



**ProSep**

**Selective Removal of BTEX from a Methanol  
Containing Process Water Stream**

**Produced Water Society Seminar 2019, Sugar Land Texas  
February 7, 2019**

Caleb Smathers, ProSep

## Introduction

- Process Water Problem
- Osorb Media<sup>®</sup>

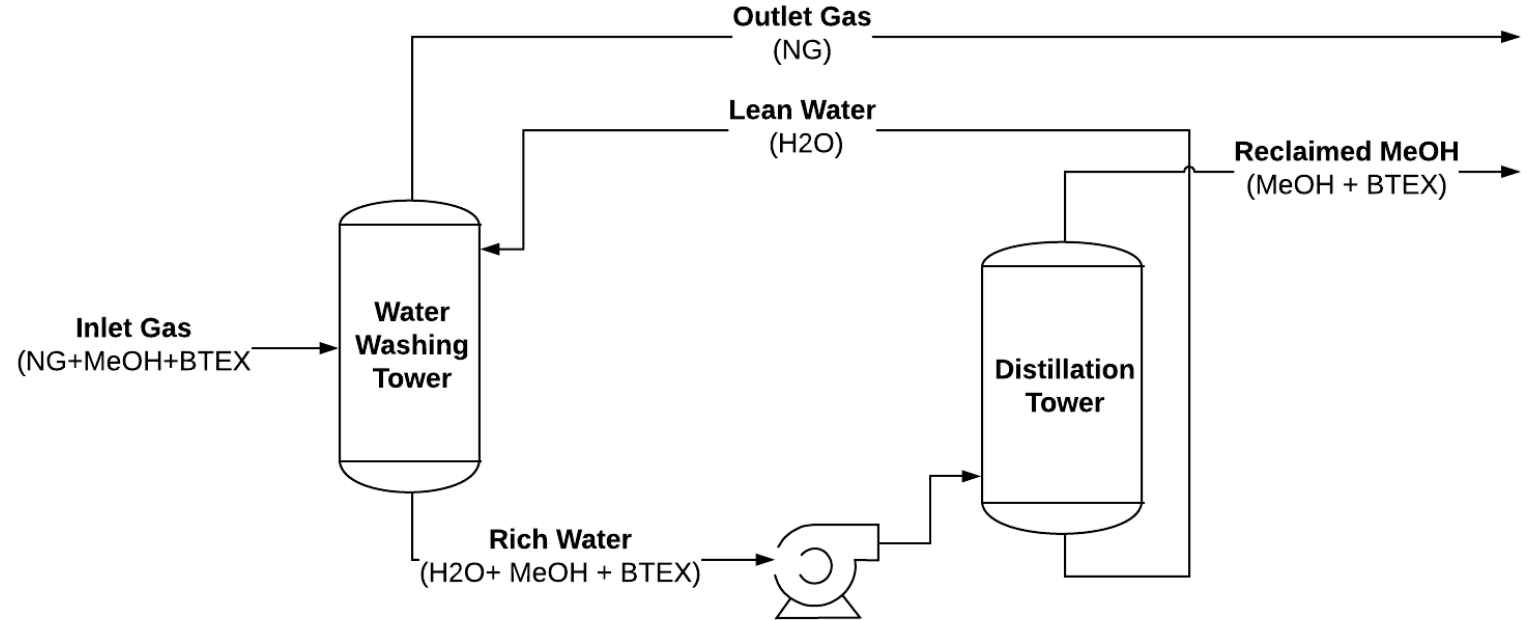
## Seeking a Solution

- Test 1
- Test 2
- Field Test

## Commercial Solution

# INTRODUCTION




- Offshore gas contains MeOH
- MeOH prohibits effective gas processing
- Clean MeOH provides revenue stream
- Dirty MeOH is a liability

