Performance Presentation for In-Situ Oilsands

Experimental Scheme Approval No. 11825
Reporting Period September 1, 2017 – August 31, 2018

SUNCOR

Nsolv Pilot Timeline

- Facility commissioned summer of 2013
- Solvent injection started February 2014
- Solvent injection continued until March 2017
- Solvent recovery (blowdown) occurred for 3 months and was discontinued at the end of May 2017
- Facility was de-commissioned June 2017
- No activity on site during reporting period of Sept 1, 2017 to Aug 31, 2018, other than well abandonments in August/September 2018

Subsurface/Geology Learnings

- Breccia and IHS does slow down solvent penetration but results indicate potential chamber expansion past both types of baffles
- Very low residual, so values of around 8% by volume shown on post solvent core
- Extent of asphaltene movement unknown - thin section and microscope photos indicate asphaltene precipitation appears to occur on the sand grains and remain in place as expected; SARA analyses vary across chamber indicating potential movement

Subsurface/Geology Learnings

- Elevated bottom hole temperature appears to provide a reduction in instantaneous SvOR and Solvent Holdup

- Artificial lift – excellent overall performance; components in the hole for over 2 years
  - MTM PCPs struggle with low viscosity fluid
  - Viton stators work well with solvent, but are challenged with any solids production
  - ESPs appear to be a good choice

Operational Learnings

- Able to produce dry oil without use of separation chemicals or external diluent
- No water treatment required on-site
- Able to operate the solvent chamber at or below initial reservoir pressure with no issues
- High solvent recycle rates readily achieved
- Asphaltenes were not an issue
- Significant and consistent in-situ upgrading occurred
- Water cut varies with chamber pressure

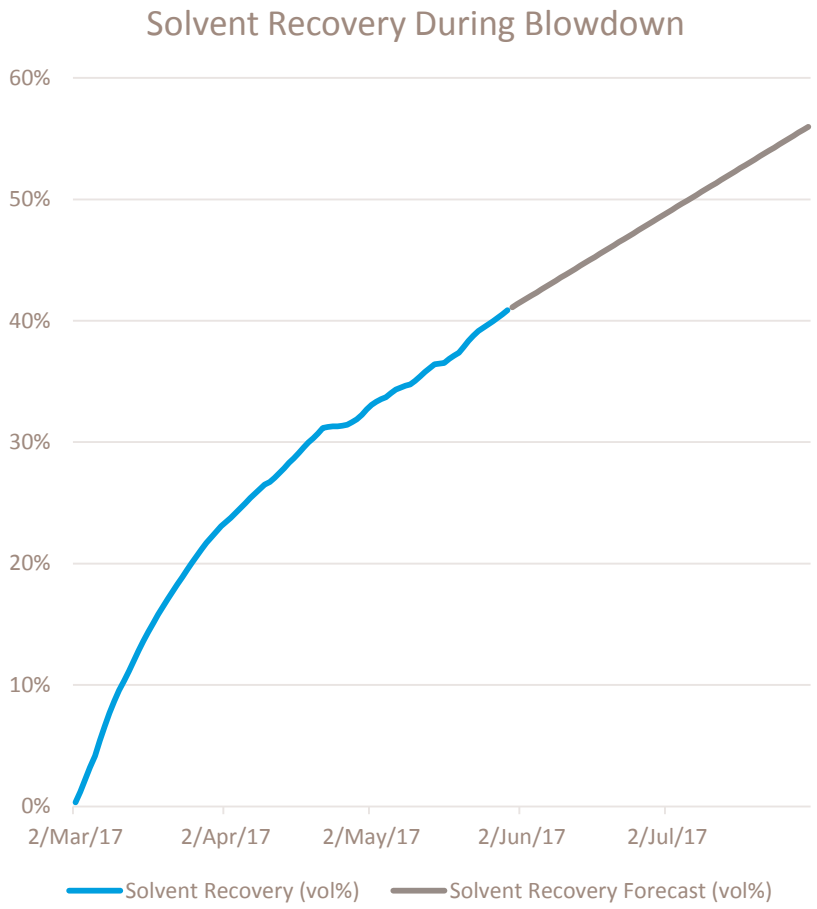
Operational Learnings

- Solvent chamber largely unaffected by extended outage due to wildfire – simple operational restart

- No challenges restarting wells after the extended wildfire related downtime, as the bitumen is still dissolved in the solvent in the wellbore and did not solidify with temperature decay

Solvent Recovery

- Brief blowdown phase prior to shut-down showed significant recovery of held-up solvent over a very short period of time
- More than 40% in only 3 months, with daily recovery rates still high at time of shut-in
- Significantly higher volumes of solvent could have been recovered by extending blowdown operations. Budgetary constraints required premature end to the project
- Results support solvent recovery prediction of over 70% for mature well pairs on commercial projects



