



Joint Operating Agreement Enhanced Recovery Systems Challenges

Marshall Maestri
Asst. General Counsel

June 8, 2017

1 **Background and Definitions**

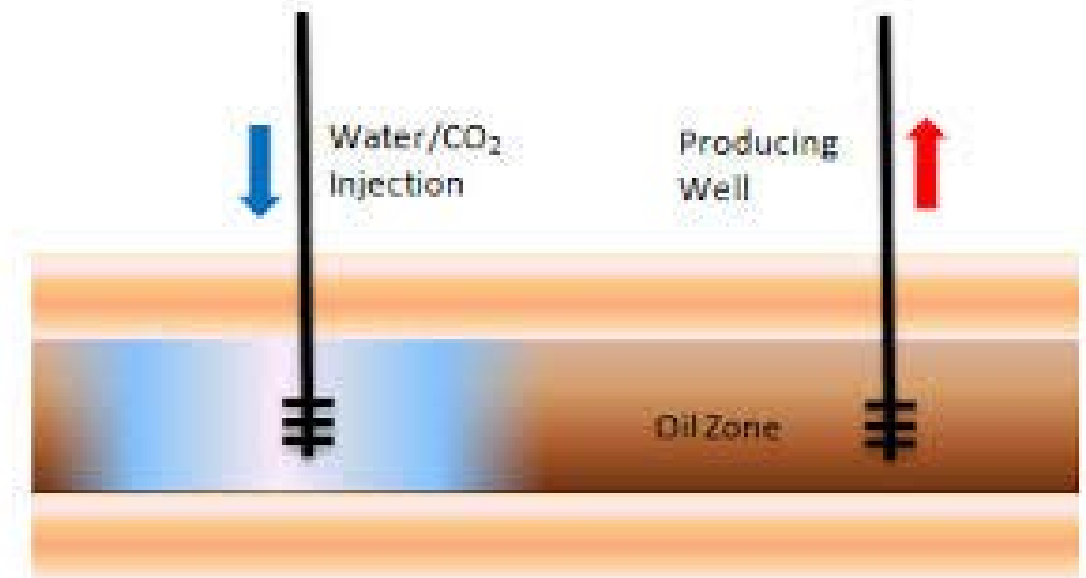
2 Non-Consent

3 New Injection System and Wells –No New Production

4 New Injection System and Wells –New Production

5 Future Considerations

- Primary Recovery
 - Pressure sufficient for well to produce (10- 25% of oil in place)
- Secondary recovery
 - Water injection
 - Natural gas re-injection
 - Gas lift
 - Additional 10-20%
- Tertiary recovery
 - Steam flood
 - Fire flood
 - CO2 flood
 - Chemical injection
 - Can allow another 5-15%



Important Definitions

- **Development Phase - Article 2.18**
 - The proposals, activities, and operations associated with determining the feasibility of development and the design, fabrication or acquisition, and installation of a Development System.
- **Development System – Article 2.20**
 - A Production System and its associated Facilities.
- **Production System**
- **Facilities**

- **Production System - Article 2.57**

A system or combination of systems on the Contract Area to develop, produce, store, distribute, and initiate the transportation of Hydrocarbons The term includes:

- (a) an offshore surface structure, whether fixed, compliant, or floating;
- (b) a subsea structure or template designed as a guide to or to provide structural rigidity to one or more wells;
- (c) any combination of the items mentioned in clauses (a) and (b);
- (d) any other type of structure designed to develop and produce Hydrocarbons; and
- (e) all associated components of the items mentioned above, including, but not limited to, a drilling rig, mooring lines, and anchor piles.
- **Production System excludes Facilities, mobile offshore drilling units, and the facilities referred to in Article 15.2 (Facilities to Take in Kind).**

- **Facilities – Article 2.30**

Production equipment located downstream of the wellhead connections, which is installed on or outside the Contract Area in order to enhance, handle, or process Hydrocarbon production or transport Hydrocarbons to processing facilities.

Facilities include, but are not limited to, control umbilicals, disposal wells and their associated components, flowlines, and gathering lines or lateral lines and their associated components that are paid for by the Joint Account.

Facilities exclude (1) Production Systems, (2) Export Pipelines, (3) the equipment procured and utilized for an enhanced recovery and pressure maintenance program described in Article 12.11 (Enhanced Recovery and/or Pressure Maintenance Program Proposals), and (4) the facilities referred to in Article 15.2 (Facilities to Take in Kind).