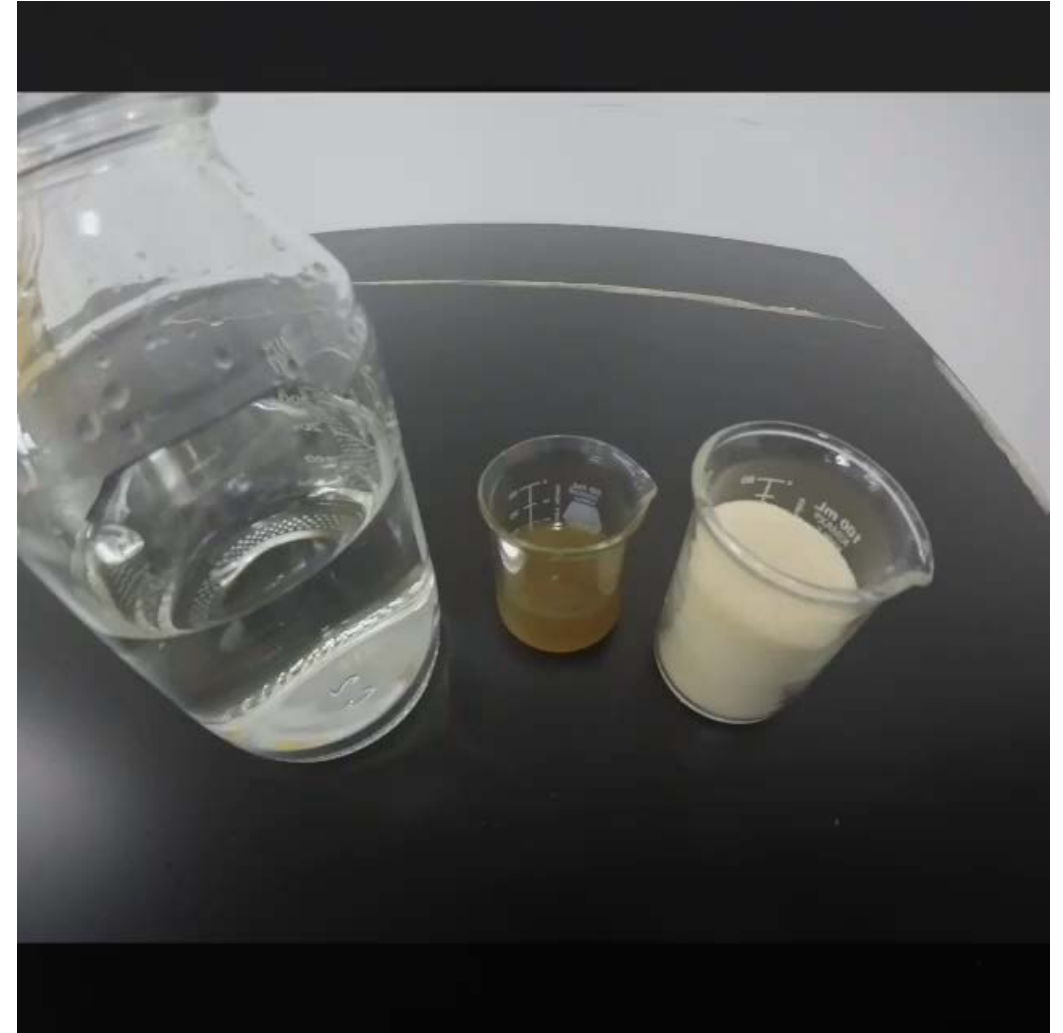
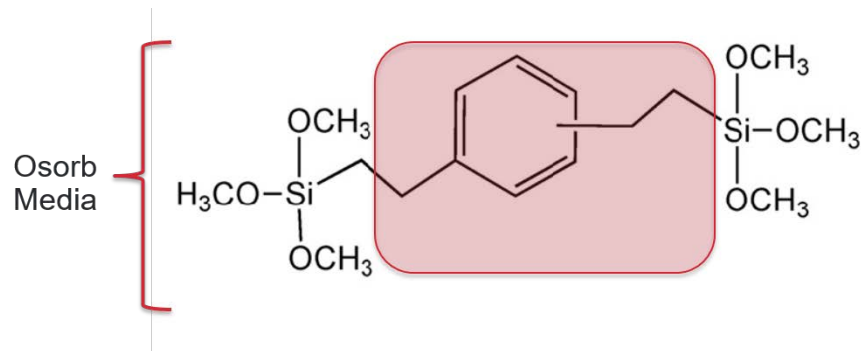


**Table 1.1 – Target BTEX Concentrations in Reclaimed Methanol**

Species	Baseline Conc. (Wt%)	Target Conc. (Wt%)
Benzene	0.050	<0.024
Toluene	0.027	<0.011
Ethyl Benzene	0.0044	<0.0007
Xylene	0.0187	<0.001

