Confidential Projects

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Enhanced Late-Life Process (ELP) Experimental Pilot

Approval 12912

Background of Scheme

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ELP Process Background

Process Description:

- Late-life follow-up to thermal recovery processes (CSS, Steamflood, SAGD, etc.)
- Continuous, low-pressure injection of butane
- Butane condenses and mixes with bitumen, reducing its viscosity
- Mobilized bitumen and condensed butane drains to production wells
- Up to 70% reduction in GHGi over steamflood

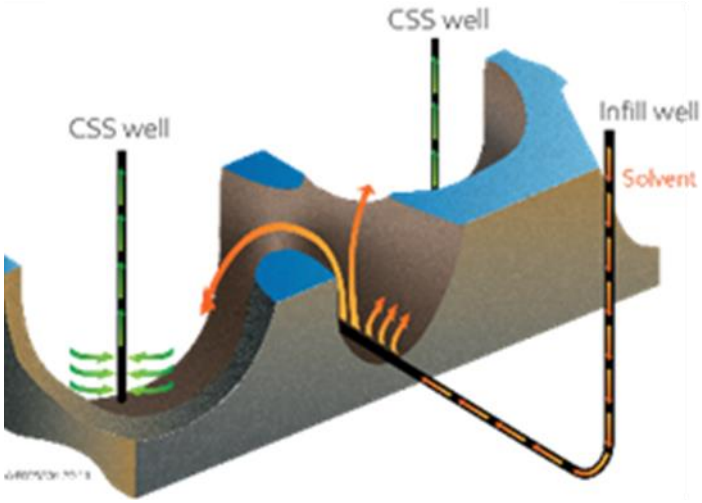
Mobilizing Agent: Dilution

Mobilizing Agent Delivery System: Solvent

Drive Mechanisms: Gravity Drainage, Gas Drive

Target Resource:

- Requires strong communication pathways between injectors and producers
- Sensitive to thief zones and/or adjacent depletion
- High vertical permeability



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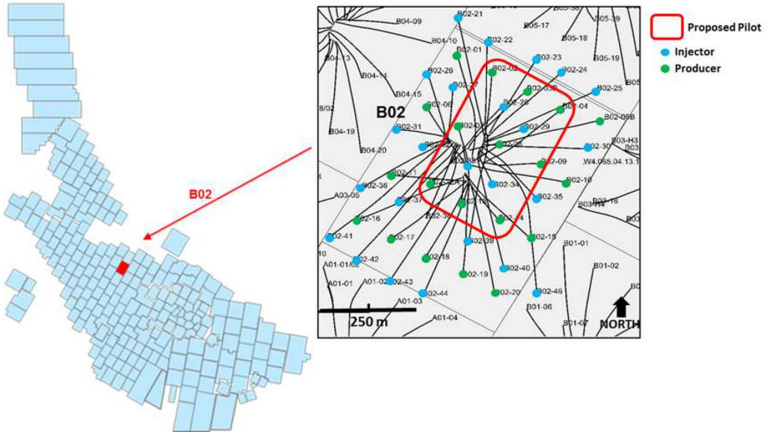
ELP Pilot Background

Background:

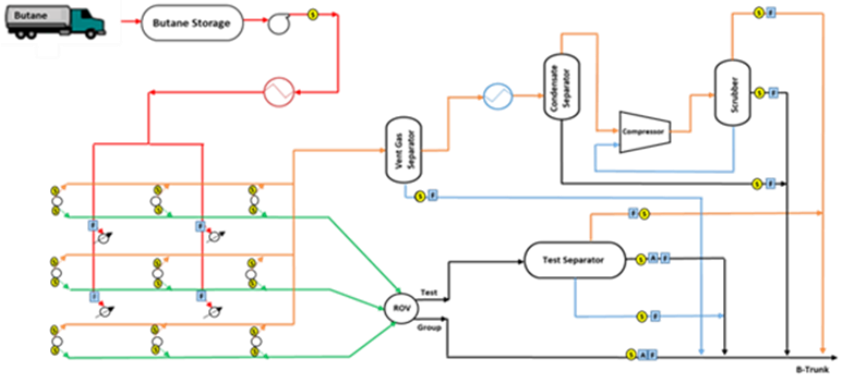
- B02 pad selected primarily due to the deviated injector-only-infill wells
- 4 injectors, 9 primary producers
- Butane selected as the solvent