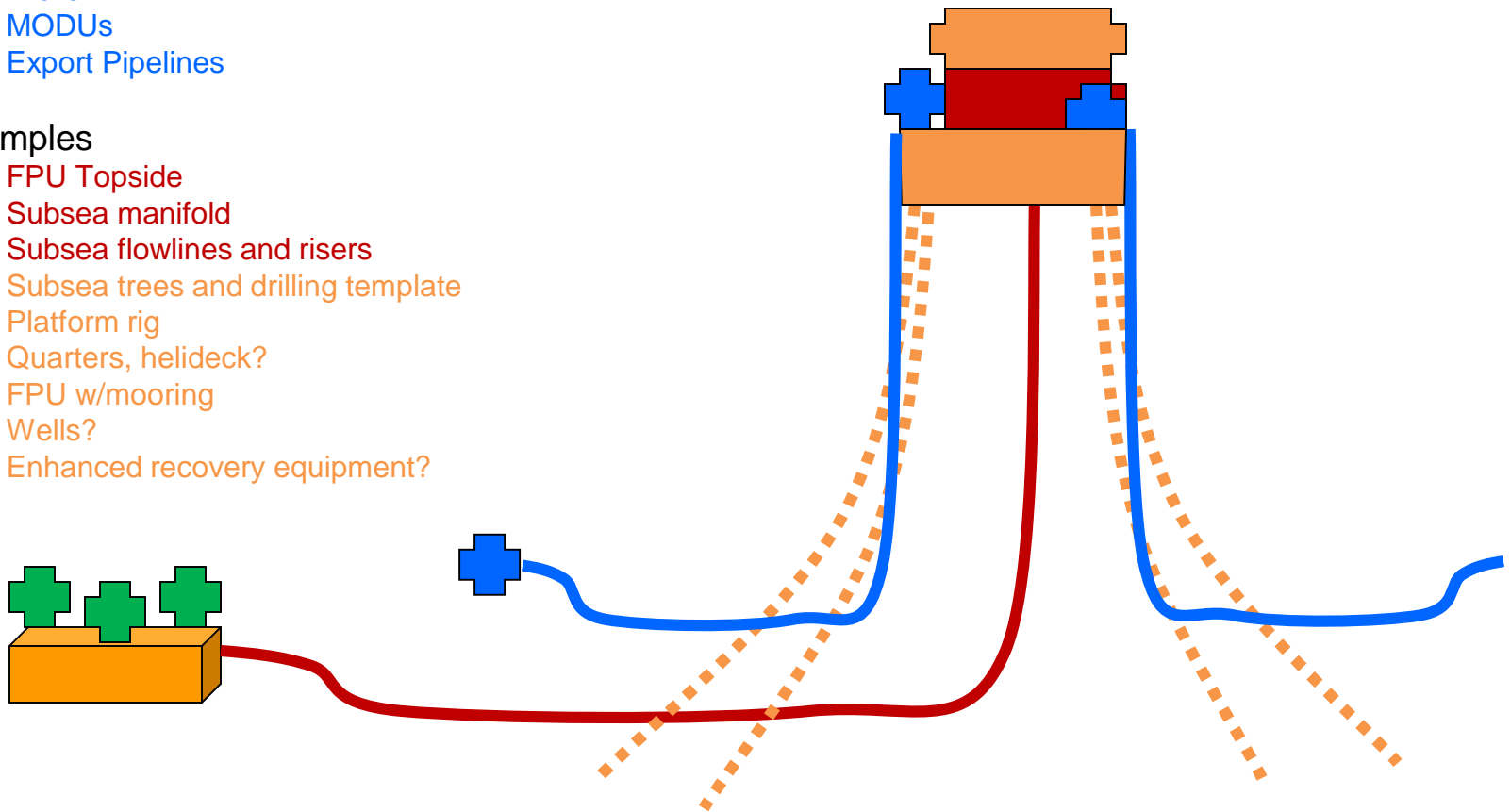
- 2.17 Development Operation

- An operation (including, but not limited to, a Recompletion, a Workover, the attempted completion of an Exploratory Well or an Appraisal Well, or an operation after a Development Well has reached its Objective Depth) conducted under Article 13 (Development Operations).