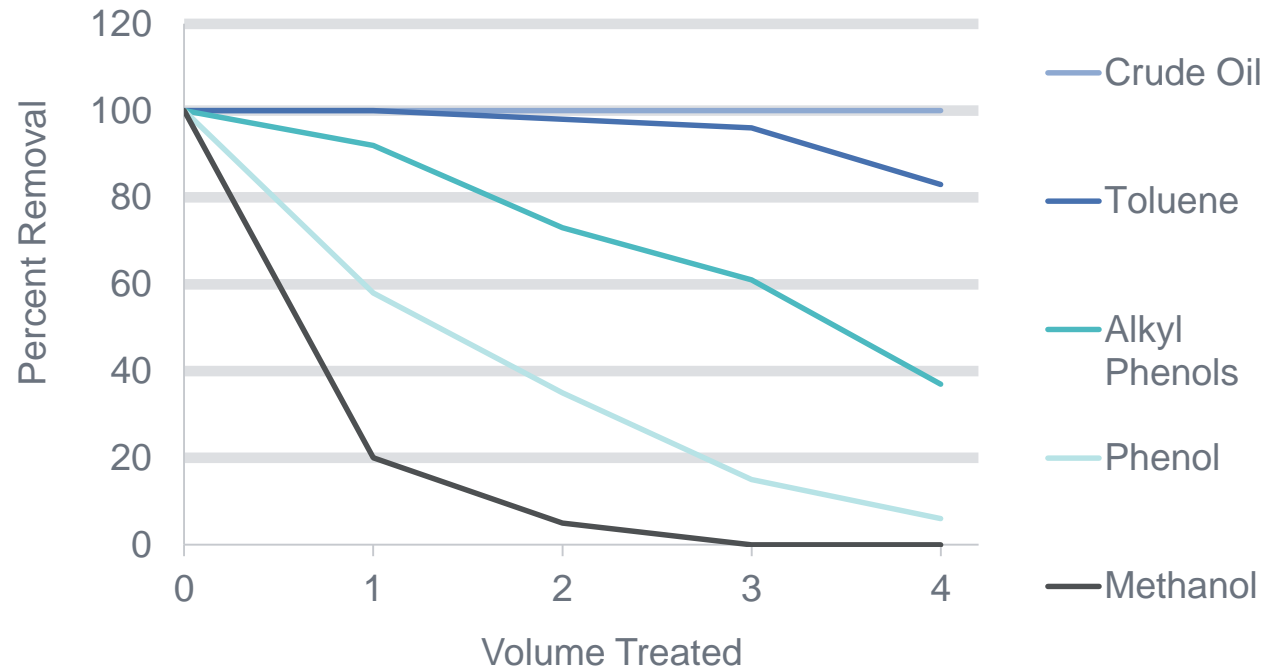
## OSORB<sup>®</sup> MEDIA

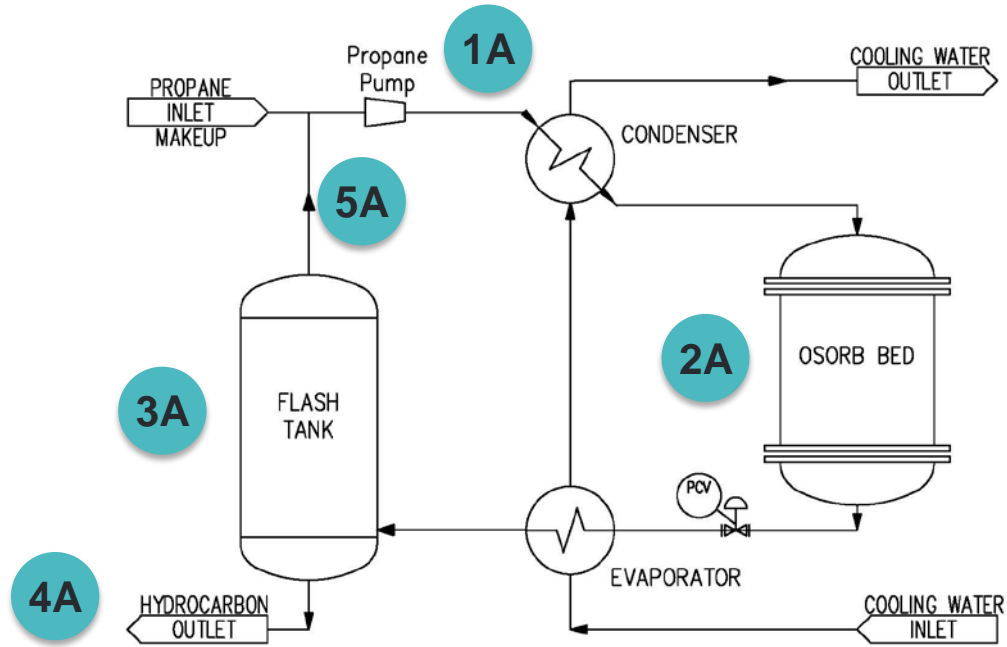
-  Silica Backbone
  - Long Term Stability (pH, Temp, Reuse)
-  Organic Linkages
  - High Organic Loading Capacity
-  Regenerable & Reusable