Specifications:

- Injection system:
  - Storage bullet and loading station
  - Two injection pumps (n + 1 redundancy)
  - Vaporizer and superheater
- Enhanced measurement:
  - Replaced turbine meters with Coriolis meters on 3 phase separator
  - Added coriolis meters to capture flow in the vent gas system
  - Installed sample points to collect pressurized samples
  - Added a coriolis meter on the group line
  - Vent gas meter on well B02-08



ELP Pilot Location



ELP Process Flow Diagram

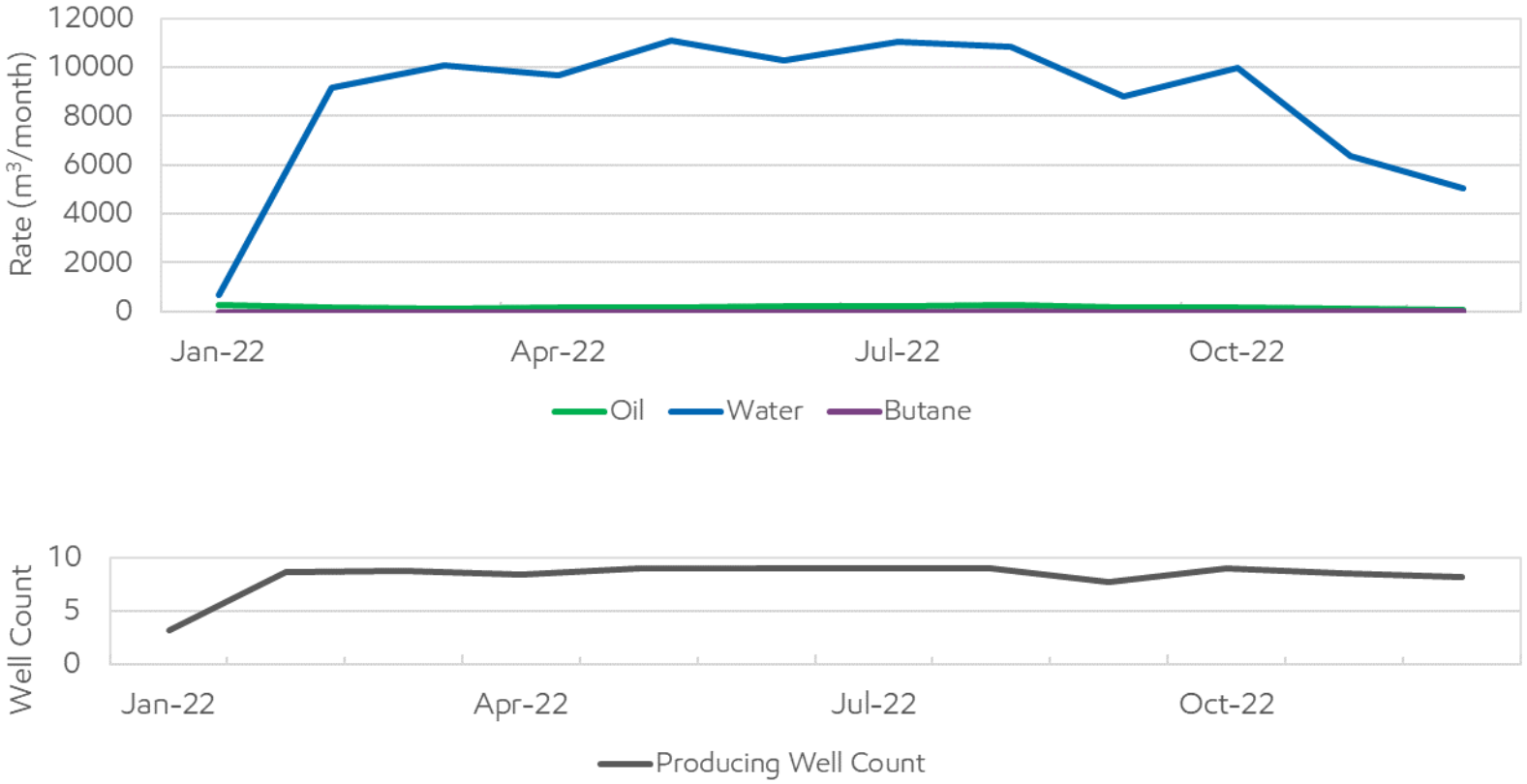
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Subsurface