Wet Tree Production System



- Development System
 - Facilities
 - Production System
- Other?
 - Wells?
 - MODUs
 - Export Pipelines
- Examples
 - FPU Topside
 - Subsea manifold
 - Subsea flowlines and risers
 - Subsea trees and drilling template
 - Platform rig
 - Quarters, helideck?
 - FPU w/mooring
 - Wells?
 - Enhanced recovery equipment?



Various different ways to make changes



- Modifications to approved Development Plan
 - Major Modifications – Vote/Unanimous depending on option selected
 - Minor Modifications – Operator may, prior to the installation of the Development System, make minor modifications
- Article 14.5 Approval of Additional Facilities
 - Approval by Vote required
 - Non-consent applies
- Article 14.6 Expansion or Modification of Existing Production System
 - Approval by Vote required
 - Binding on all Participating Parties
- Article 12.9 Subsequent Development Phases
 - Unclear as to what is a Subsequent Development Phase
 - Article 12 process applies (non-consent)
- Article 12.11 Enhanced Recovery/Pressure Maintenance

- Article 12.11 Enhanced Recovery and/or Pressure Maintenance Program Proposals
 - Any Party may propose a Project Team
 - Approved by Election
 - Creates a Project Team first (a party can go non-consent to the PT)
 - The Operator has the sole right (option) to submit an enhanced recovery and/or pressure maintenance program proposal and AFE
 - What is in the AFE – Everything? Wells?
 - Approved by Vote of the Parties, then binding on all Participating Parties in the Execution AFE for that Development Phase

1 Background and Definitions

2 **Non-Consent**

3 New Injection System and Wells –No New Production

4 New Injection System and Wells –New Production

5 Future Considerations

- What articles do non-consent penalties apply to?
 - Yes
 - Article 14.5 Additional Facilities
 - Article 12.9 Subsequent Development Phases
 - No – drag along
 - Article 12.11 Enhance Recovery and/or Pressure Maintenance
 - Article 14.6 Expansion or Modification of Existing Production Systems

What is meant by extension of an existing Producing Reservoir?

- More production from the reservoir?
- Extending geographic boundaries?

16.5.7.1 Non-Consent Exploratory Operations, Non-Consent Appraisal Operations, and Non-Consent Development Operations That Discover or Extend a Producing Reservoir

that is conducted as a Non-Consent Operation and discovers a new Producing Reservoir or ***extends an existing Producing Reservoir*** (as the Producing Reservoirs existed at the time the Development Operation was proposed),

- (i) one hundred percent (100%) of its Non-Participating Interest Share of all Hydrocarbons produced and saved **from the Non-Consent Operation**, if the Non-Consent Operation results in Hydrocarbon production, and
- (ii) fifty percent (50%) of its Participating Interest Share of all Hydrocarbons produced and saved from operations conducted after the Non-Consent Operation that **result in Hydrocarbon production from the same Producing Reservoir discovered or extended by the Non-Consent Operation**.

Do water injection operations result in hydrocarbon production?

16.5.7.2 Non-Consent Development Operations in an Existing Producing Reservoir

If a Development Operation is conducted as a Non-Consent Operation and does not discover a new Producing Reservoir and also does not extend an existing Producing Reservoir (as the Producing Reservoirs existed at the time the Development Operation was proposed), each Non-Participating Party shall satisfy Hydrocarbon Recoupment from one hundred percent (100%) of its Non-Participating Interest Share of Hydrocarbons produced and saved from the Non-Consent Operation, if the Non-Consent Operation ***results in Hydrocarbon production.***



16.5.7.3 Non-Consent Subsequent Development Systems or Additional Facilities

If the construction and installation of a subsequent Development System or additional Facilities is conducted as a Non-Consent Operation, each Non-Participating Party shall satisfy Hydrocarbon Recoupment from:

- (a) one hundred percent (100%) of its Non-Participating Interest Share or its Participating Interest Share (whichever applies) of Hydrocarbons produced and saved from all Development Operations that are **conducted from that subsequent Development System**,
- (b) one hundred percent (100%) of its Non-Participating Interest Share or its Participating Interest Share (whichever applies) of Hydrocarbons produced and saved from all wells that **benefit from injection** or disposal wells **drilled and/or operated from that subsequent Development System**, and
- (c) In the case of additional Facilities, other than those covered by 16.5.7.3(b), one hundred percent (100%) of its Non-Participating Interest Share or its Participating Interest Share (whichever applies) of Hydrocarbons produced and saved from **all wells that utilize the additional Facilities**.

