

# JewelSuite™ Geomechanics Solids Production

## Accurately Model and Predict Sand Production

### Use Cases

- Sand Production Prediction
- Production Operating Condition Management
- Optimizing well trajectory and perforation orientation for formation stability
- Completion Selection
- LWD Sampling

### Features and Benefits

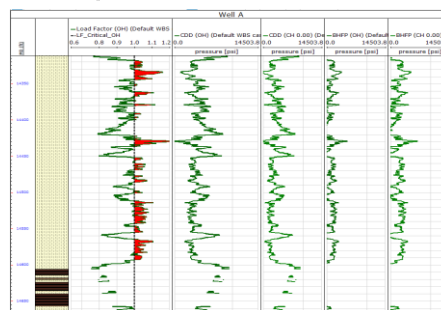
- Complete Sand Production Prediction Workflow
  - Predict the Onset of Sand Production in Planned or Drilled Wells
  - Model and Predict Production Operating Constraints for Sand Free Production
  - Define Active and Passive Sand Management Strategies
  - Plan Optimal open hole Wellbore Trajectories or perforation strategies
  - Execute Sensitivity Analysis
- Seamless Integration with Geomechanics Workflow
  - Use Input Data from JewelSuite Geomechanics ID and Wellbore Stability Modules
- Scenario Management
  - Model multiple perforation strategies
  - Consider Alternate Wellbore Trajectories
- Automated Workflows
  - Repeat All Calculations When Data or Models Have Changed
  - Manage Cases Within One Solution

Unexpected and uncontrolled sand production can result in expensive well interventions, significantly reduced production rates, and in some cases pose environmental and safety hazards.

The **Solids Production Module** in **JewelSuite Geomechanics** is an integrated analytical modeling workflow, which allows to quickly analyze and predict sand production for a given well trajectory. This module determines the critical bottom hole flowing pressure below which rock failure is expected for open-hole and cased-hole completion designs, ensuring safer operations and optimal hydrocarbon production. Once sand production risk is quantified, appropriate well design and completion solutions can be applied to minimize, mitigate and manage sand production safely and economically over the life of the well.

The Solids Production Module consists of four workflows: Sanding Evaluation, Operating Envelope, Polar Plot and Perforation Optimization.

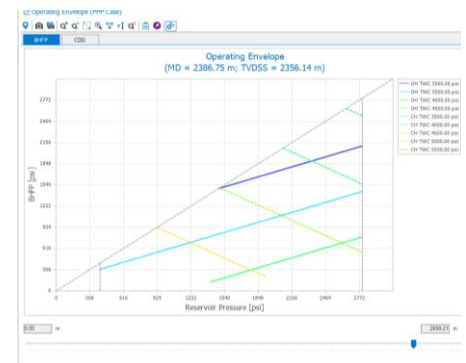
### Sanding Evaluation



The Sanding Evaluation workflow uses stresses, rock mechanical properties

and pore pressures directly from the ID model. Together with user-specified drawdown and depletion pressures as input, the critical drawdown pressures and load factors are calculated for the zone of interest. The calculations can be performed for open-hole and cased-hole completions. The result from this workflow provides insight into the stability of the formation.

### Operating Envelope



The Operating Envelope workflow identifies sand-free zones from potential sand producing zones by plotting the bottomhole flowing pressure against a number of drawdown and depletion curves for specific rock strength and depth.

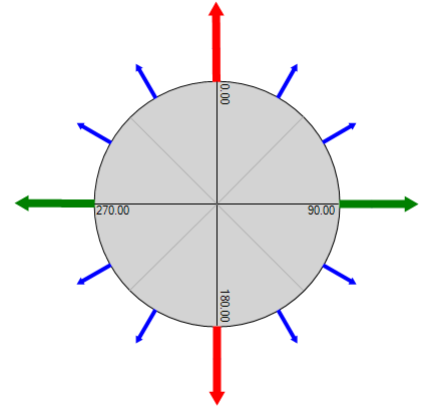
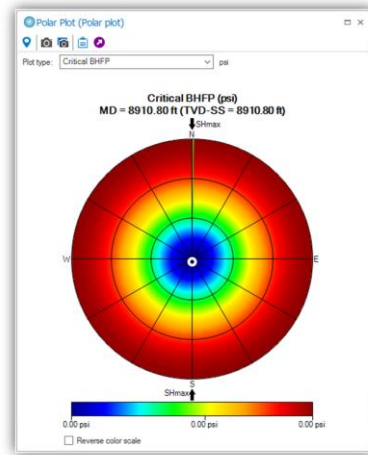
This workflow is designed to investigate the sensitivity of the input data such as rock mechanical properties, stresses, pore pressure, thick-walled cylinder and also perforation orientations.

The Operating Envelope workflow also consists of a ToolFace Optimization calculations to better assist the field

engineers to optimize the tool face for LWD sampling.

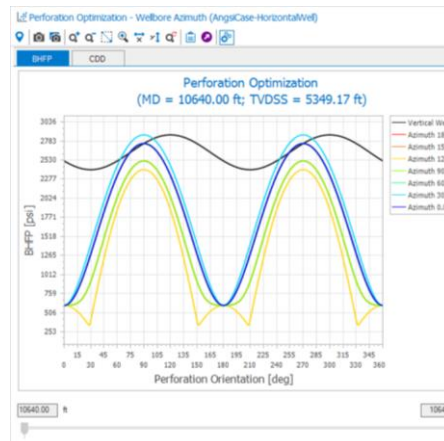
strength, wellbore azimuth and inclination. The perforation orientation plot gives a visual insights into safe and unsafe perforation orientations.

### Polar Plot



The Polar Plot assists the user in designing an optimal open hole well trajectory and open-hole completions by plotting the effects of drilling directions on critical drawdown, critical bottomhole flowing pressure and load factor.

### Perforation Optimization



The Perforation Optimization workflow identifies the optimal perforation orientation based on the effects of reservoir pressure, thick-wall cylinder