## Osorb Removal Characteristics

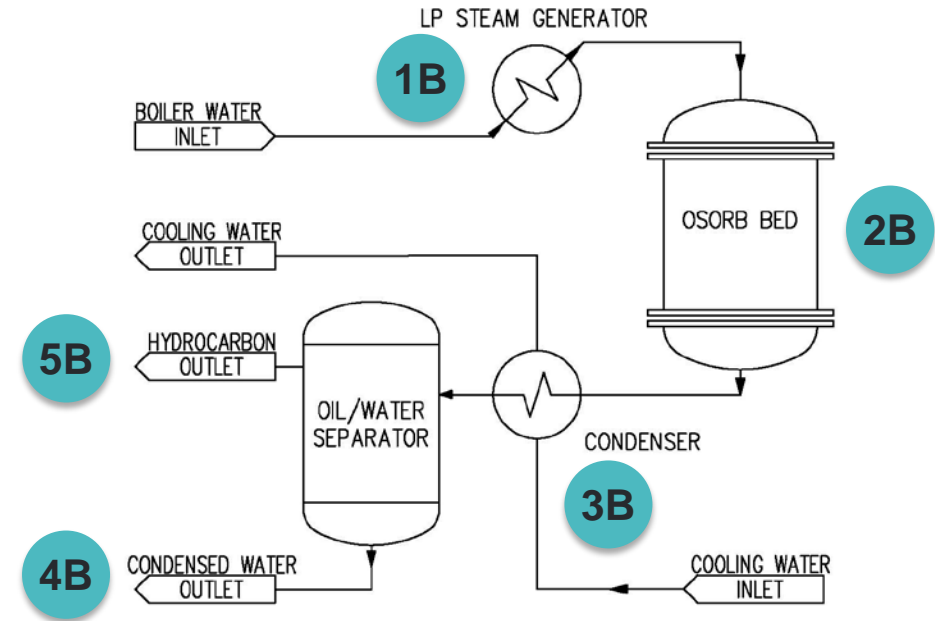
- Physical Adsorption
- Selective Removal Based on Water Solubility
- High Loading Capacity





## NGL Regeneration

- 1A. NGL is compressed and cooled into a liquid
- 2A. NGL dissolves the captured hydrocarbons
- 3A. The NGL/hydrocarbon mixture is separated in a flash tank
- 4A. Clean hydrocarbons are recovered from the flash tank
- 5A. The NGL is recycled