1 Background and Definitions

2 Non-Consent

3 New Injection System and Wells –No New Production

4 New Injection System and Wells –New Production

5 Future Considerations

- How is a proposal for a subsea injection structure (no new production) made and approved under the model form JOA?
 - Can such a scenario be proposed as a subsequent Development Phase and a subsequent Development System?
 - A development System includes a Production System and its associated Facilities.
 - Production System - A system or combination of systems on the Contract Area to develop, produce, store, distribute, and initiate the transportation of Hydrocarbons.
 - Do you have to have all of these?
 - Is the water injection system a Production System? Excluded from Facilities definition.
 - Does template make it a Production System? Should this be limited to producers?
 - If approved, the Article 12 process applies – possible non-consent.

- Can such a scenario be proposed as an Article 12.11 Enhanced Recovery Program?
 - What happens if it serves multiple Development Phases?
- Can such a scenario be proposed as an Additional Facility under Article 14.5?
 - Only if not proposed as 12.11 (see exclusion to Facilities definition).
 - Do Facilities only related to Hydrocarbons? What about flowlines and gathering lines for water?

- **Facilities – Article 2.30**

Production equipment located downstream of the wellhead connections, which is installed on or outside the Contract Area in order to enhance, handle, or process Hydrocarbon production or transport Hydrocarbons to processing facilities.

Facilities include, but are not limited to, control umbilicals, disposal wells and their associated components, flowlines, and gathering lines or lateral lines and their associated components that are paid for by the Joint Account.

Facilities exclude (1) Production Systems, (2) Export Pipelines, (3) the equipment procured and utilized for an enhanced recovery and pressure maintenance program described in Article 12.11 (Enhanced Recovery and/or Pressure Maintenance Program Proposals), and (4) the facilities referred to in Article 15.2 (Facilities to Take in Kind).

- How are Injector Wells (injection wells) proposed and approved under the model form JOA?
 - Is the well to be included in a subsequent Development Phase and funded through the Execution AFE?
 - By approving an Execution AFE that includes injector wells costs, a party would be bound to the costs of those injection wells, without further vote. Additionally, the Operator may be forced to drill injector wells that were included in approved Execution AFE that the Operator no longer wishes to drill as it is a Major Modification to change the enhanced recovery program.
 - What if the well is in the Development Plan, but not in the Execution AFE?
 - Is this a Major Modification because of the change in costs?
 - Is it an expansion of the Existing Production System, and thus 14.6 applies?
 - Propose on its own?
 - Use the Article 13 Development Well proposal?
 - Is the well to be included in an Enhanced Recovery Program and funded through the Enhanced Recovery Program AFE?
 - Depends on how the 12.11 proposal is drafted.

- Can Injector Wells be proposed outside of an Enhanced Recovery Program through Article 13.1 (Development Wells and Operations)?
 - The JOA does not make any distinction between injectors and producers.
 - What about casing point election? Seems to apply.
 - Non-consent issues
- Can Injector Wells be proposed as an Expansion or Modification of a Production System through Article 14.6?
 - Production System definition is very vague and broad
 - Please note that this could lead to a drag along for the injector well.



