The Business Case for Reuse
Encana's Experience So Far

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encana

Presentation Overview

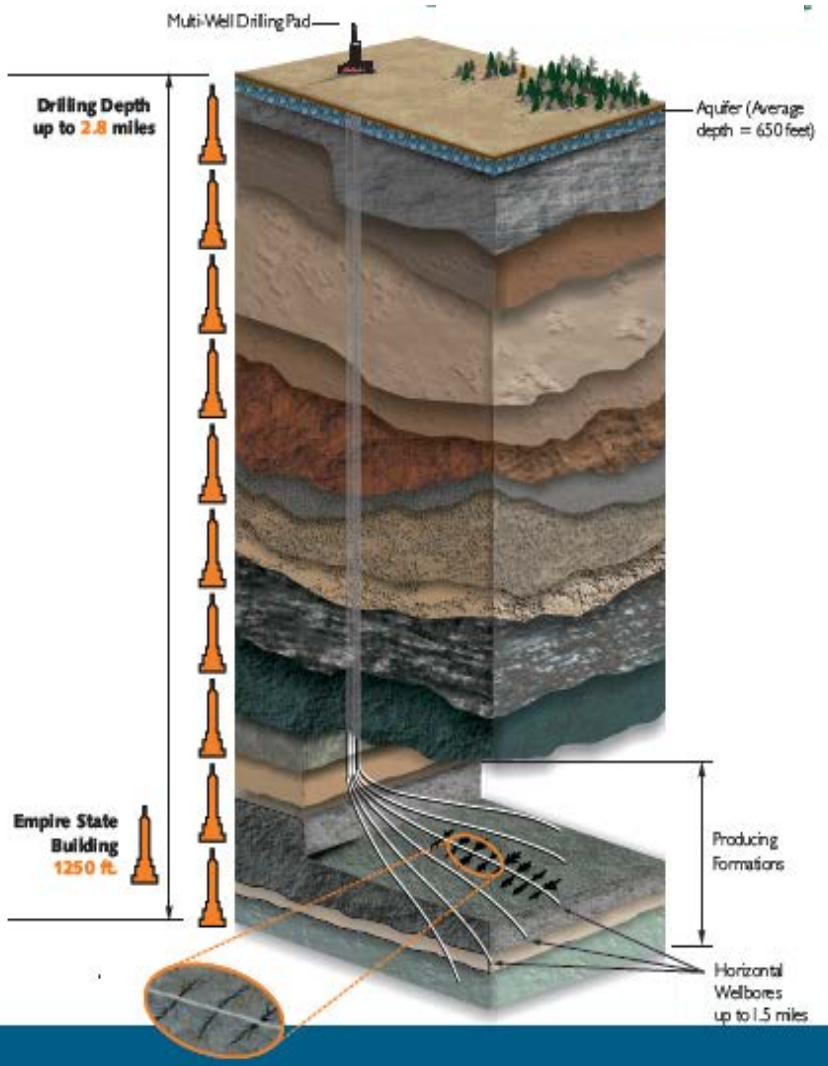
- Brief Encana overview and why effective water management is key to our strategy
- Encana’s water use philosophy and approach
- Conditions which support and enable water reuse
- Challenges to water reuse
- Three case study examples
- Our learnings so far

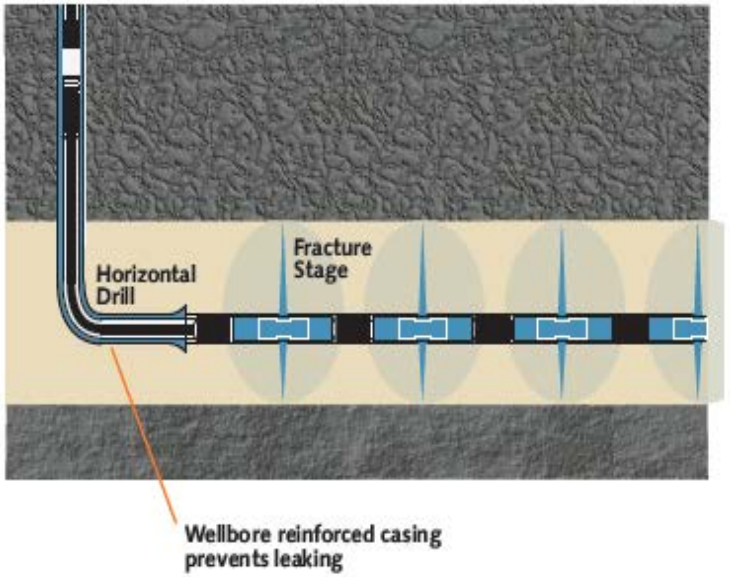
Encana Corporation

- Leading North American energy producer
- Diverse natural gas, oil and natural gas liquids portfolio
- Running room and scalability - growth potential of ~50,000 boe/d
- Diversification of commodity, geography and life cycle

Hydraulic Fracturing

Key to accessing the resource





Water

Enables Hydraulic Fracturing

Sustainability at Encana

Encana's sustainability definition:

"Creating long-term value by integrating financial, environmental, social and ethical considerations into the successful execution of our business strategy"

Encana's Water Strategy

Our Approach to Water Management

- water is a valuable resource
- committed to responsible use of water in all our operations:
  - water plans for all plays
  - reuse and use non-potable water when possible and practical in hydraulic fracturing operations
  - participate in strategic, collaborative and regional approach to meet our water needs
  - ensure industry best practices are being followed and contribute to their creation
  - carefully select the chemicals used if hydraulic fracturing
  - be transparent about the water volumes and chemicals used