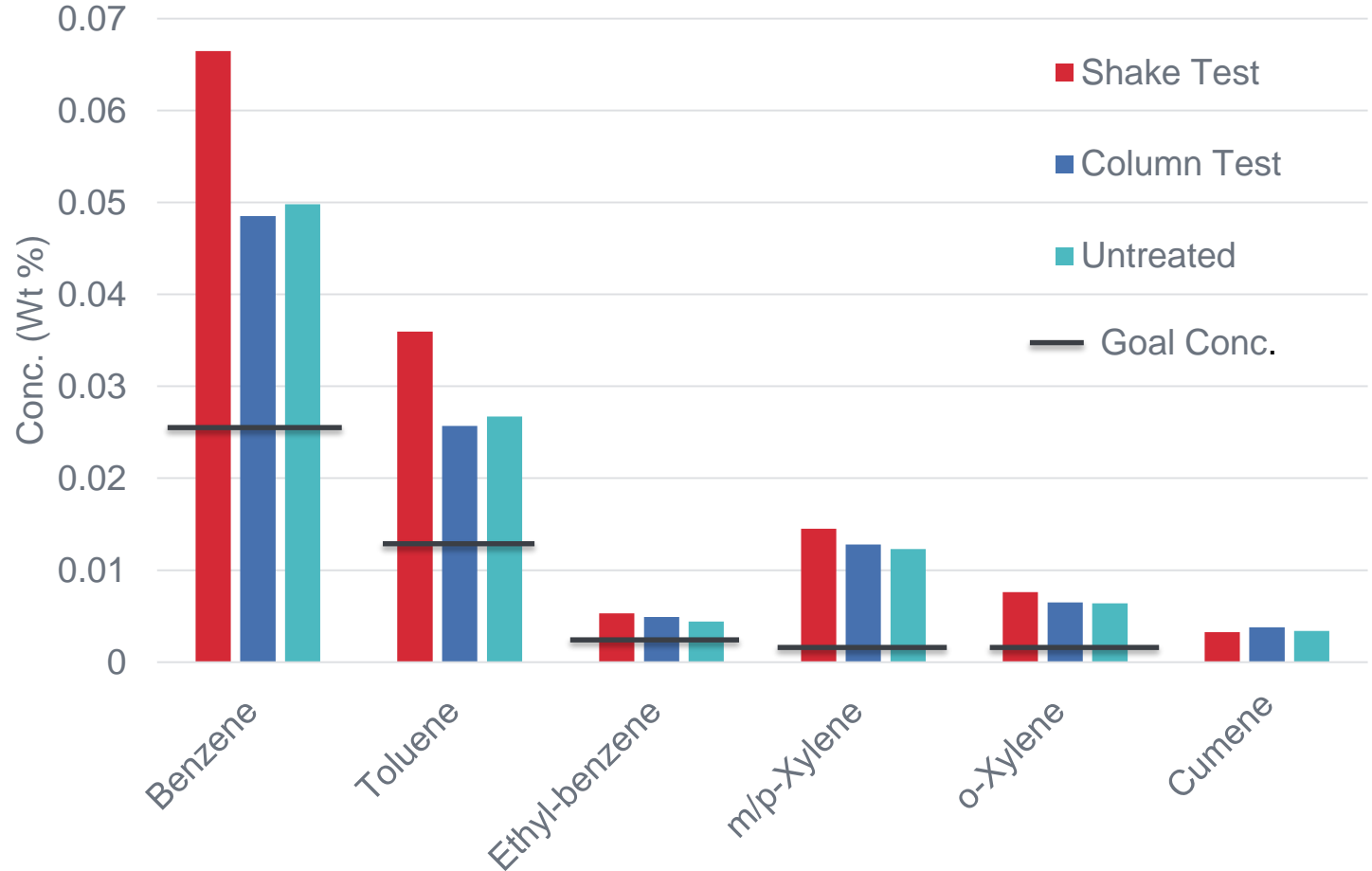
## Steam Regeneration

- 1B. Low pressure (LP) steam is generated
- 2B. The LP steam evaporates the captured hydrocarbons
- 3B. Steam and hydrocarbons are condensed into liquid
- 4B. Water is separated from the hydrocarbons and recovered
- 5B. Hydrocarbons are recovered

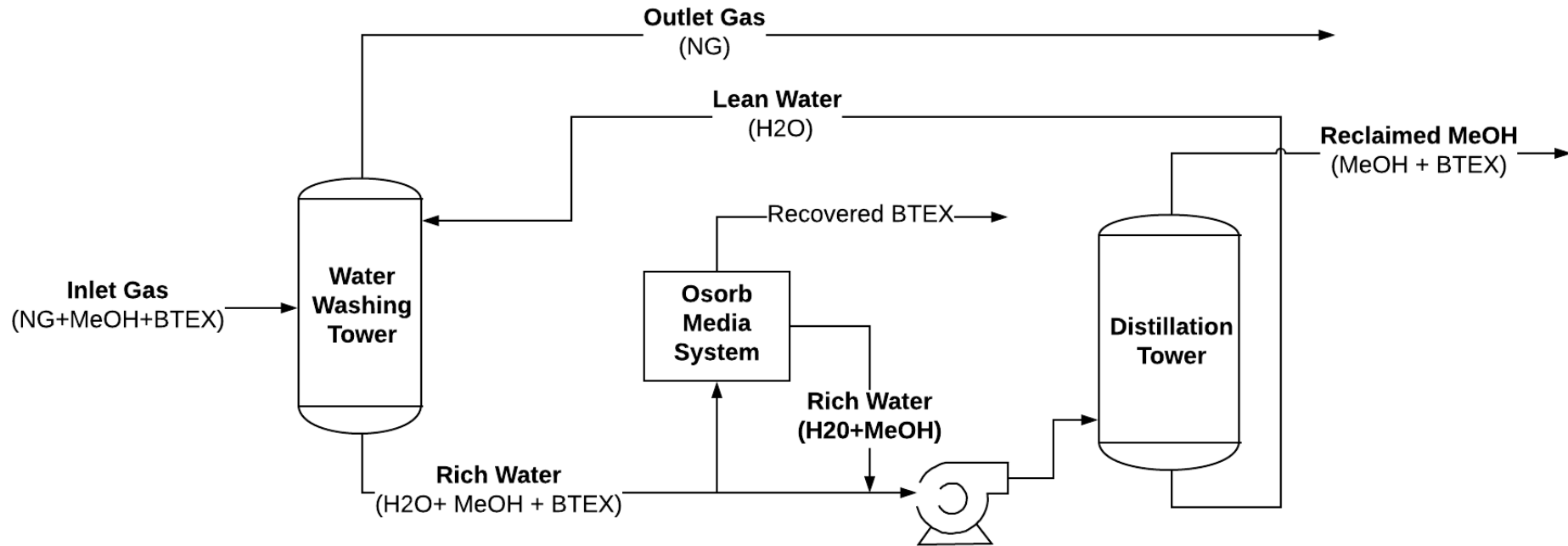
# SEEKING A SOLUTION




-  Shake Test - Minimal removal
-  Column Test - Minimal removal
-  Conclusion – Ineffective solution