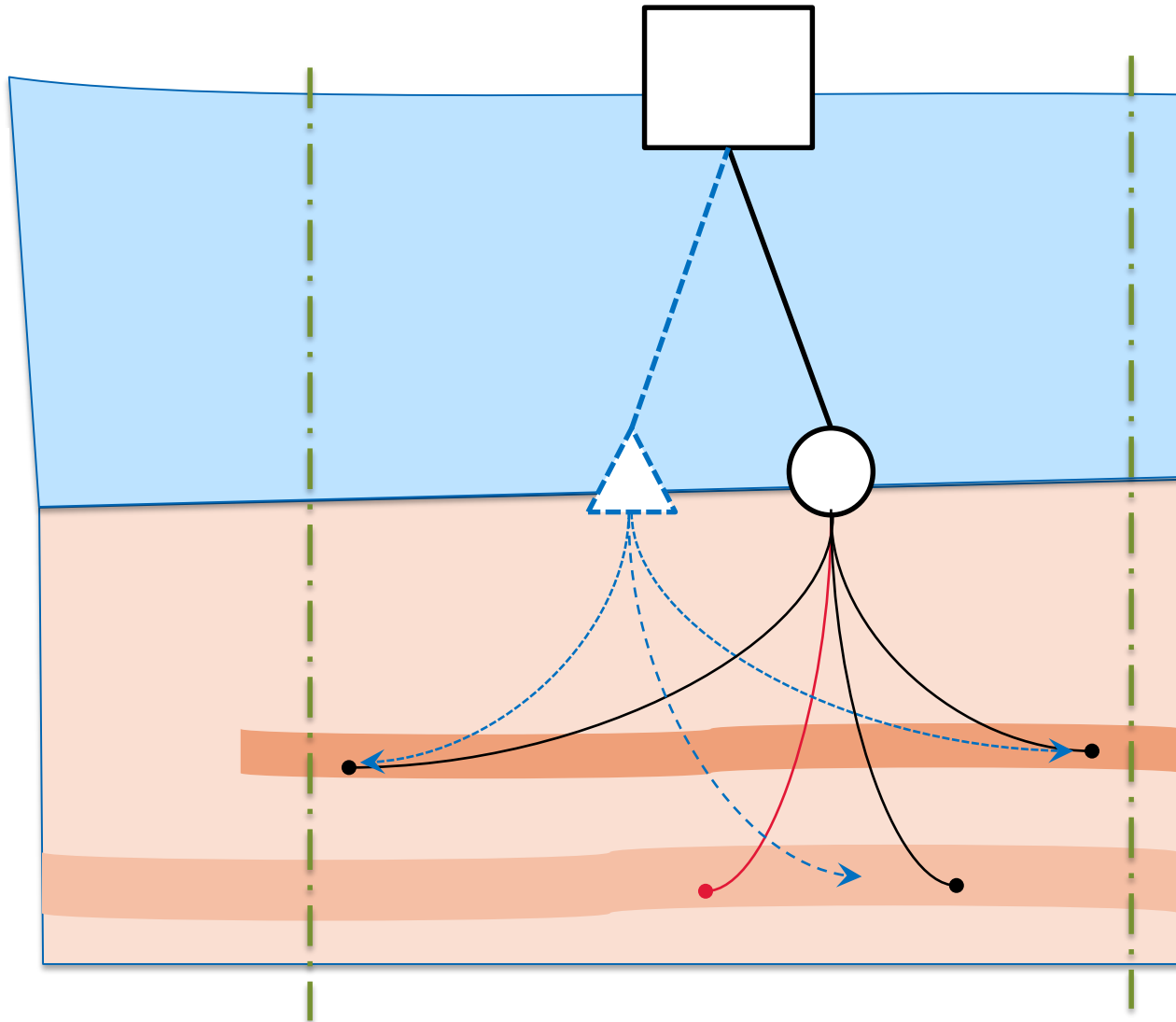
- Situation 1:
 - Company A is a non-consenting party to a Production well in BPO status
 - An Enhanced Recovery System (ERS) that will benefit the NC Production wells, and another well in which Company A is a participant, is proposed and approved

Water Injection without new production



Legend

- Enhanced Recovery
- Non-Consent
- Spar/FPS
- Production Template
- Injection Template
- Wellpath (Production)
- Wellpath (Injection)
- Proposed
- Development Area Boundary



- Result :
 - Would Company A be required to pay for all costs associated with the ERS, while only a portion of the ERS benefits Company A?
- What if water injection proposed as a Subsequent Development Phase?
 - Is the penalty from incremental production? How is this determined?
 - From all production?
 - What if parties disagree as to whether a particular well benefits?
 - What happens if there are multiple development phases?
 - Who is bound?
 - What does penalty apply to?



