



ENHANCED MAGNETIC SURVEYING

H&P SURVEY MANAGEMENT

IMPROVE SEPARATION FACTORS AND REDUCE COLLISION RISK WITH ENHANCED MAGNETIC SURVEYING

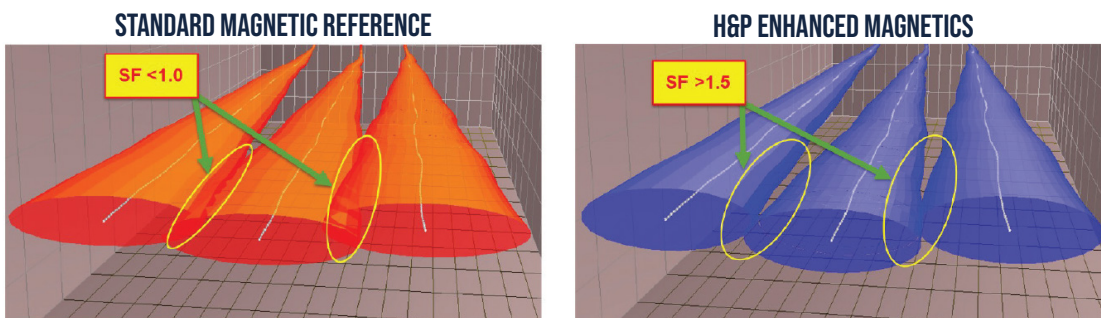
Tighter well spacing, multi-well pad designs, and longer laterals create drilling conditions with higher collision risk and the need for greater positional accuracy. Using high-accuracy In-Field Referencing (IFR) models will improve anti-collision separation factors (SF) by as much as 60% as compared to main field magnetic models used in standard MWD surveying. This not only reduces collision risk, but also enables more accurate well placement. IFR does NOT require additional downhole tools, on-site personnel, or rig time.

IN-FIELD REFERENCING (IFR)

IFR is an industry-recognized, low-cost method for reducing wellbore positional uncertainty associated with MWD surveying. Applying IFR can significantly increase the SFs for wells drilled in congested fields. While H&P survey corrections do not require re-entry/re-surveying old wells, that option is available to further reduce uncertainty of previously drilled wells in congested fields. Higher SFs will require fewer dispensations and reduce risk of well-to-well collision and lease line infractions. Reducing positional uncertainty also enables future in-fill drilling campaigns.

Main field geomagnetic models used in standard MWD do not capture local crustal anomalies of the geomagnetic field. IFR is the industry-leading method of accurately predicting the magnetic field magnitude and direction for a geographic location and time. IFR relies on independently acquired measurements of the local magnetic field to accurately map regional variations caused by magnetic minerals in the Earth's lower crust.

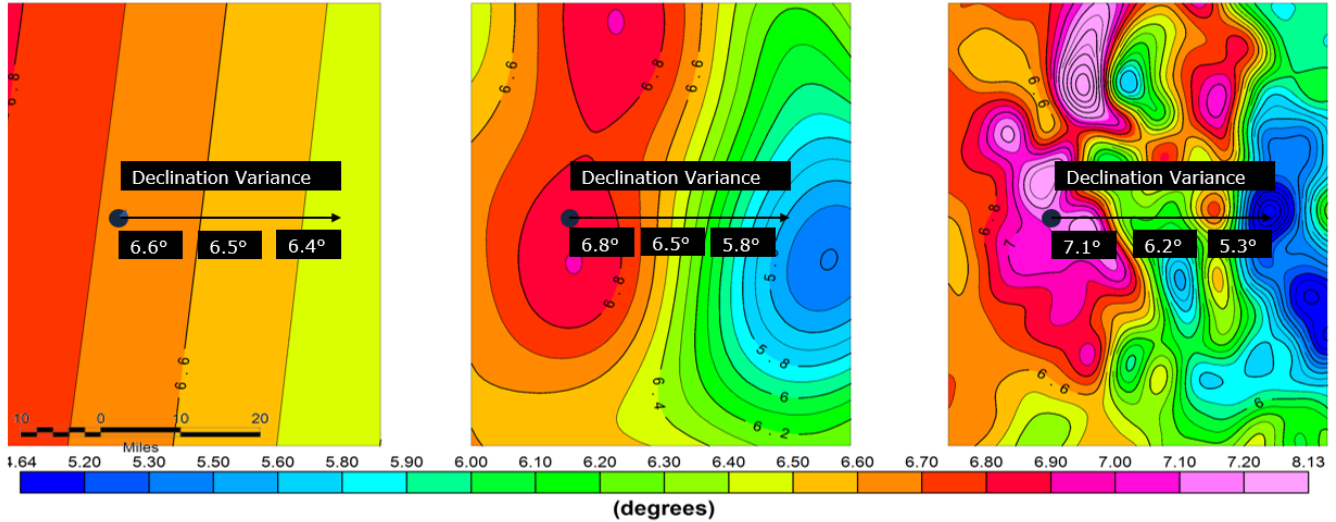
IFR improves MWD surveying by providing highly accurate reference directions for azimuth calculation. IFR also provides more accurate estimates for magnetic dip angle and total field strength, which enables more precise survey quality control and correction.



Main Field

MVHD

IFR



Magnetic Declination Comparison

These plots were pulled from H&P Survey Management data and show the same area using different levels of magnetic model accuracy (MVSD, MVHD, and IFR).

ERROR IN MAGNETIC DECLINATION IS ONE OF THE MOST COMMON AND LARGEST SOURCES OF ERROR FOR AN MWD SURVEY

5,000' Lateral		10,000' Lateral		15,000' Lateral	
DECLINATION ERROR	FOOTAGE OFF	DECLINATION ERROR	FOOTAGE OFF	DECLINATION ERROR	FOOTAGE OFF
0.50	44	0.50	87	0.50	131
0.75	65	0.75	131	0.75	196
1.00	87	1.00	175	1.00	262
1.25	109	1.25	218	1.25	327
1.50	131	1.50	262	1.50	393

WHAT DOES A MISPLACED WELLBORE COST?

INTERESTED IN LEARNING MORE ABOUT MAGNETIC DECLINATION?
WATCH OUR YOUTUBE VIDEO [HERE](#).

CONTACT US

For more information on how H&P Survey Management can help you achieve better drilling outcomes, contact an H&P sales representative today or contact us through our website at helmerichpayne.com/contact.

It's time to follow through on your drilling performance potential.