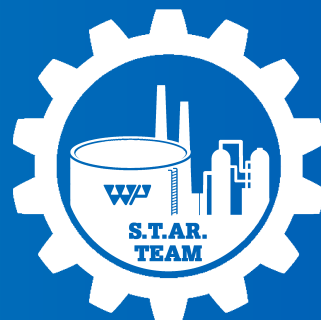




CHEMICAL CLEANING HISTORY BY REFINERY TYPE

OIL SANDS UPGRADER & REFINERY CHEMICAL CLEANING HISTORY



OPERATIONAL SCOPE

Processing or upgrading of oil sands deposits presents many challenges in that several extraneous materials need to be removed to produce refinery-ready feedstocks. These extraneous materials often lead to accumulation of fouling and hazardous gas contamination that reduces operational efficiency over time and literally prevents specific units or vessels from being inspected or repaired for continued operation. Therefore, periodic cleaning and decontamination must be completed to restore these units or vessels to optimum operational efficiency as well as to provide entry for repair or inspection.

PROCESS ISSUES

Where refinement immediately follows upgrading, additional processing units such as cokers, fractionators, and recovery units related to diluent recycling or sour water processing will experience heavy accumulation of contaminants such as sludge, pyrophoric scale, LEL gases or volatile organic compounds (VOC's), and even H₂S.

Operators at both upgrading and refinery process facilities often require development and implementation of a coordinated chemical cleaning program to return all assets back to operational specification. These chemical cleaning programs will be completed using liquid circulation or vapor phase co-injection techniques, depending on site logistics, asset configuration, and deposit accumulation.

OUTCOMES

Oil sands operators across northern Alberta have coordinated successfully with industrial service providers and cleaning contractors for over 14 years to return their assets back to optimum operation using West Penetone products.

Throughout this history, West Penetone has and continues to provide products to combat specific process issues at oil sands upgraders and refineries, with brief examples of chemical programs included in the table on the next page.



ADVANTAGES

UNIT & CONTAMINANTS	CHEMICAL PROGRAM	METHOD OF EXECUTION
Coker – debris, heavy oil fouling, entrained coke deposition, pyrophoric scale, H ₂ S, VOC's	ROC 40, SCAVEX VP, CITRIKLEEN, POTASSIUM PERMANGANATE SOLUTION	Liquid circulation to flush solids, sludge, and debris from the feed and slurry systems and nozzles, fractionator, subsequent light-end recovery units as well as to degrease circuits and treat pyrophoric scale deposits. Subsequent vapor phase co-injections to control residual H ₂ S and VOC emissions and areas with potential for pyrophoric burning.
Diluent Recovery – heavy oil fouling, H ₂ S, VOC's, pyrophoric scale	ROC 40, CITRIKLEEN HD, IRONSULFIDE DISSOLVER OSP-1	Series of vapor phase co-injections into pre-flash, fractionation, & bitumen cooling.

These programs are also supported with supplementary chemical products to manage general cleaning tasks. All programs are also provided with demonstrated job monitoring techniques to support management and verification of chemical consumption and job completion, where needed or required, to create a continued history of successful chemical cleaning projects at oil sands upgraders and refineries.

A comprehensive and integrated approach

With over 100 years of product development, manufacturing and application experience, the West Penetone family of companies has designed and patented many products to satisfy the needs of our clients world wide.

Our technical group provides customers effective support to ensure that contaminants are paired with the right chemistry for any task.

Establishing and maintaining a collaborative approach with our customers in tackling their operational and maintenance challenges is key to realizing efficiencies and cost savings.

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