Interception Techniques

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Wellbore Positioning Technical Section

The Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA)

Speaker Information

- Tyler Milford
- Interception Specialist
- March 2016
- Sperry Proximity Ranging and Interception

Reasons for Interception

- Well Control
- Plug and Abandon
- Platform Extension
- Pipeline Connection
- Production
- Wellbore recovery

Magnetic Ranging Services

- Access Dependent – A magnetic source or receiver must be deployed inside the TW wellbore
- Access Independent – All ranging must be performed from the drilling well

Magnetic Ranging Services

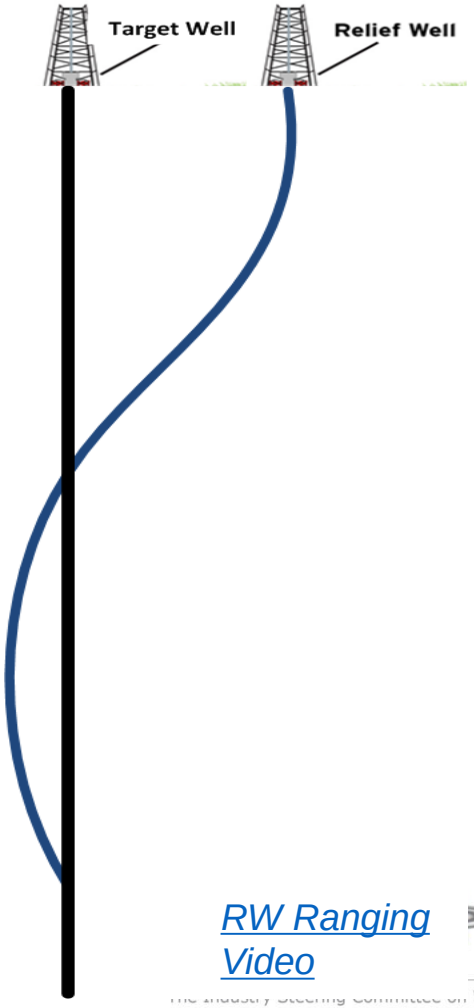
Access Dependent

- ✓ Single Wire Guidance
- ✓ Magnetic Guidance Tool
- ✓ Rotary Magnetic Tool

Access Independent

- ✓ WellSpot
- ✓ Passive Magnetic Ranging

“Access Independent” Interception



Well path is designed around:

- Required interception point (Well Control)
- Survey management
- Results of the WellSpot modeling
- Interception method

Interception methods Include:

- Hydraulic communication via formation
- Perforation of TW casing
- Milled window TW Casing (hydraulic communication)
- Milled window TW Casing (re-entry)

Typically used for:

- BO Control
- Plug & Abandon
- Wellbore recovery

RW Ranging Video

WellSpot Planning Factors

- RW well path is designed around the results of this modeling
- WellSpot signal intensity model is impacted by:
  - Relative orientation of the TW and RW
  - Formation resistance
  - TW tubular
  - Bridle configuration
- With pre planning WellSpot can be used on most wells including ultrahigh resistive formations

“Access Dependent” Interception

Well path is designed around:

- Placement of the magnetic source
- Survey EOU
- Interception method

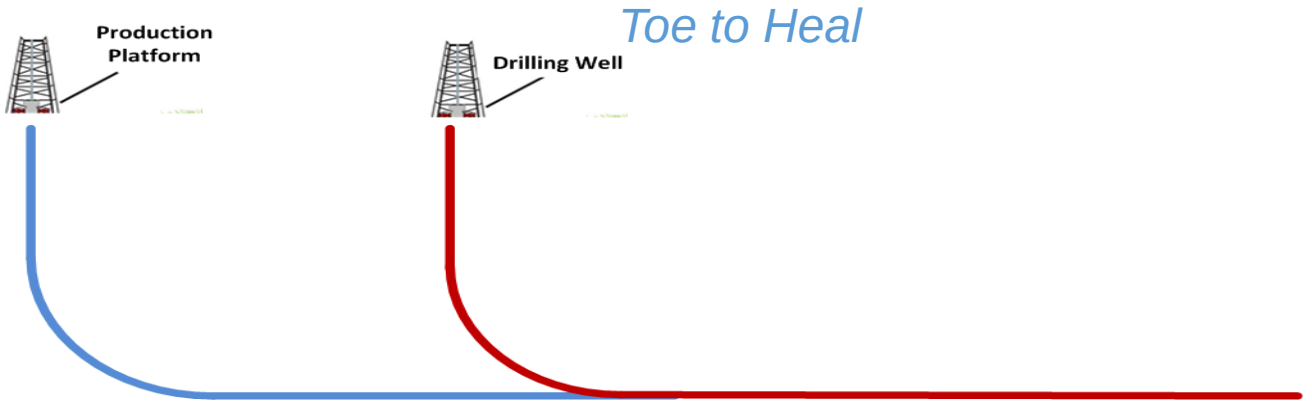
Typically used for:

