



DRILLING & COMPLETIONS ENGINEERING SERVICES



D&C ENGINEERING

Understanding the Application, the Well Design and Delivery will be tailored to delivery Best in Class Well Performance

Professional Drilling, Completions, Workover Services

Constructing a well that meets all objectives, for both reservoir access and data gathering, at the lowest possible cost and/or time without compromising HS&E or wellbore quality

Drilling Engineering

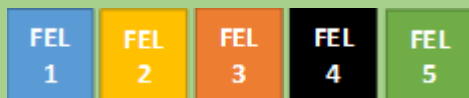


Drilling Engineering with an emphasis on Operations Excellence

- Design and implement a strong and easily implementable HSE program that would aim to ZERO incidents and recordables
- Well design and AFEs
- Rig Contracting, Rentals and Drilling Services
- Monitoring daily drilling activity
- Participate in the field during Special Operations (i.e. Casing Installations, Cementing Operations, etc.

Well Delivery Optimization

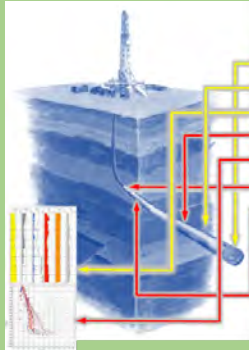
Front End Loading (FEL)



- Well Design and Delivery Process improvements
- Supply Chain contracting strategies
- D&C Technology implementation
- Drilling performance improvements
- Fit for purpose Completions systems and fracking designs



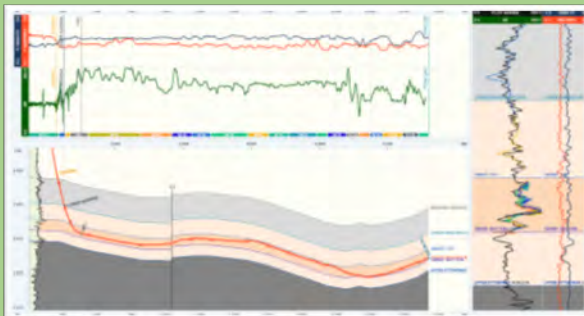
Drilling Performance Optimization



Bit Selection / Optimization
 Drilling Systems Selection and BHA Design
 Drilling Parameters Mapping
 Vibrations Management
 T&D and Hydraulics monitoring and forecast
 ECD Management
 Fluid Selection / Hole Cleaning

- Well Trajectory and Borehole stability
- Casing design and setting points optimization
- Drilling Fluids, BHA and Directional Tools design
- Drilling Bits and Drilling Parameters

Directional drilling supervision



- Plotting actual well path against designed well trajectory
- Identification of **wellpath** relative to stratigraphic markers (wellpath with TVD gamma and formation tops)
- Constant **communication** with directional drillers to ensure wellpath follows optimal trajectory
 - Best **reservoir** or
 - Best wellbore **placement** or
 - Optimal **drill path**
- **MWD/LWD** supervision: data stream monitoring
- **Geosteering** and **reservoir navigation** based on MWD/LWD parameters, gas ratios or ranging
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Remote Directional Drilling



- From our Remote Center or your Office
- The Directional Driller will handle up to 3 to 4 rigs
- Well-planning and borehole trajectory optimization
- Make unbiased recommendations for motor selection and settings during planning
- Optimizes borehole trajectory during drilling using T&D models in real-time
- Running Borehole Cleaning and Hydraulics in real-time to reduce back-reaming and improve ROP

Abandonments



- Geological and Petrophysical Characterization
- Public Data Correlations (Logs, production and testing data, aquifers)
- Gas source identification
- Carbon Isotope Analysis
- Analysis of available abandonment techniques
- Recommendations and abandonment Engineering programs
- Perforating, feed rate, cementing



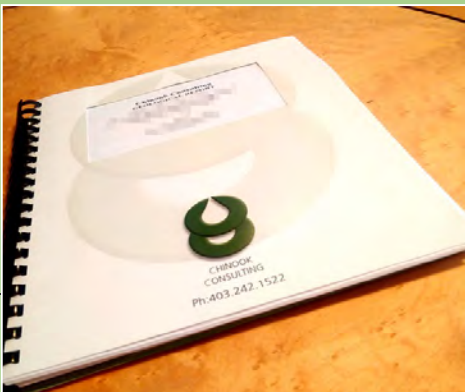
Communication



Constant **communication** with all involved personnel along established protocol and command chains:

- Drilling Consultant (Engineering or Wellsite);
 - Daily Reporting
 - Communicate issues and deviations from prog
 - Receive instructions and disseminate reports
- Drilling supervisor/coordinator: communicate geological requirements, receive drilling operations update, alerts about drilling challenges and restrictions
- Directional driller and MWD operator: communicate targets, supervise data stream, communicate interpretation of data
- DST/Coring personnel: communicate requirements, QC operations, collect data

Manpower Services



Our wellsite supervisors provide day-to-day on-site leadership and supervision, with an emphasis on Safety and due diligence. Planning and scheduling, forecasts and preparation are included in the service

- Drilling and Completions Engineers
- Superintendents
- Geologists
- Production Engineers
- Reservoir Engineers
- Wellsite Drilling and Completions Supervisors



All Chinook geologist have up to date safety tickets:

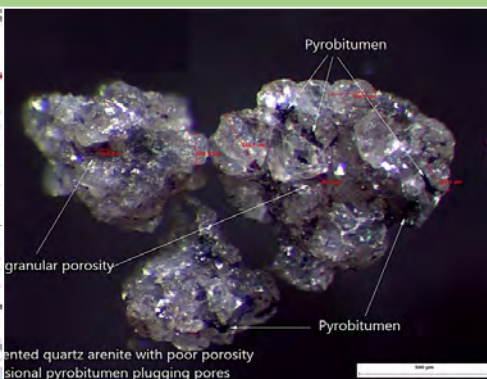
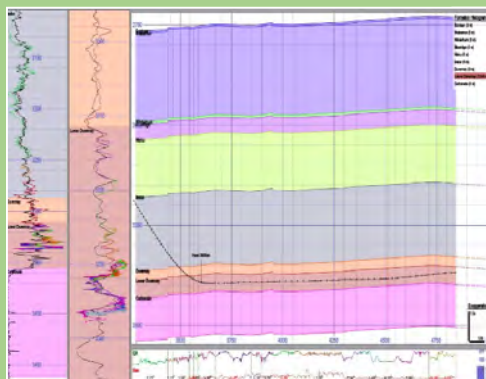
- **H2S Alive, First Aid/CPR, WHMIS, TDG**
 - Optional defensive driving, PST, wildlife awareness, etc
- All Chinook geologists are trained to wear Personal Protective Equipment at all times in or around drilling and service rigs.
- Fire retardant coverall (Nomex or equivalent) with reflective stripes, Top impact hard hat , Steel toed boots, Goggles, Rubber lined gloves

For cuttings sample preparation at invert mud wells, geologists are required to wear:

- Goggles, Coverall or apron, Non-latex gloves, Respirator mask, Sample preparation areas should be well ventilated
- Chinook geologist follows safety procedures:
- Established travel protocol
 - Observe health, safety and environmental requirement imposed by the operator
 - Report safety hazards and environmental concerns



CHINOOK SERVICES



Wellsite Geology

- Petrographic analysis of drill cuttings
- Porosity/Permeability estimation
- Directional and wireline supervision
- Mudlogging
- SAGD and Oil Sands Delineation Services

Remote Geosteering

- Monitoring of drilling, MWD, Mud gas
- Assessment of stratigraphic location
- Optimal placement of wellpath
- Reporting

Reservoir Evaluation

- Basin Analytics
- Reservoir Evaluation
- Prospect Generation

Petrographic studies

- Petrography striplogs
- Petrographic features
- Reservoir evaluation
- Digital photography
- Digital data exports

Field and Laboratory Geochemistry

- XRF Analysis and Quantitative interpretation
- XRD Analysis
- GCMS (Gas Chromatography Mass Spectrometry)

Drilling and Completions

- Drilling Engineering and Operations
- Drilling Performance Optimization
- Abandonment Studies
- Manpower Services

International Operations

- Project Management
- Geoscience projects
- Drilling and completion projects
- Safety and compliance