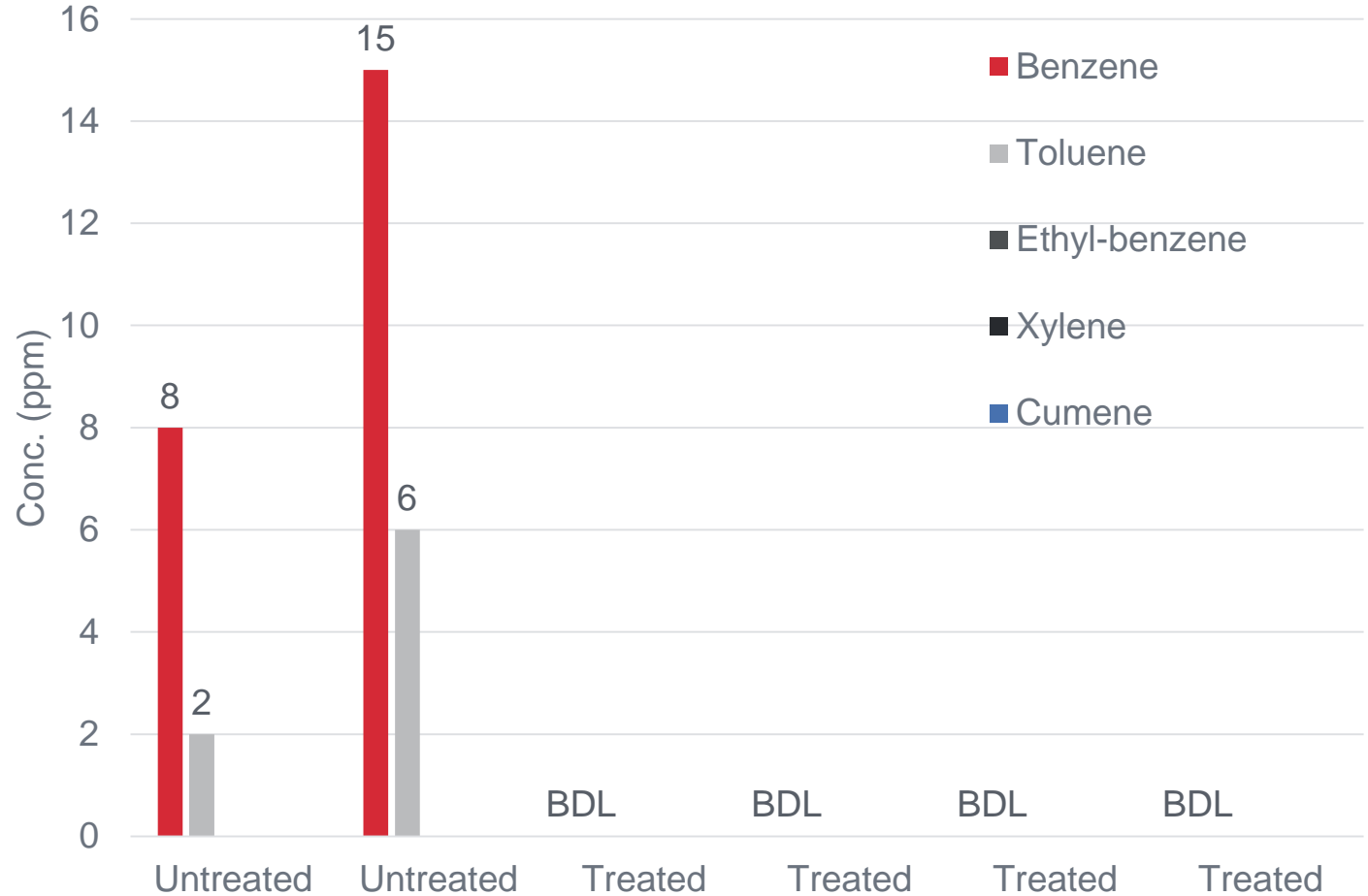
## New Process Stream for Treatment




Placing OMS in Water Dominate Stream Provides Required Conditions for Effective BTEX Removal