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ELP Brownfield Production Performance

- Production wells were restarted in January 2022 after facility construction was completed
- Only a small volume of butane was injected in 2022 to commission the butane injection pumps



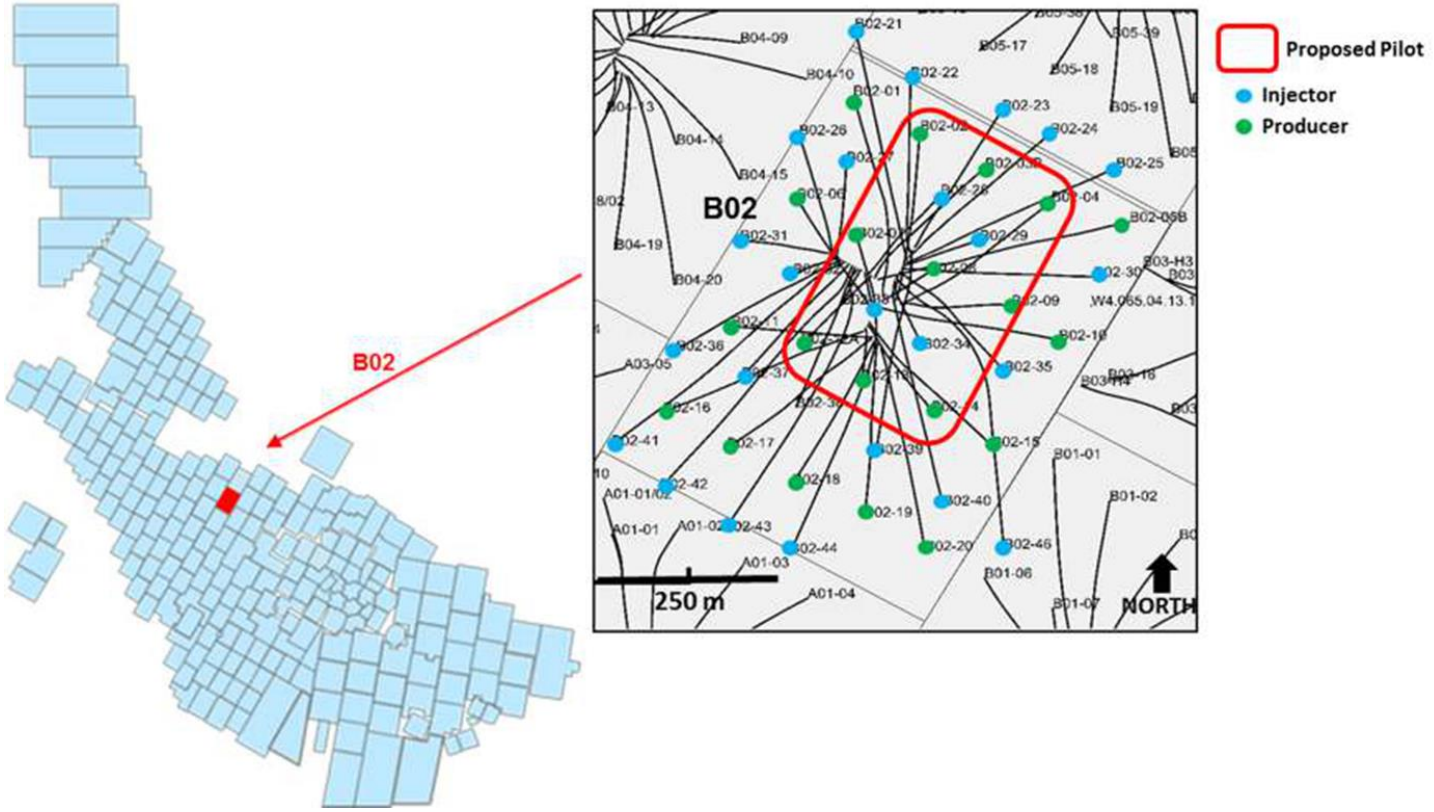
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Major Events

Time	Events
January 2022 – Present	Brownfield data collection phase. Production facilities were restarted after facility upgrades were completed. Baseline production rates were established.

