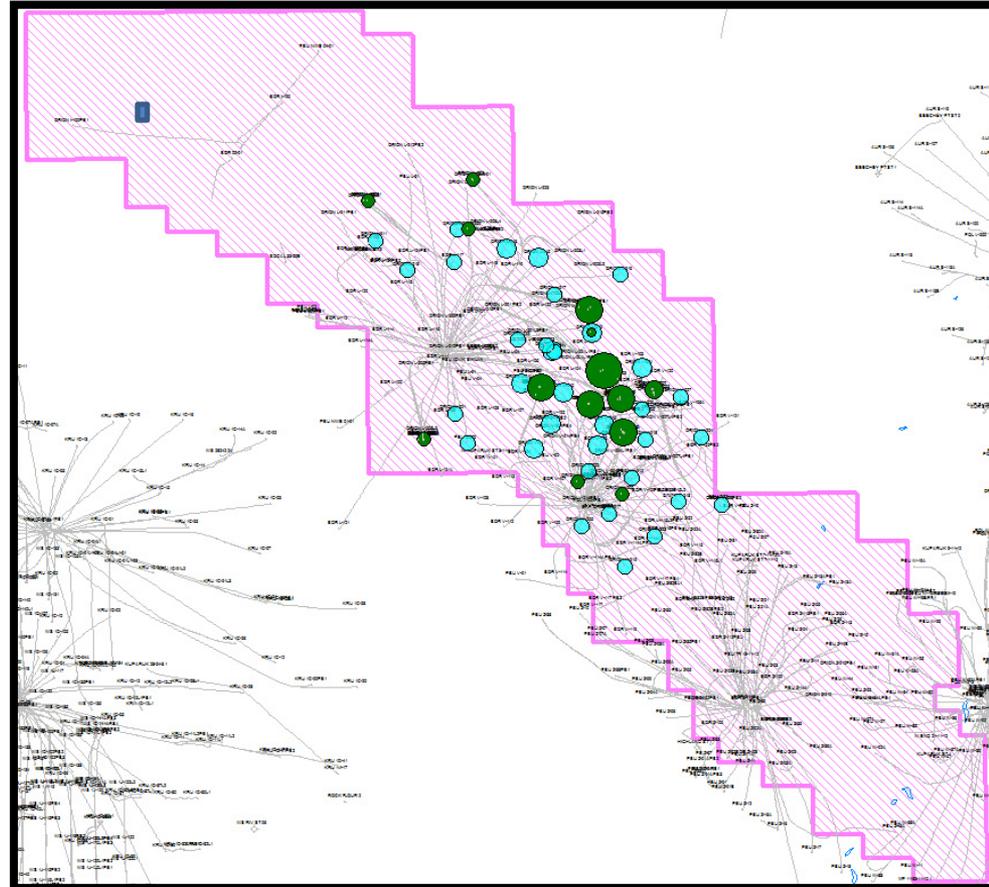
Prudhoe Bay Unit

~8 Miles
18

Borealis Cumulative Production and Injection



Orion Cumulative Production and Injection