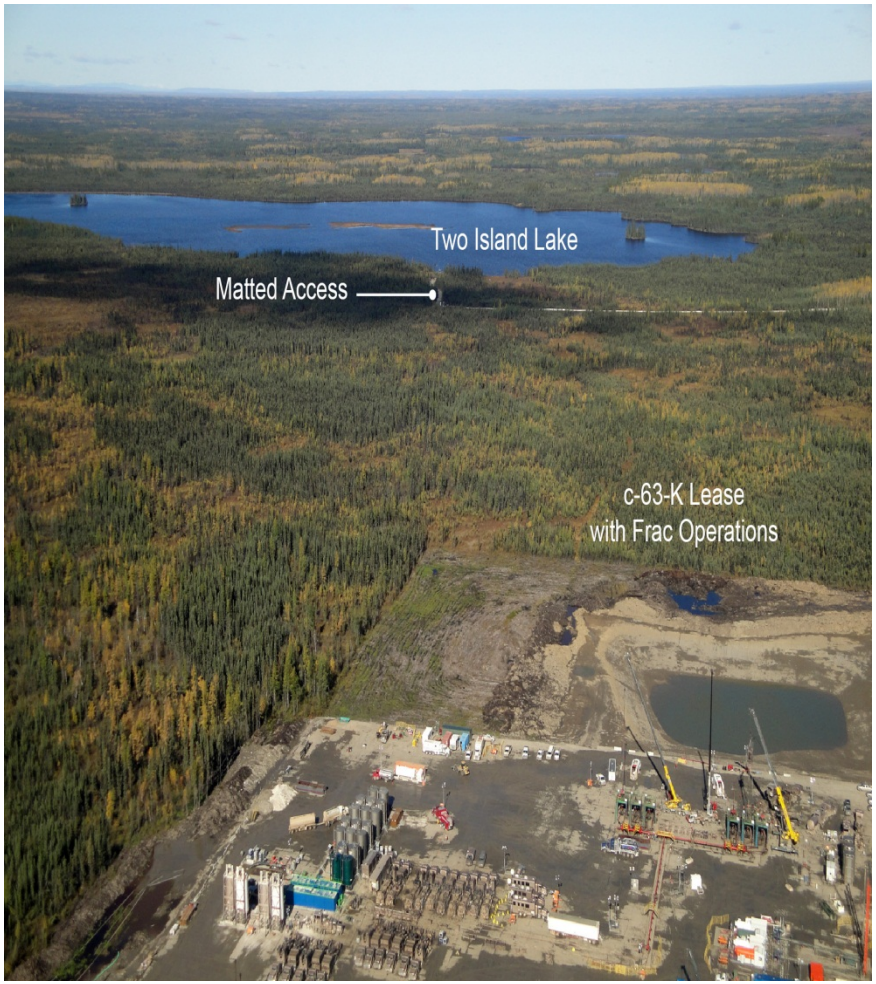
Water is an important environmental issue for our stakeholders. As an industry leader, Encana believes it is important to participate in initiatives to improve the responsible use and management of water.

Our Process

Identify the most appropriate water source for the play

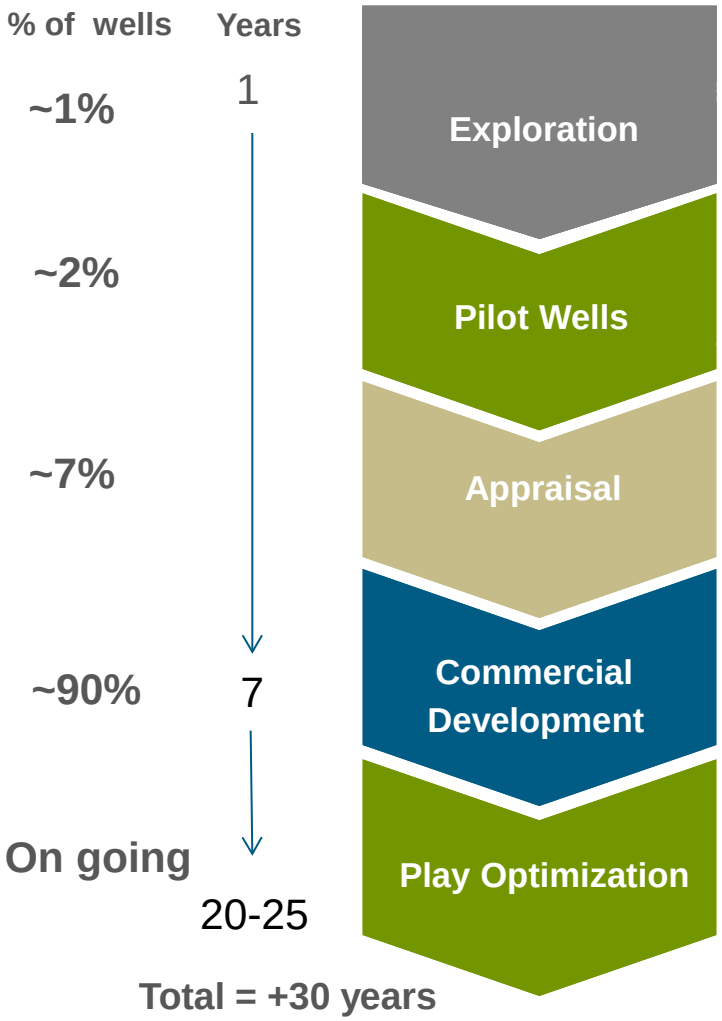
Analyses includes:

- community & stakeholder concerns
- environmental considerations
- technical feasibility
- economic viability
- regulatory & permitting construct
- opportunity for industry collaboration
- play maturity