Drilled/Approved Map

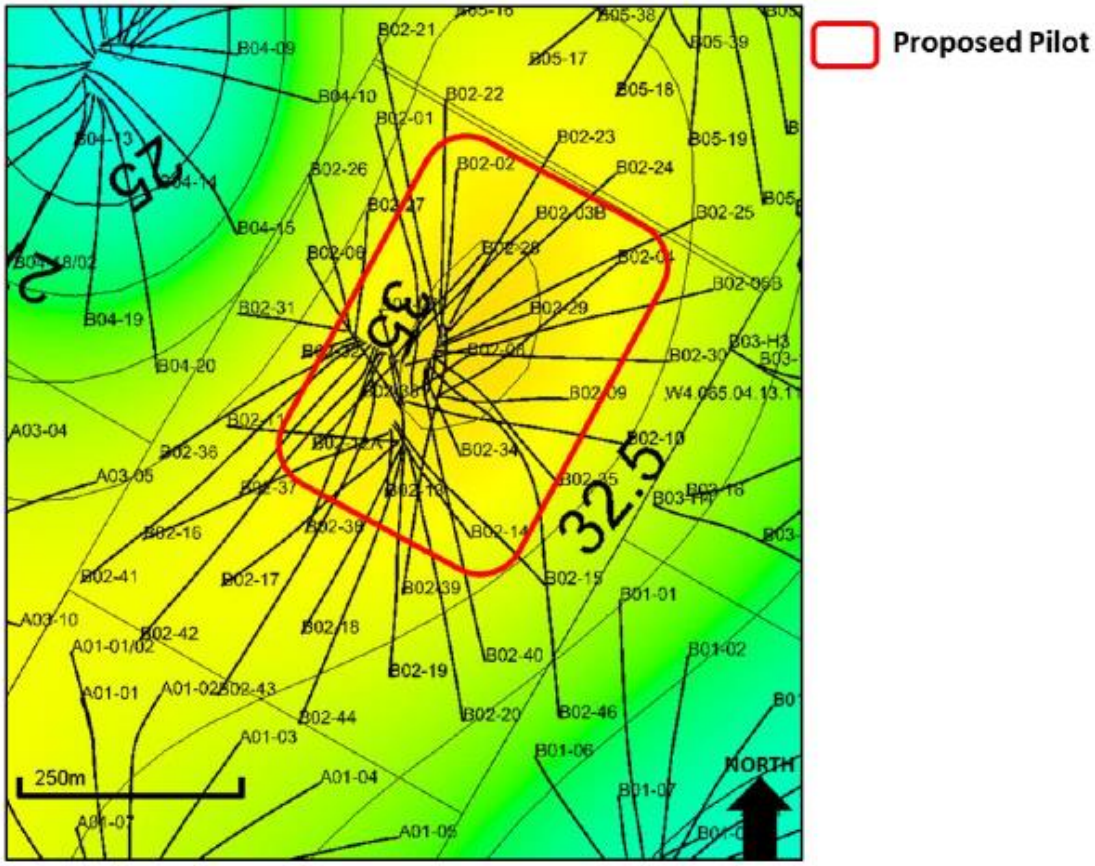
- Existing wells at B02 Pad at Cold Lake were repurposed for the ELP pilot
- Wells 28, 29, 33 and 34 are dedicated butane injectors
- Wells 02, 03, 04, 07, 08, 09, 12, 13 and 14 are production wells



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Isopach of Net Pay

- Net pay is defined as top of effective pay to the base of the Clearwater reservoir
- Pay zones with less than 8 weight percent bitumen are excluded



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Gas / Water Intervals

- Geological interpretation shows no bottom water or top gas is in contact with the resource in the ELP pilot area