 Low concentration of BTEX present in water

 Positive results as expected



 <20% of Full Rich Water Stream Treated

 Three Parts

- Water Treatment

- Regeneration with Steam

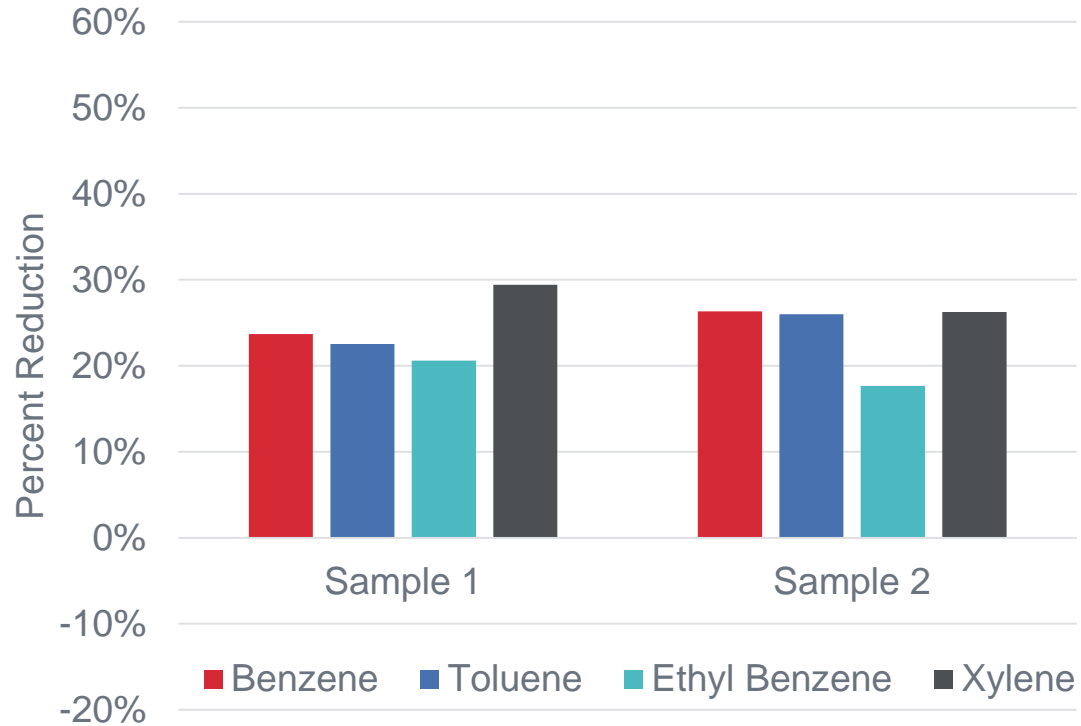
- Water Treatment

Inlet and Outlet Samples of Rich Water

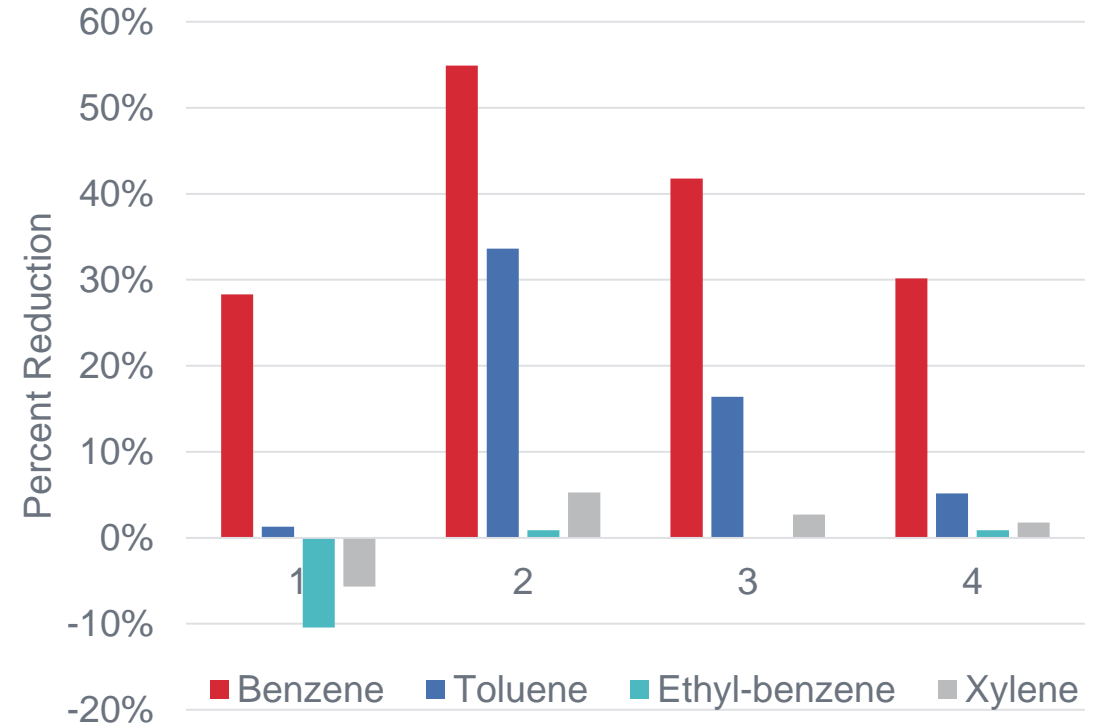


## Concentration of BTEX in Reclaimed Methanol after Treating Slipstream of Rich Water

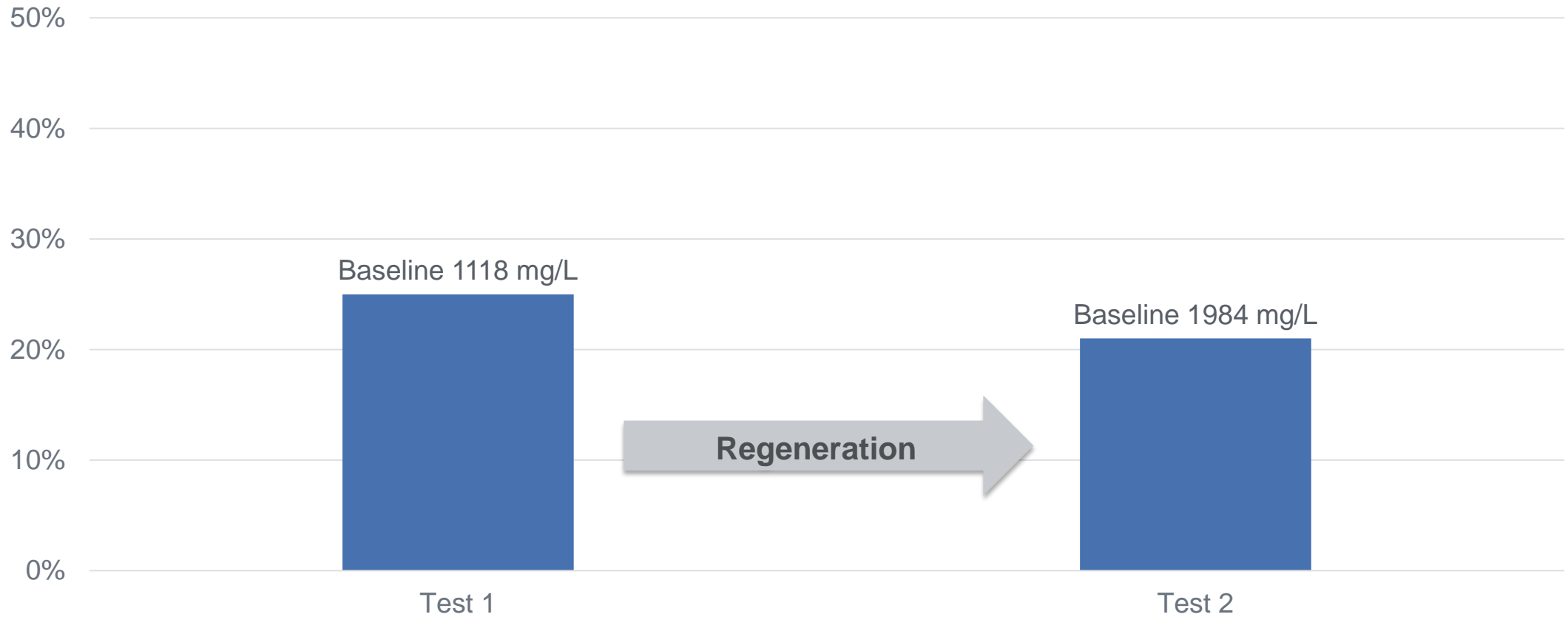