Unconventional Expertise

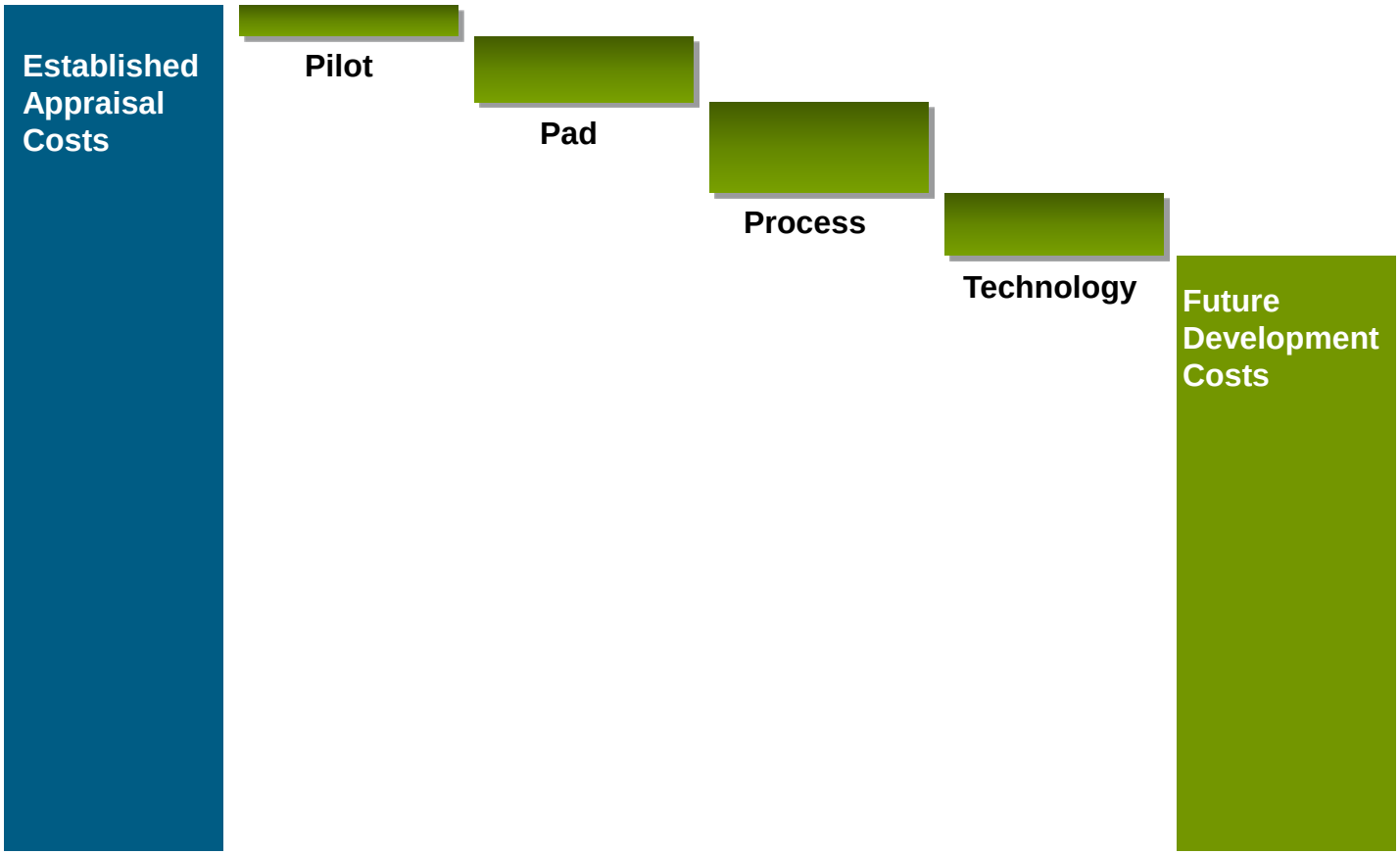
Resource Play Development Life Cycle



- **Exploration**
  - High costs and risk
  - Acquire key technical data
- **Pilot Wells**
  - Technical & commercial learnings
- **Appraisal**
  - Reduce costs
  - Well design optimization
- **Commercial Development**
  - Drive down costs through efficiencies
  - Continuous improvement

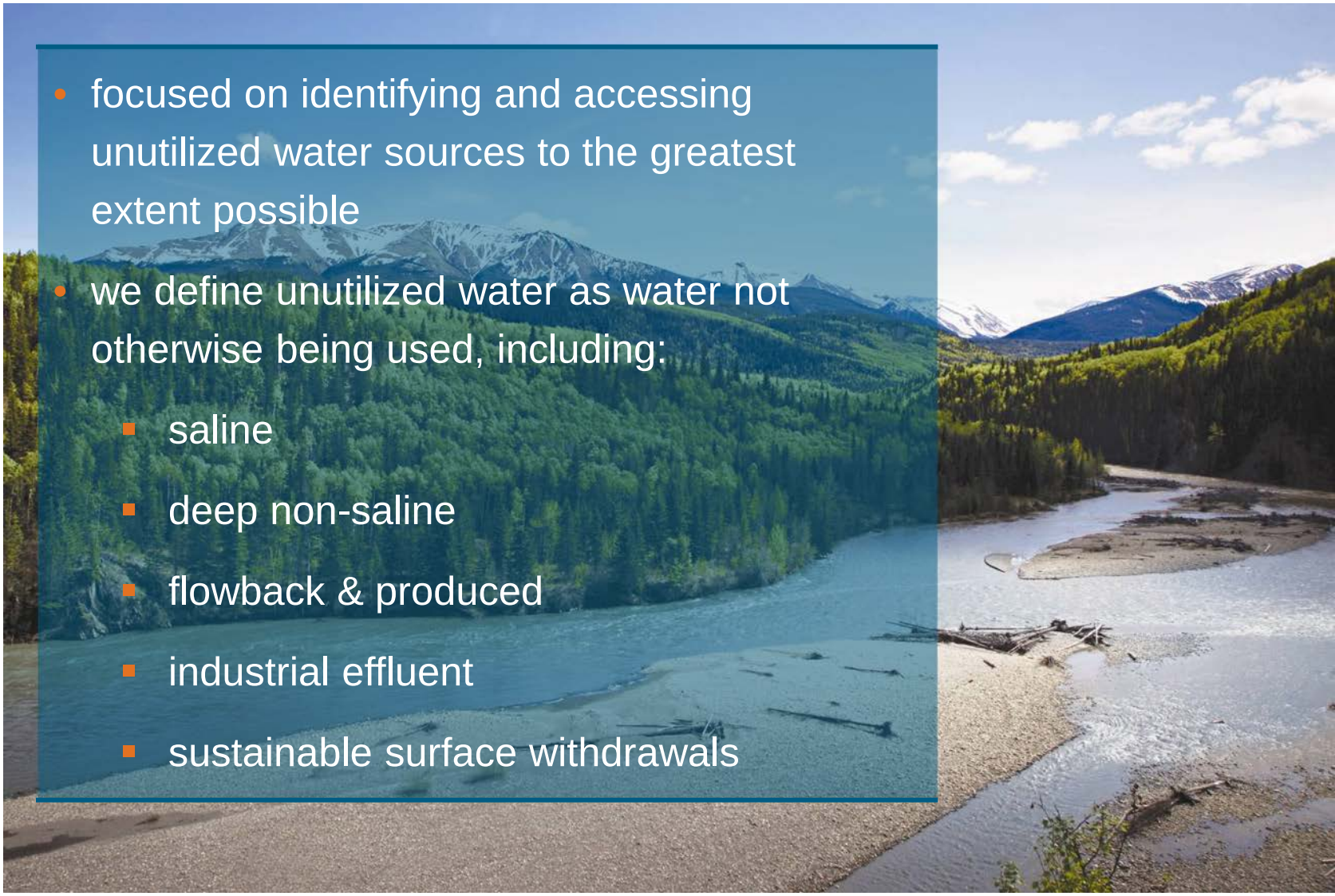
Commercial Development: Optimization

Identify Capital Reductions, Forecast Future Costs



Our Goal

Identify the “best” source available



- focused on identifying and accessing unutilized water sources to the greatest extent possible
- we define unutilized water as water not otherwise being used, including:
  - saline
  - deep non-saline
  - flowback & produced
  - industrial effluent
  - sustainable surface withdrawals