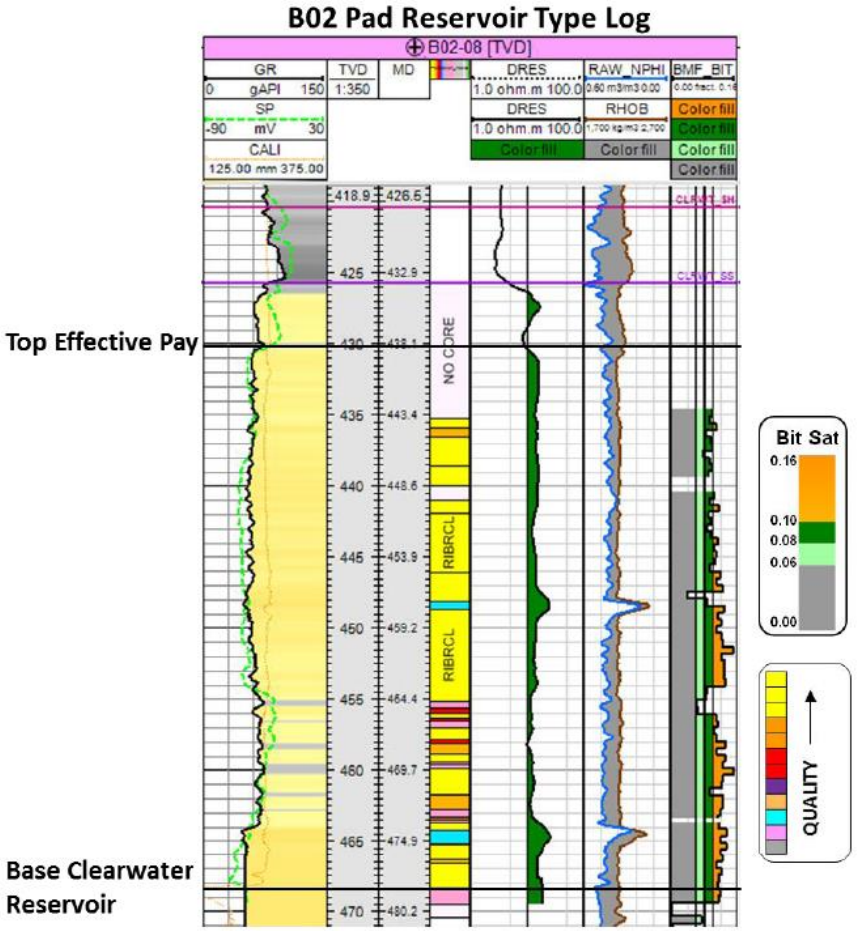
Geomechanical Anomalies

- No observed geomechanical anomalies within pilot area

Seismic Acquisition

- A 4D seismic survey was acquired over B02 pad in 1995
- No additional seismic data was collected as part of the ELP pilot

Representative Type Log



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Average Reservoir Properties and Original Bitumen in Place (OBIP)

Reservoir Properties	Value
Depth	Clearwater @ 425 m
Environment of Deposition (EOD)	Fluvial
Reservoir characterization	High quality reservoir with few or rare interbeds and/or clasts (RIBRCL)
Gross thickness	~43 m
Average net pay thickness	~27 m
Average porosity	~0.34
Average bitumen wt%	~11%
Average permeability	~1.8 D
Bitumen viscosity	~100,000 cp
Effective OBIP	930 e^3m^3
Recovery to YE 2022	50% of Effective EBIP
Ultimate Recovery	50 – 55% of Effective EBIP

