ISCWSA #41
Update from the Error Model Maintenance Committee

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Membership

- Grown to 54

- Much more than regularly attend and contribute

- Minutes will go on website

- Members will be asked if they wish to continue and if they intend to contribute

Error Model Documentation

- Previously recognised need for one document which describes the current status of the error model

- Not much progress

- ISCWSA MWD models described in same spreadsheet format as the OWSG model.

Drillstring Interference – Term Value

- Last meeting we agreed on change in how drill string interference is modeled.

- Older version uses AMIC and AMID terms

- Newer version uses AMIL term

- AMIL used by several service companies and in OWSG models

Drillstring Interference – Term Value

- Attempt to match to older model at mid-latitudes
  - 227nT is required to match AMIC+AMID at 90/90 At a location with B_{horiz} of 20,000nT
  - AMIL returns smaller azimuth uncertainties at all other wellpath attitudes
  - only matching AMIC+AMID at the worst case attitude.
- OWSG was at 300nT.
- For Rev2 OWSG has changed to 220nT
- Agreed this value for ISCWSA model too

Misalignment Terms

- ISCWSA Rev 3 was 0.06 deg

- Previous meeting change to 0.1 deg discussed

- More conservative for anti-collision, especially for low inclination wells

- OWSG has 0.1 deg

- Agreed that ISCWSA model will also use 0.1 deg

ISCWSA Rev 4

- AMIL weighting function + 220nT value
- 0.1 deg misalignments
- Addition of random terms to model geomagnetic disturbance field for consistency

OWSG Rev2

- Also has AMIL term at 220nT
- Addition of random terms to model geomagnetic disturbance field for consistency.
- OWSG and ISCWSA MWD models now in alignment

	Test Well		
	#1	#2	#3
ISCWSA Rev3	84.36	32.01	12.64
OWSG Rev1	118.41	35.3	13.89
ISCWSA Rev4 / OWSG Rev 2	95.65	31.68	12.38

- Some further work to be done on correct form for modeling the disturbance field for EMS surveys run over a shorter time period.
- Evaluation and results

BGGM Lookup Tables

- Several years ago BGS published SPE paper defining lookup tables for BGGM accuracy

- Better detail the uncertainty and the underlying physics

- Generally believe current term values are conservative
  - Certain cases (mid-latitudes) dip very conservative

BGGM Lookup Tables

- Concerns about complexity of the implementation
  - Multiple lookup tables for multiple magnetic models
  - Tool code specific if disturbance field elements to be included
  - Minimised if this is included in code supplied by the magnetic model providers
  - Cost benefit issue

- Formed a work group to look at technical issues, benefits and best means of implementation

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Correlation of Magnetic Models

- Raised by anti-collision group
- Three propagation coefficients and four modes: random, systematic, well-by-well and global
- Originally assumed only one magnetic model (BGGM) hence geomag ref errors correlated i.e. global
- But actually not implemented in this way for relative uncertainty i.e. we assume 0 correlation
- Now various mathematical models plus IFR1, IFR2, different provides

Correlation of Magnetic Models

- Evaluation of the various combinations and the correlations

- Values varying from 0.04 to 0.78

- Error Model only allows 1 or 0

- Believe current implementation is conservative in most instances

- But for interleaved wells it is not conservative

- Consider how best to handle this
  - Correlation values reviewed
  - Special case for wells towards each other from different sites
  - Procedural issues
  - Distortions for arbitrary selection of 1 or 0
  - Question about different magnetic references from leg to leg of same well

Uncertainty in IFR2 with Distance from Observatory

- Early status of work by BGS

- Looking at disturbance field errors between various high latitude observatories

- Differing separations

- Data from different years

- Trying to quantify at what distance is IFR2 no longer beneficial