Conditions Supporting Reuse

1. Play maturity
2. Technical feasibility
3. Economic viability
4. Community & stakeholder input
5. Regulatory & permitting construct



Policy Drivers for Water Re-use/Recycle

Alberta

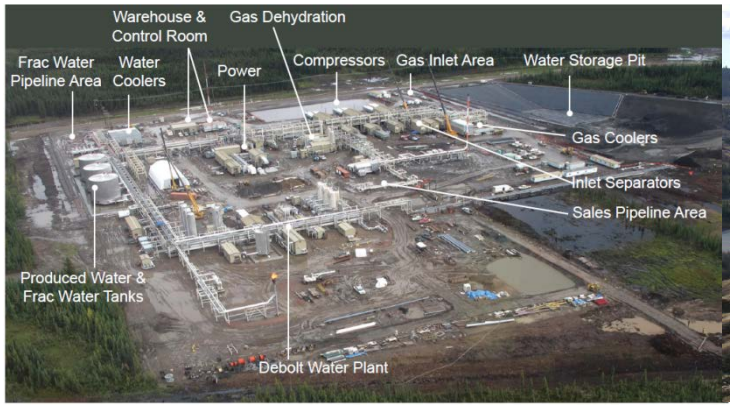
- Water Conservation Policy
  - Requires industry to show increased use of alternate sources and preferentially maximize reuse/recycling
- AER Play Based Regulation
  - Water management objective focused on enabling saline and recycled water use

British Columbia

- Water Sustainability Act
  - Based on principle of improved water use efficiency and conservation
  - Surface and groundwater use has a cost: *"…pricing should incent the use of non-potable water, encourage freshwater conservation, promote innovation…"*
- Infrastructure Royalty Credit Program
  - Supports water infrastructure that enables recycling and reuse

Challenges to Reuse

1. Economies of scale
2. Volume of the available water stream
3. Quality of the available water stream
4. Availability/practicality of infrastructure
5. Availability/practicality of water storage capacity



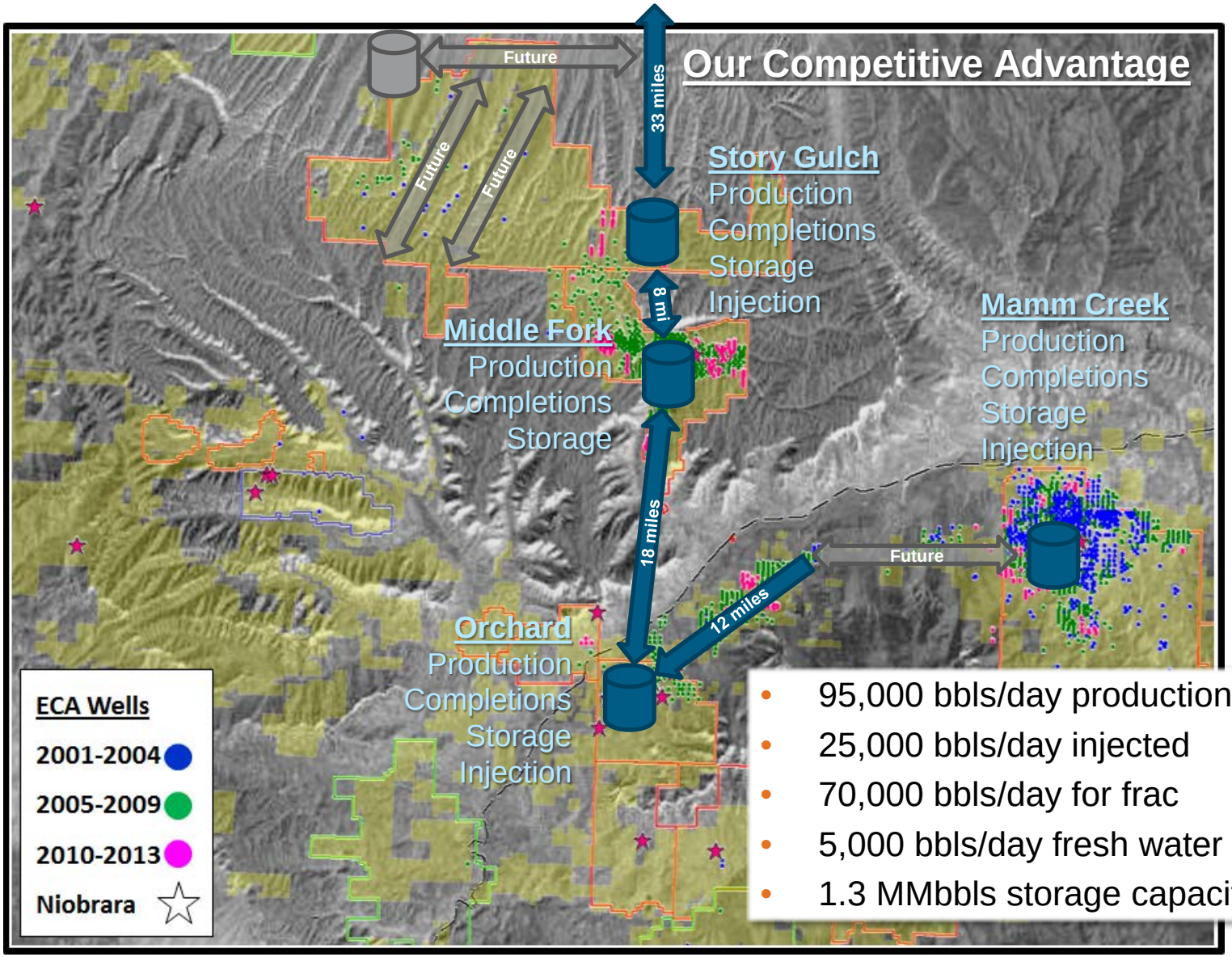
Case Study Examples

1. Piceance Three Phase Gathering & Treatment Facility – Colorado

2. Neptune Water Treatment Facility – Wyoming

3. Dawson Water Resource Hub – British Columbia

Piceance Three Phase Gathering



- 95,000 bbls/day production
- 25,000 bbls/day injected
- 70,000 bbls/day for frac
- 5,000 bbls/day fresh water usage
- 1.3 MMbbls storage capacity