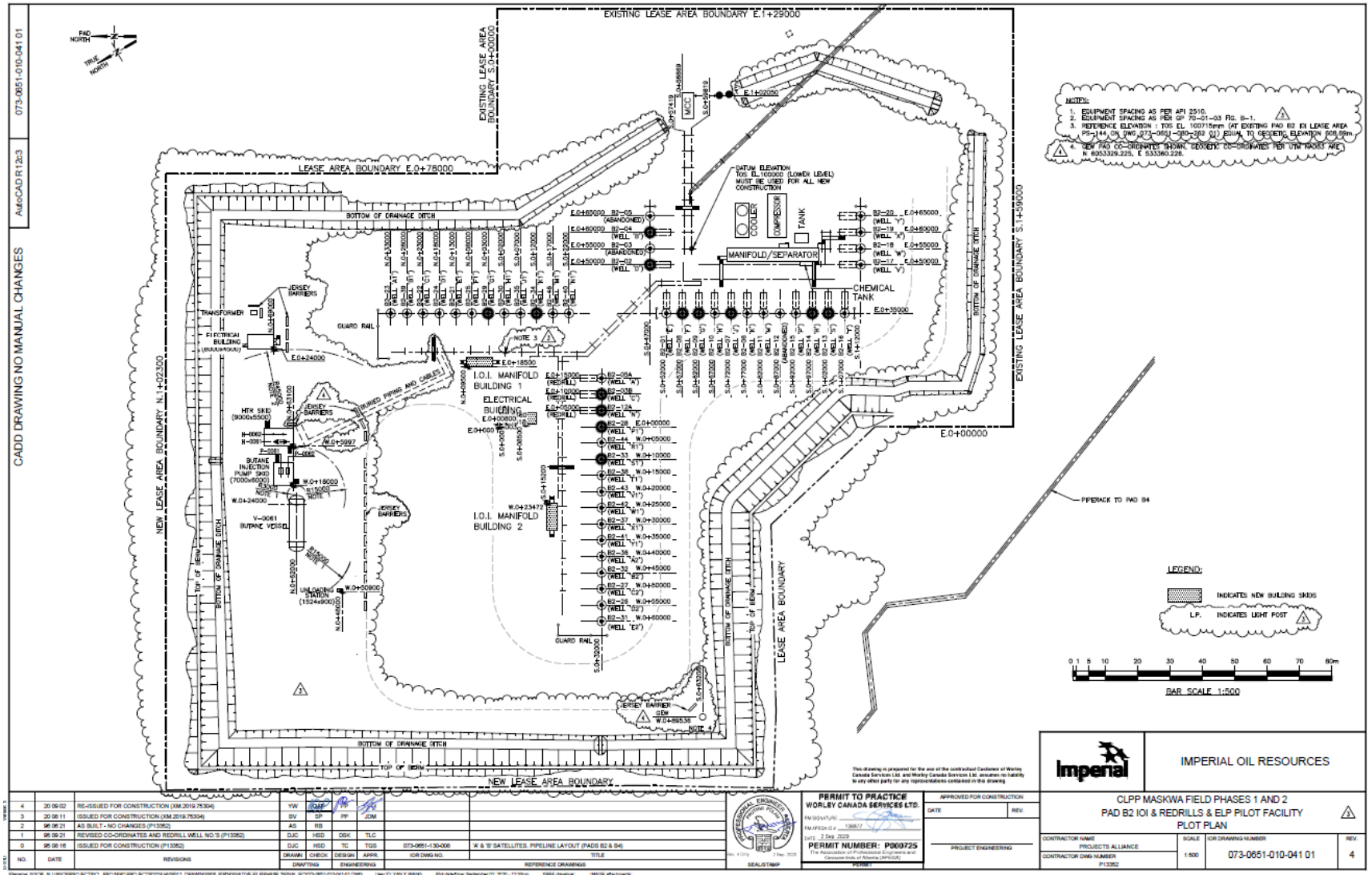
Co-injection

- Only 100% heated butane vapor will be injected into the 4 dedicated injection wells

Surface

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Built and Planned Surface Infrastructure



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Facility Modifications

- No modifications implemented at the ELP pilot in 2022 that require AER approval

Historical and Upcoming Activity

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Summary of Suspension and Abandonment Activity

- No suspension and abandonment activities at the ELP pilot in 2022

Regulatory and Operational Changes

- No regulatory or operational changes in 2022 for the ELP pilot

Account Compliance History

- No reportable incidents, voluntary self-disclosures, contraventions and associated remediation occurred at the ELP pilot in 2022

Scheme's Future Plans

- An application has been made to the AER to extend the confidential period of the scheme to August 31, 2026