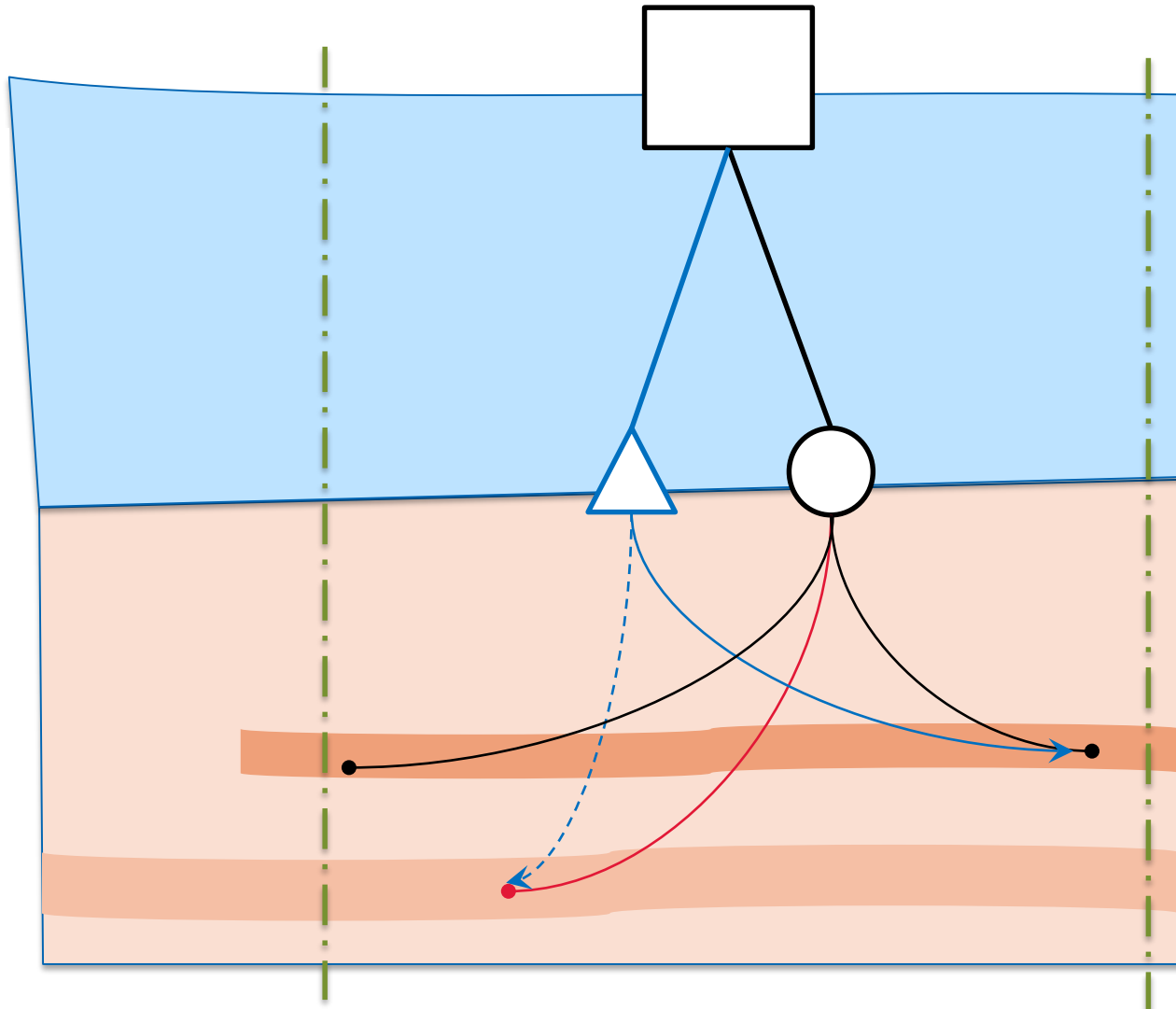
- Situation 2:
 - Company A is non-consenting party in 1 of 3 production wells. The Partnership approves an Enhanced Recovery System (ERS) that will target 2 sands:
 - (i) 1 that will impact production in a sand which Company A has non-consented production from, and
 - (ii) 1 that will impact production in a sand in which Company A is a participating party to multiple wells.

Water Injection without new production



Legend

- Enhanced Recovery
- Non-Consent
- Spar/FPS
- Production Template
- Injection Template
- Wellpath (Production)
- Wellpath (Injection)
- Proposed
- Development Area Boundary



- Result :

- Company A paid for its full share of the cost of the ERS at the time the proposal is approved.
- If the well was included in the ERS, would Company A be responsible for its share of the well costs, even if it does not benefit?
- Once the injection well targeting the NC producer is proposed and approved, would Company A be reimbursed a share of the ERS cost (via the usage/slot fee)?