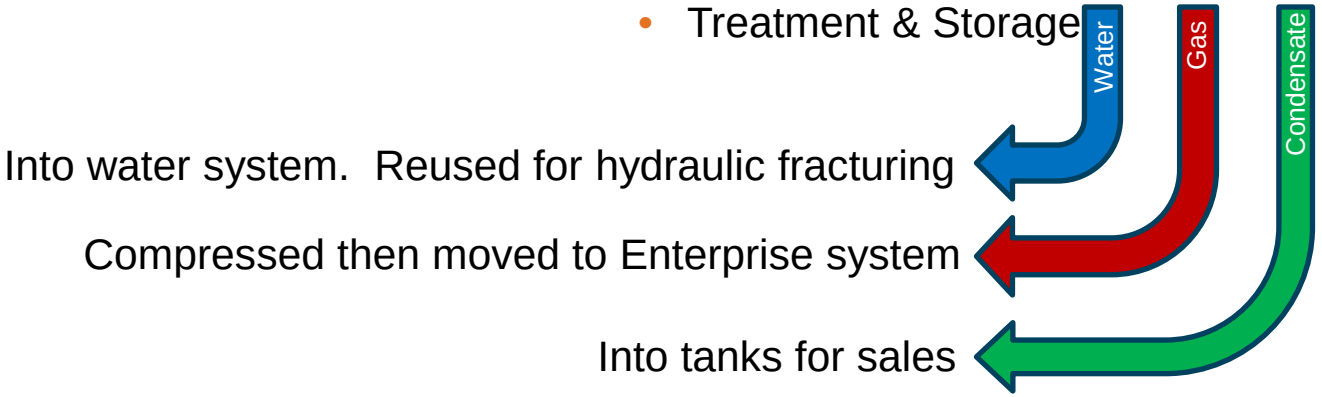
Piceance Three Phase Gathering

Well Pad

- Wells
- Three phase metering for allocation

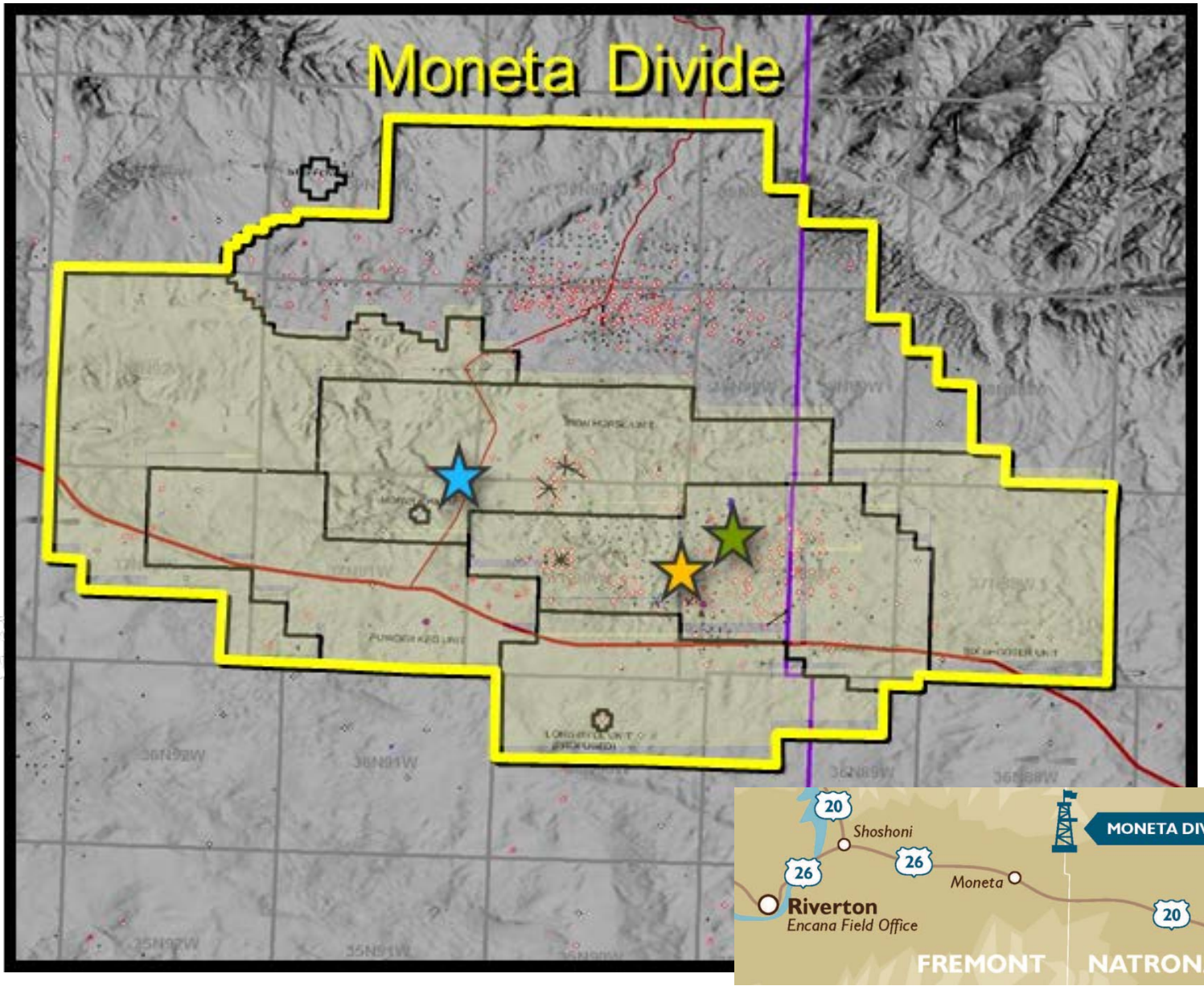
Central Delivery Point (CDP)

