Data Driven Approach De-Risks Large Diameter Complex HDD

SOUTHERN CROSS ENERGY

- Location: Australia
- Sector: HDD
- Application: River Crossing
- Phases: 12.25”, 27”, 42”, 58”
- Completion: HDPE 1200mm
- Length: 880m
- Completed: Q2 - 2020

Outline

Southern Cross Energy was engaged to provide Project Management, Engineering & Optimization Services.

Challenges

Large reaming step sizes introduced optimization challenges relating to on-bottom performance, tool life, hole cleaning and cuttings transport effectiveness.

Design constraints dictated a tighter annular tolerance with final hole diameter of 1473mm and a 1200mm product pipe. This was below the typical HDD industry rule of thumb requiring final hole size to be 1.3-1.5 times diameter of product pipe. Wellbore tortuosity, geometry and cleanliness needed to be assured.

Complex pipe pull involving marine, land, [multi-machine] breakover and subsurface.

Solutions

An application specific fluid system was designed with low-end rheology properties that delivered sustained cuttings suspensions over extended flow state cycles and excellent transport efficiency at low velocities for a range of cuttings sizes and densities.

Model match of mechanical specific energy, torque & drag and hydraulics throughout the borehole construction facilitated data-driven parameter selection and operational decision making. Multi-case load force modelling of the combined marine, land and subsurface works for pipe pull back allowed accurate understanding of bend stress, dynamic loads and pull force to facilitate early detection of risk impacting events.