- Pipeline connection
- Civil engineering

“Access Dependent” Interception

Well path is designed around:

- Placement of the magnetic source
- Survey EOU
- Interception method



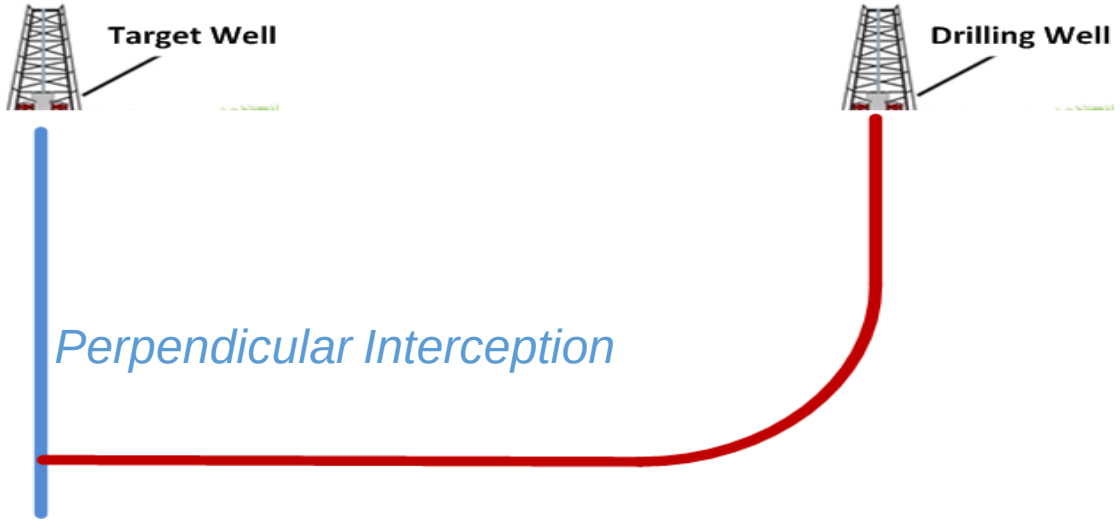
Typically used for:

- Extending Hz wells
- Offshore to Onshore

“Access Dependent” Interception

Well path is designed around:

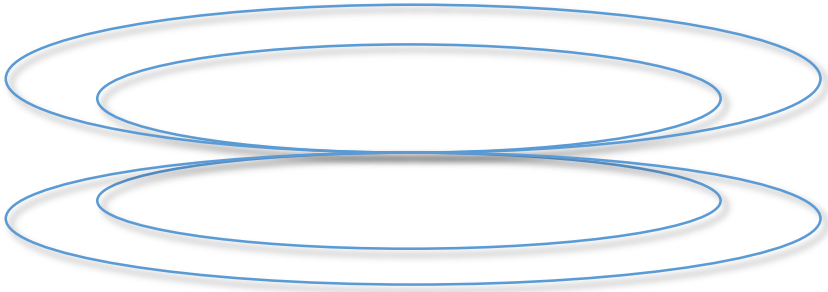
- Placement of the magnetic source
- Survey EOU
- Interception method



Typically used for:

- CMB
- Artificial Lift

RMRS Procedure



RMRS Planning Factors

- Max range 240’
- Metallic Casing reduces the detection range by ~40%
- Ranging is not impacted by the well trajectory

Well Intersection Summary

- Well intersection is not limited to use on relief wells
- Several ranging technologies may be used on the same project
- Advanced survey management may be required to bring the drilling well inside the ranging tools detection range
- Approximately two hundred wells have been intersected using WellSpot
- Over one thousand wells have been intersected using RMRS

Questions?