- Separation
- Single phase measurement
- Treatment & Storage

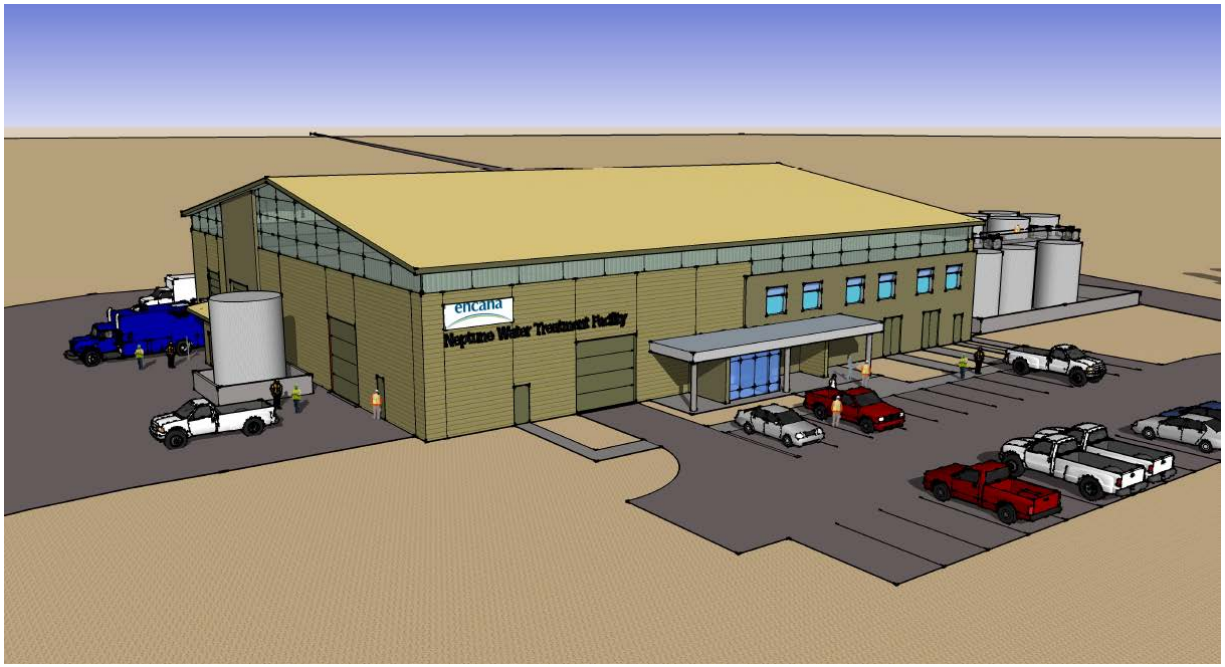


Piceance Three Phase Gathering

Neptune Water Treatment Facility



Neptune Water Treatment Facility