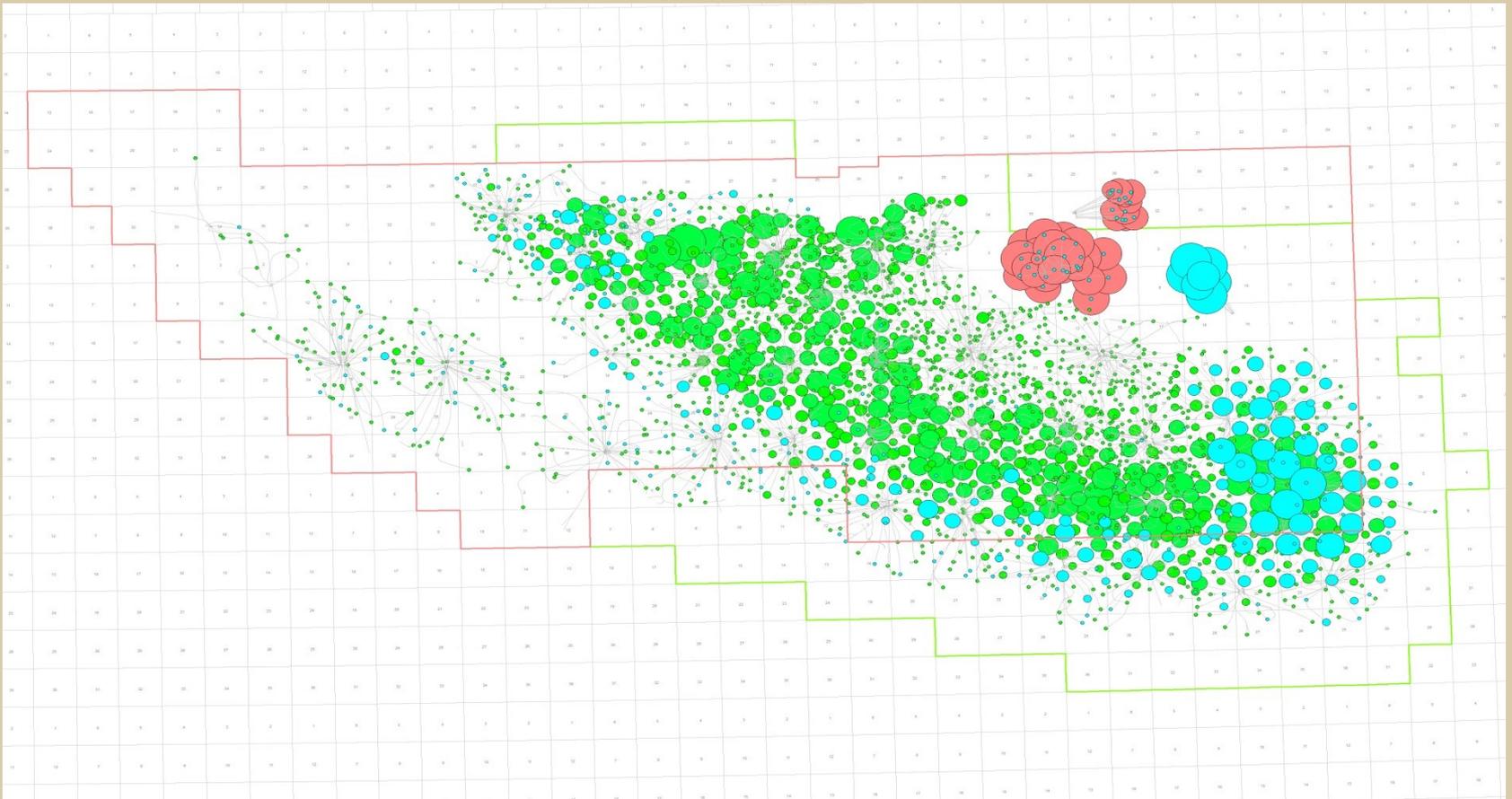
Cum Barrels

- 0 – 50,000
- 50,000 – 1,000,000
- 1,000,000 – 2,000,000
- 2,000,000 – 4,000,000
- 4,000,000 – 8,000,000
- 8,000,000 – 15,000,000