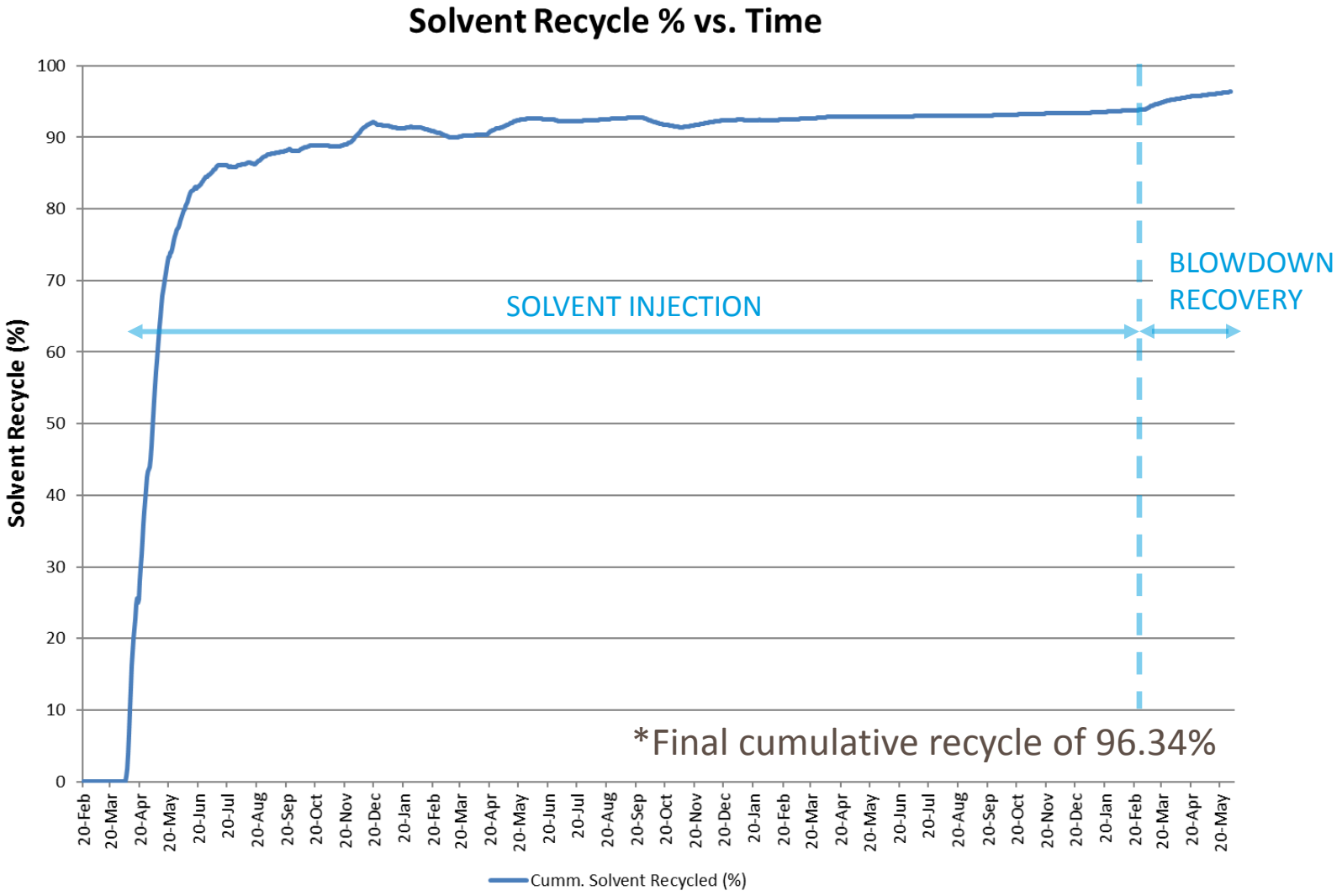
Solvent Recovery

- Shortened wind-down phase showed that the recovery process could continue without any make-up solvent for an extended period without issue

- Blowdown phase also contributed to a meaningful reduction in cumulative SvOR

- Pressure support during blowdown via NCG injection for the last few weeks of blowdown was helpful from a stability point of view

Solvent Recovery



Well Abandonment

- Seven vertical observation wells abandoned in August/September 2018
  - 103/15-18-093-12W4/00, 104/15-18-093-12W4/00,105/15-18-093-12W4/00, 106/10-18-093-12W4/00, 108/15-18-093-12W4/00, 109/15-18-093-12W4/00, and 110/15-18-093-12W4/00
- One post solvent core well (NS-14) abandonment was completed in August/September 2018
  - 121/15-18-093-12W4/00
- Two horizontal wells, producer and injector, were abandoned in August/September 2018
  - 112/15-18-093-12W4/00, 111/15-18-093-12W4/00
- All wells abandoned as per Directive 20

Future Plans

- Submission of an updated Conservation & Reclamation Plan to the AER
- Facility abandonment and reclamation
- Please note this will constitute the final performance presentation unless otherwise requested by the AER
- Pressure and temperature reading are unavailable for the reporting period as the site was inactive and the wells eventually abandoned