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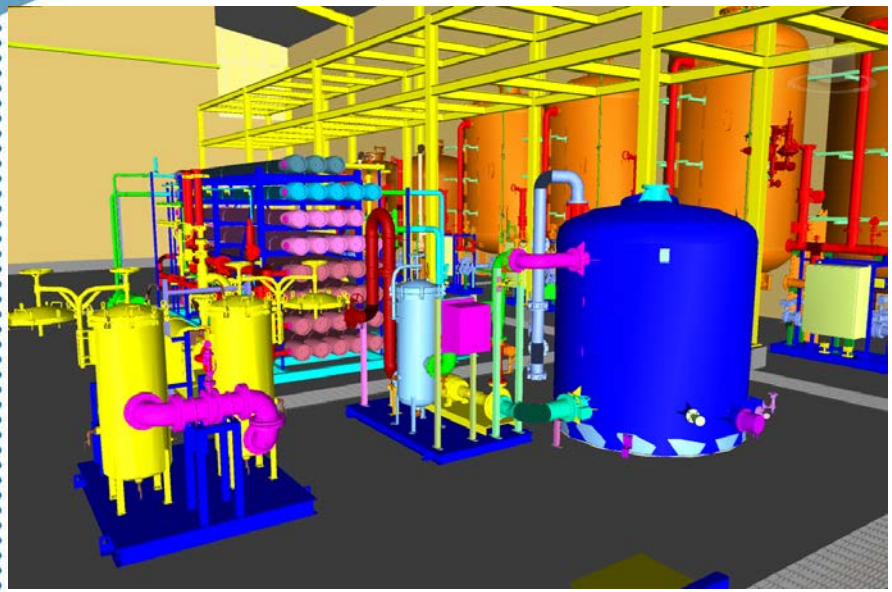
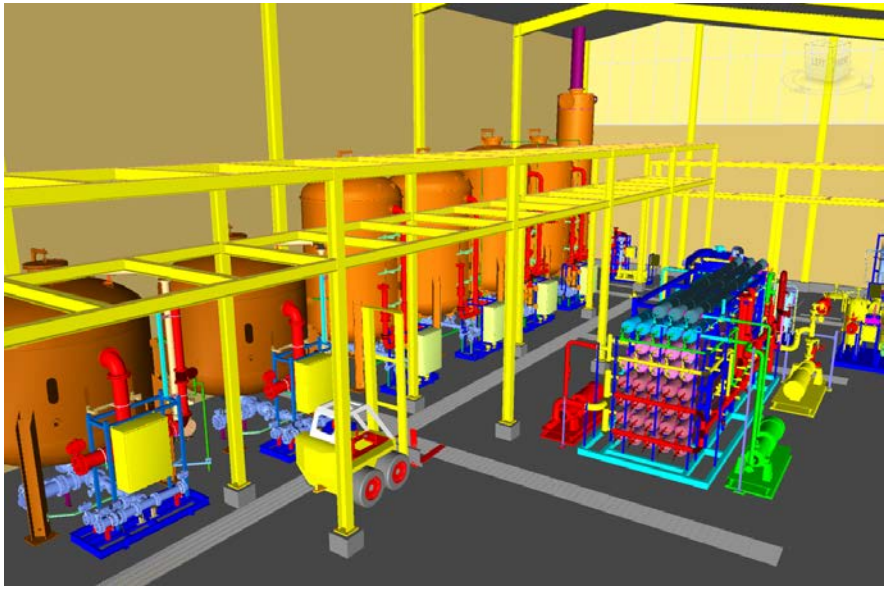
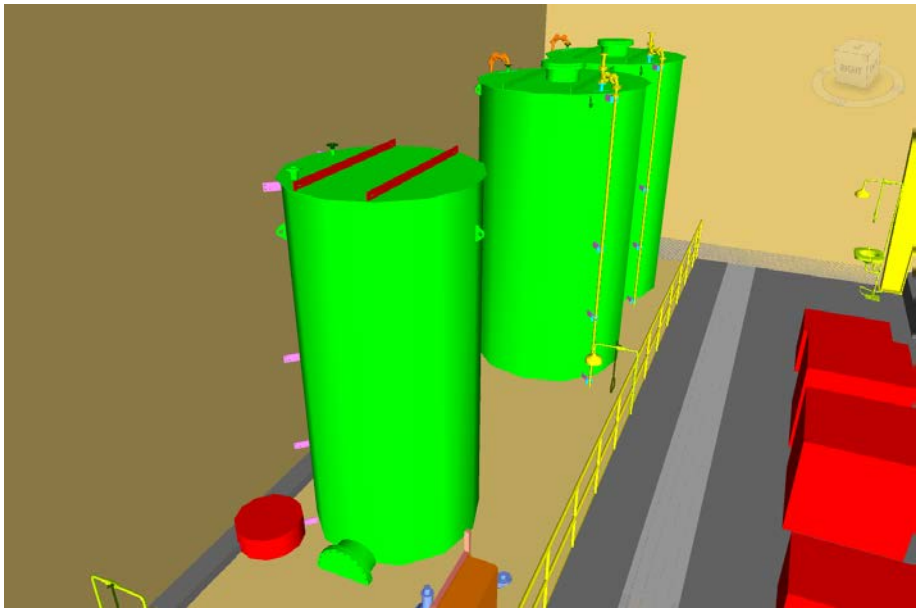
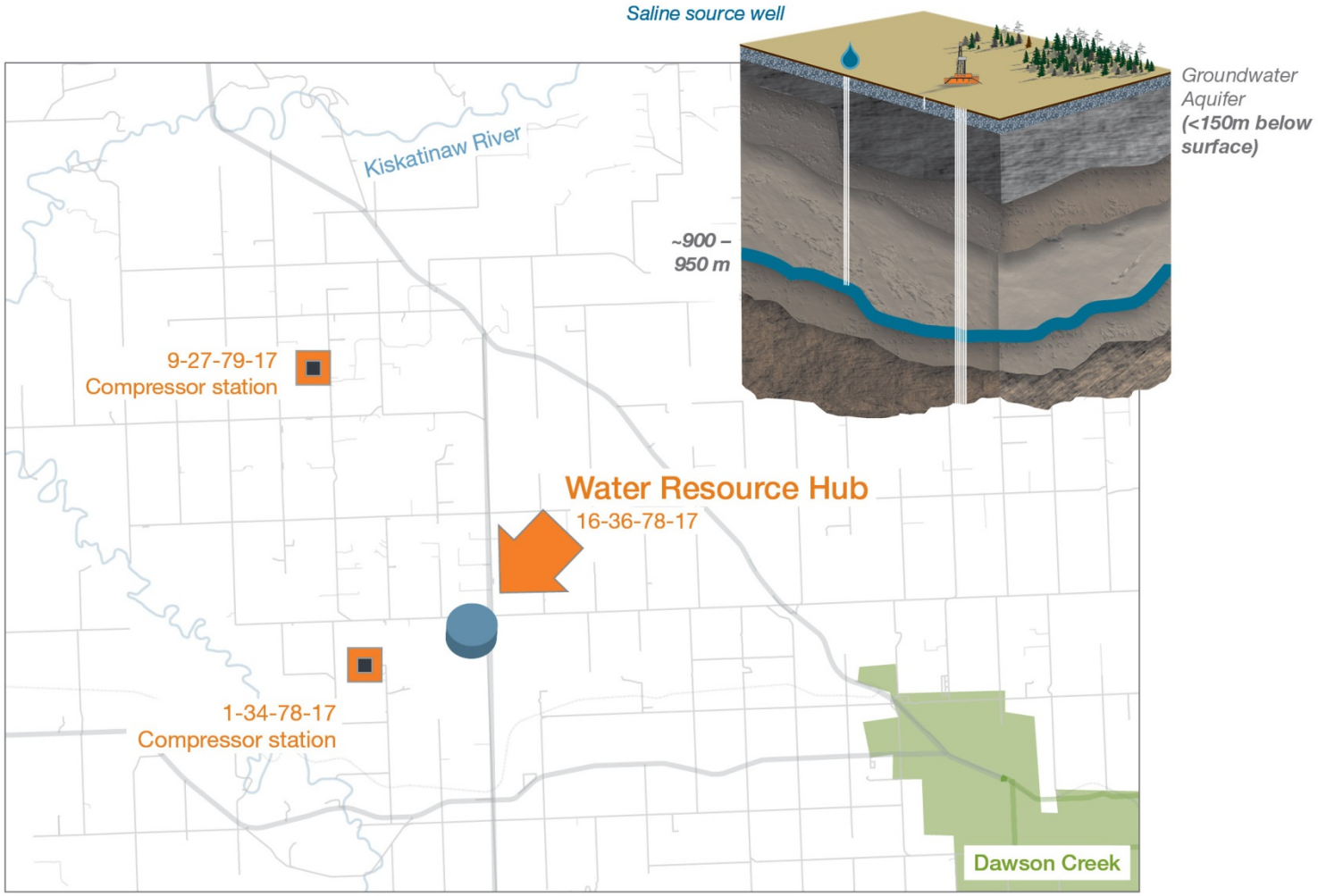