- Oil Produced
- Water Injected



PBU IPA Bubble Map



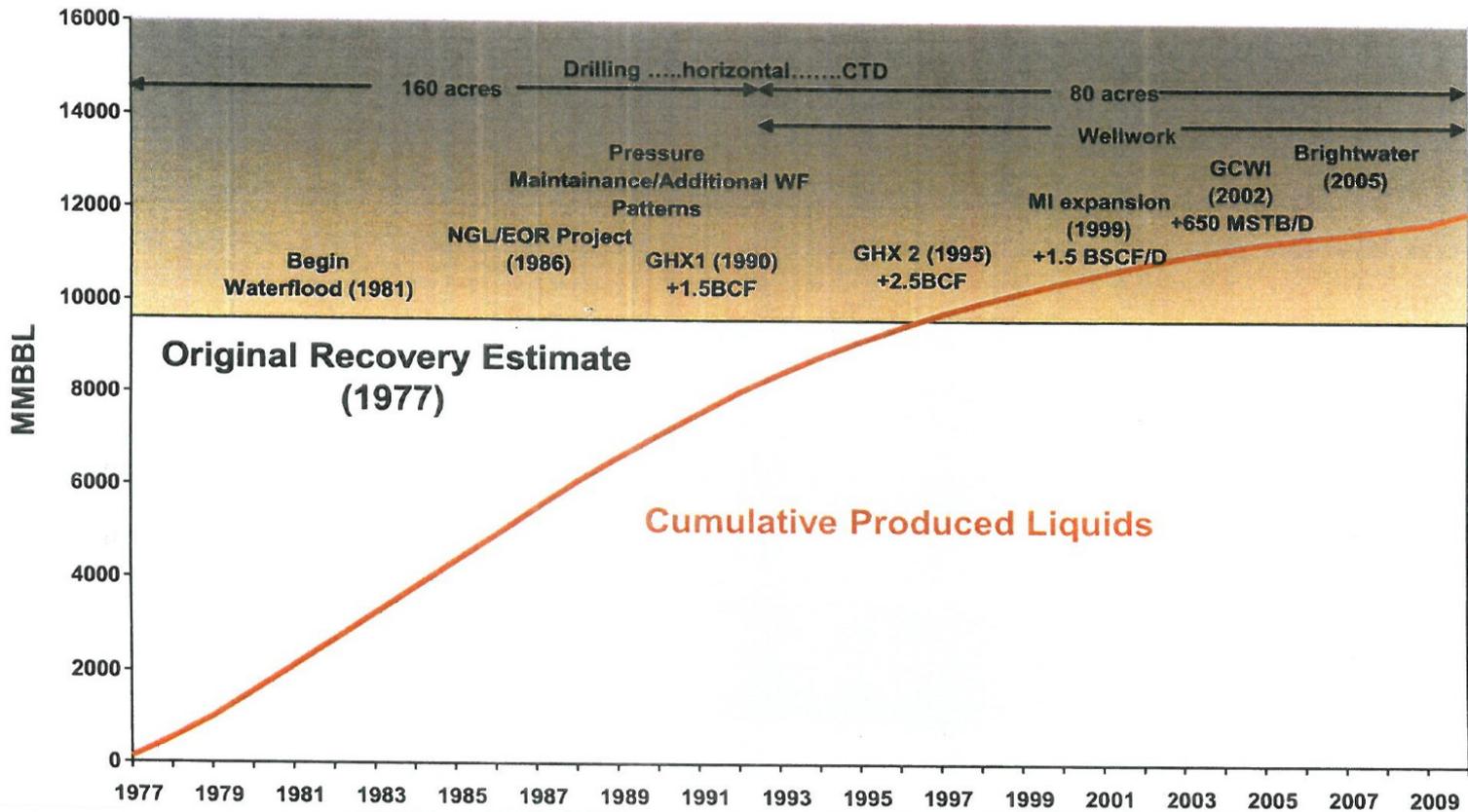


PBU - Borealis and Orion PAs 2012 Plans of Development

- PODs not approved
 - Working with unit operator to evaluate the development of another option around approval
 - Proposed modifications that would qualify the plans for approval
- What results from rejected POD
 - PAs lack approved POD
 - **11 AAC 83.343: No development activities allowed without approved POD**



Prudhoe Bay Development History





Summary

- Leases unitized when producible hydrocarbons proved by drilling and testing
 - PAs formed when unitized reservoir achieves sustained production
- PODs submitted for each unit which has PAs
 - Technical review and analysis to determine if plan meets criteria of 11 AAC 83.303
 - Complex units producing from multiple horizons
 - Development activities must be conducted under approved POD

