

Flow Assurance Challenges

Sand Production

- Several techniques are used to prevent sand production but none are completely effective
- Need to design or have procedures in place to deal with produced sand
- Many issues need to be addressed
 - Detection, Erosion, Transport, Separation, Disposal

- Sand Detection

- How do you know if sand is being produced?
Acoustic monitors, electrical resistance monitors, sampling
- For what conditions do monitors work?
- What is minimum detectable sand rate?

- Erosion

- Produced sand can erode equipment and piping
- Severe erosion can lead to hydrocarbon release
- Many operating conditions affect erosion and due to complexity erosion is not well understood in gas/liquid flows

- Sand Transport
 - In horizontal lines, sand can travel fully suspended or in a moving bed or sand may form a stationary bed
 - Stationary sand bed can lead to plugging of the line or result in underdeposit corrosion
 - It is important to be able to predict the transitions between fully suspended, moving bed, and stationary bed
 - Transitions are not known for multiphase flow