1 Background and Definitions

2 Non-Consent

3 New Injection System and Wells –No New Production

4 **New Injection System and Wells –New Production**

5 Future Considerations

- How is a proposal for a new subsea production structure and a new subsea injection structure that is to be placed under an existing Platform made and approved under the current JOA?
 - Is this a Subsequent Development Phase?
 - Can Operator propose production and injection system under a single proposal?
 - Non-consent from only new wells?
 - Proposed as a Subsequent Development Phase and a separate Enhanced Recovery Project (12.11)
 - Remember drag along
 - How do the separate phases benefit from the injection system?



- Situation 3

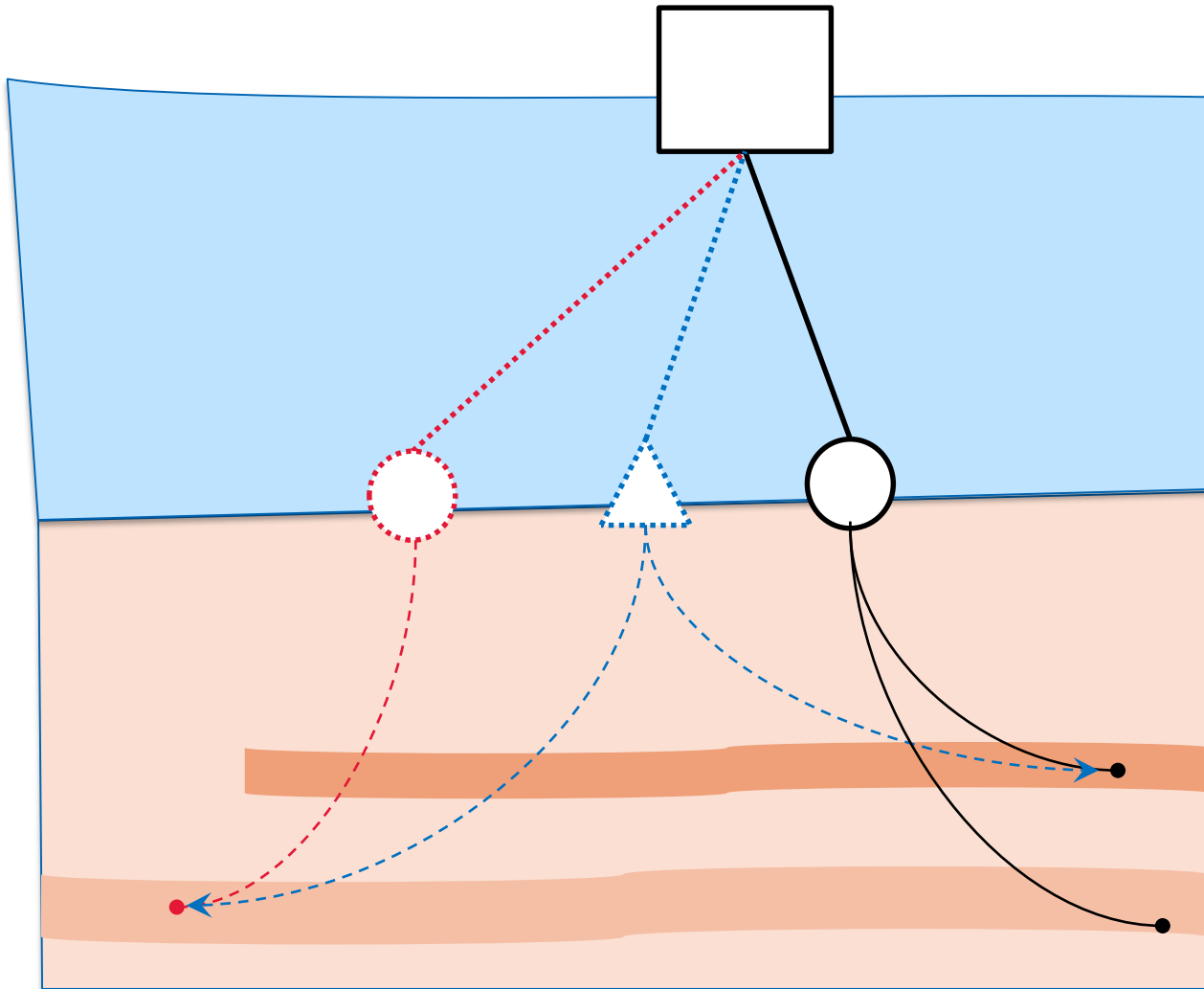
- Company A non-consents a subsequent development system, which includes injection and production (aka Phase 2)
- The injection from Phase 2 will benefit Production wells from initial phase (aka Phase 1)