Dawson Water Resource Hub



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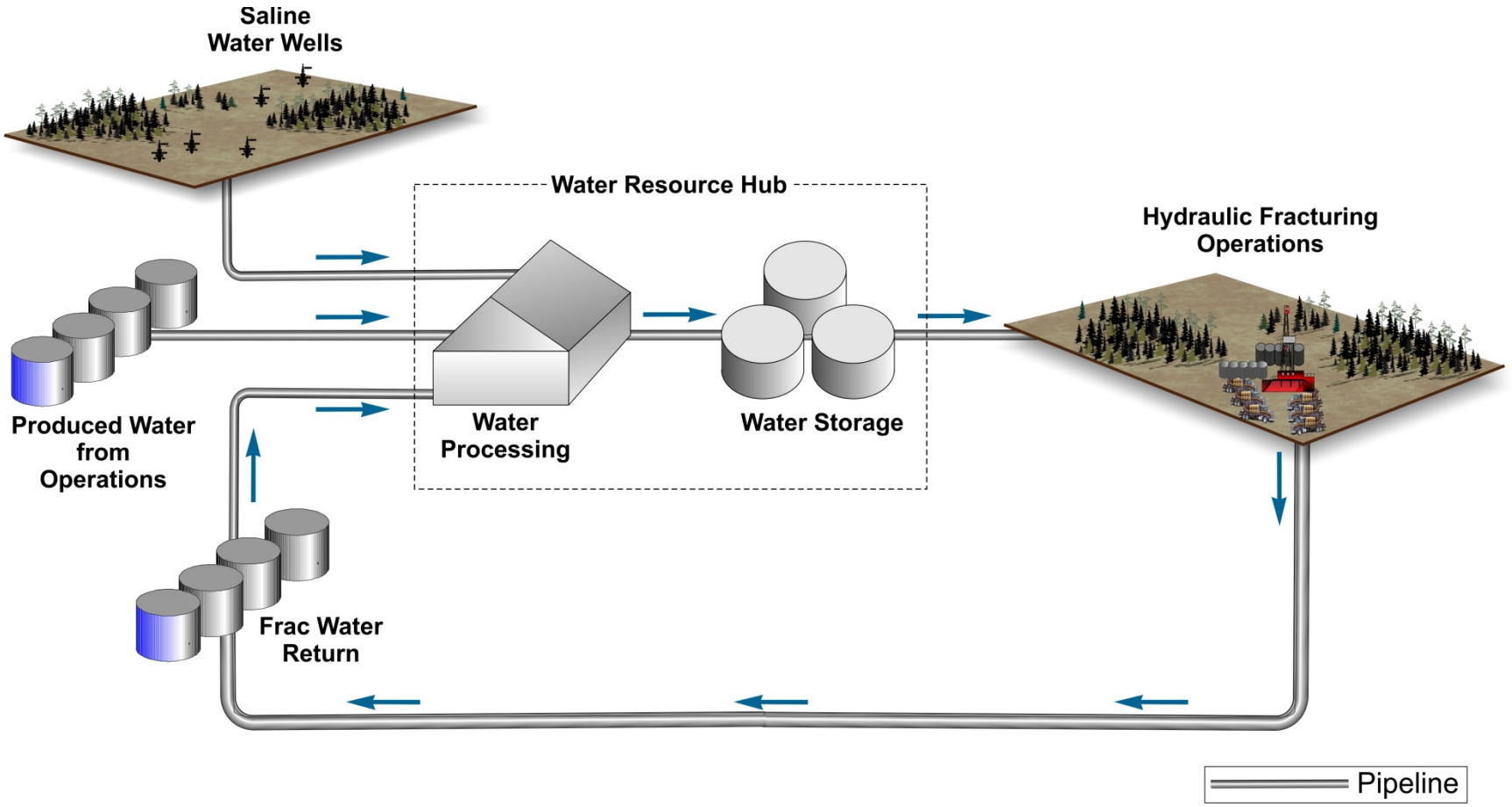

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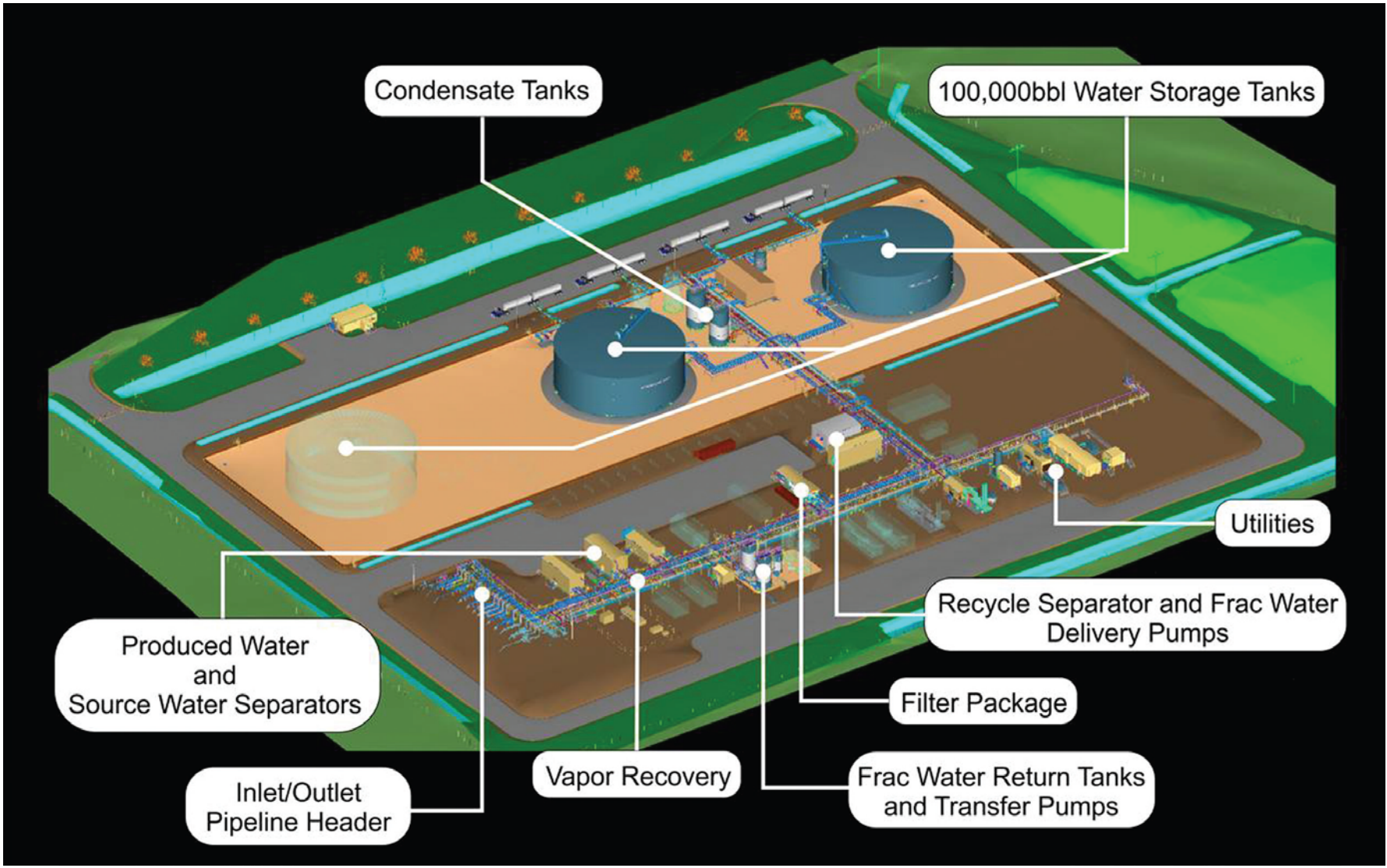

Dawson Water Resource Hub

Key Learnings

- Approaching water sourcing from a sustainability perspective preferentially positions reuse as the preferred option
- Water sourcing and reuse solutions are complex – identifying the “right” solution requires thorough analyses by an interdisciplinary team
- Play maturity is the critical driver to enable reuse opportunities
- Government policy and stakeholder expectations preferentially maximize reuse/recycling
- There is no one size fits all solution to water reuse. Each play is different and there is often variability across the play
- Collaboration and innovation is key


Thank-You