### Field Trial Test 1



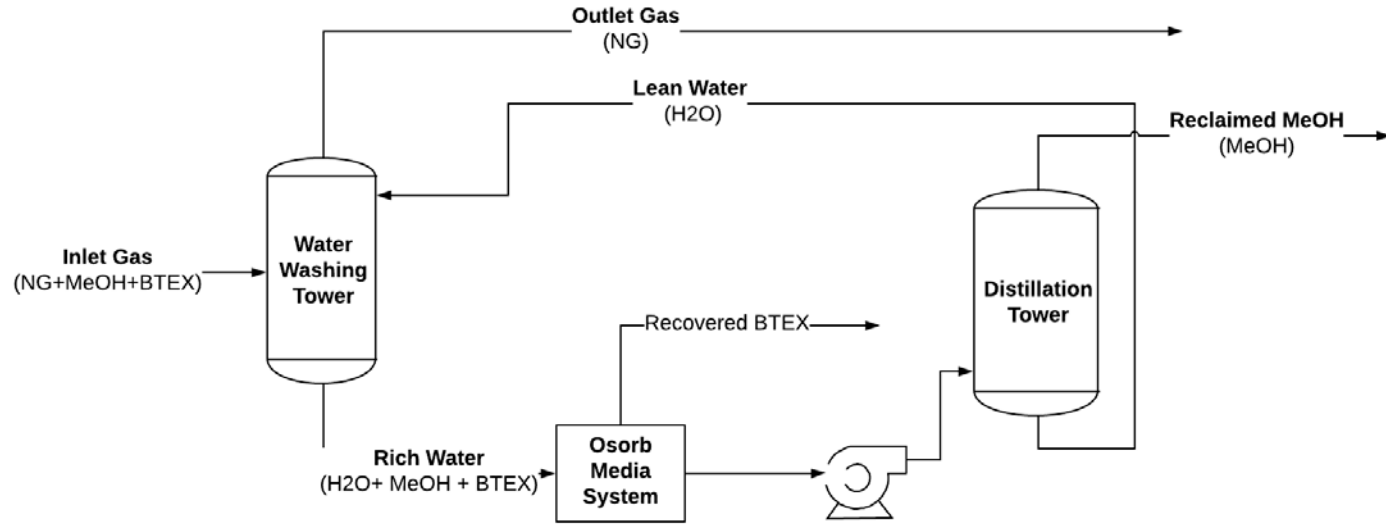
### Field Trial Test 2



>99% removal of BTEX from Water resulted in significant reduction of BTEX in reclaimed Methanol



# POTENTIAL COMMERCIAL SOLUTION



 3 x 100% Osorb Vessels

 NGL Regeneration Process

 N+1 rotating Equipment

 Degasser

 PLC/HMI

 Online BTEX monitor