New Production and New Injection



Legend

- Enhanced Recovery
- Non-Consent
- Spar/FPS
- Production Template
- Injection Template
- Wellpath (Production)
- Wellpath (Injection)
- Proposed



- Result :
 - Is Company A's interest in Phase 1 Production well that benefits from injection immediately forfeited and applied to Phase 2 NC penalty?
- New Subsea Production and Injection Scenario
 - If proposed together as a Subsequent Development System, and the non-consenting party is in the initial system – does his penalty apply to his production from the initial system?
 - If subsea injection is proposed separately under 12.11, but benefits one system over another, non-op is still dragged along?
 - Should an operator be allowed to “game the system” in choosing how the proposal should be made?

- How is a new subsea production structure (for drilling and producing one or more Development Well(s)) that is to be placed under an existing Platform proposed/approved under the current Deepwater JOA?
 - Is this matter a subsequent Development System proposal under Article 12.9 (Subsequent Development Phases)?
 - Is this subsea production structure an “additional Facility” to be approved pursuant to Article 14.5 (Approval of Additional Facilities)?
 - Note - Operator proceeds, if Operator decides that there is no interference
 - Is this an Expansion or Modification of an Existing Production System?
 - What about the drilling template (see- Production System definition)?
 - Is this a Major Modification to the Development Plan?
 - What is “installation of the Development System?”
 - Major modifications generally require unanimous consent

- 1 Background and Definitions
- 2 Non-Consent
- 3 New Injection System and Wells –No New Production
- 4 New Injection System and Wells –New Production
- 5 Future Considerations**

JOA Governance

Subsequent Development Issues



Issue	Questions
Definition of Subsequent Development projects that can be non-consented	Which Subsequent Development programs should co-owners be able to non-consent? Which programs should be binding on all parties?
Injection well proposals	At what time are injection wells proposed and approved?
Enhanced recovery projects	Should a party be able to non-consent an enhanced recovery project benefitting multiple development phases?
Reservoir definition	Should approval thresholds be different for Subsequent Development programs involving reservoirs already on production?

JOA Governance

Subsequent Developments



Which subsequent development proposals should co-owners be able to non-consent?* Which development proposals should be governed by the Expansion or Modification of Existing Production System provision that provides a binding vote?

- New Floating Production System (FPS) & new associated subsea infrastructure
- New FPS for existing wells & subsea Infrastructure
- New subsea infrastructure (e.g. drilling template)
- Expanded subsea infrastructure (e.g. addition of manifold to template)
- Topsides expansion for production purposes (e.g. add deck space to make room for production equipment)
- Topsides expansion for non-production purposes (e.g. helideck, living quarters)
- Add or replace flowline(s)

*Enhanced Recovery will be addressed on separate slide

At what time are injection wells proposed and approved?

Included in Execution AFE

- Commits parties (Operator and Non-Operators) to costs up front

As individual well proposals are made near the time at which operations are to commence

- Allows for decisions to be made as reservoir is better understood
- Gives non-operators more influence over timing & placement

JOA Governance

Subsequent Developments



Should a party be able to non-consent an enhanced recovery program that benefits multiple Development Phases?

Yes (non-consent penalty)

- Complex agreement governance for allocating non-consent penalty
- Requires definition of reservoir boundaries for each phase to determine which wells are deemed to benefit from enhanced recovery operations

No (binding)

- All parties are forced to pay for enhanced recovery if voting threshold is reached
- Maintains uniform interest
- No need to define boundaries for individual Development Phases

JOA Governance

Subsequent Developments



Should approval thresholds be different (e.g. supermajority) for Subsequent Developments that target reservoirs already on production?

Yes

- Protects the reservoir(s) already on production from drainage, damage, etc.
- Requires definition of reservoir boundaries and/or protected well drainage radiuses
- Restricts ability of party(ies) to proceed with Subsequent Developments without alignment

No

- Could result in a non-consenting party's existing production being negatively impacted



QUESTIONS?
