**Evaluation of drilling events in the Haynesville and Bossier Shale, Magnolia, NW Louisiana**

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**Introduction**

The Haynesville gas play in NW Louisiana, known as the Magnolia field, has been a potential target for drilling wells by Shell Exploration and Production and Encana since 2007. The upper Jurassic Haynesville/Bossier shales are found at over 10,000 ft on the subsurface. Natural gas is found on a tight unconventional reservoir in which wells are drilled to produce gas obtained from the Haynesville formation. Drilling wells is an expensive task and drilling events such as circulation losses, LOT (failed formation integrity tests) and gas shows can cause equipment damage, wasted drilling time and economic loss. It is important to understand the changes in the subsurface and how this correlates with drilling events to prevent them. Therefore, creating geohazard maps of drilling events will enhance the production of natural gas in the Magnolia field.

**Methods**

An evaluation for the origin of 140 drilling events was done based on mudlogs and HSI drilling reports data in the Haynesville and Bossier shales. Each event was classified into 3 categories: lithology related, fracture related (includes faults), unknown (missing information). Geohazard maps were created using Petrel 2009.2 and ArcGIS 9.2 by plotting each event in the Magnolia field to analyze the areal distribution of drilling events. The purpose is to find if there exist any relations between drilling events and lithological or structural changes within the Haynesville and Bossier Shales. Geohazard maps were compared with EUR’s (estimate ultimate recovery) to determine if there exist a relation to drilling events.

**Results**

- Gas shows are very common on the Lower Bossier
- Circulation losses and LOT are more common on the Upper Bossier
- Drilling events in the Haynesville are rare
- 3 zones of high permeability and high occurrence of gas shows where identified in the Lower Bossier:
  - Sulfate hazard zone
  - Joseph hazard zone
  - Minerals hazard zone
- The larger amount of gas was found at the Lower Bossier and the Haynesville
- The amount of Silt and Sand decreases southward which is consistent with the depositional history (prodelta) of the Bossier and Haynesville shales

**Conclusion**

The distribution of drilling events on the geohazard maps did not appear to be related to the EUR’s of Shell and Encana wells. Circulation losses are prevented once casing for the well is set and the amount of gas shows reported while drilling is not a direct representation of how much gas will be obtained from the subsurface. The larger amount of gas was found on the Upper Bossier and the larger amount of gas shows are found at the Lower Bossier. A change of facies on the Lower Bossier makes it more permeable and thus larger gas shows are encountered in this interval. Few drilling events were found at the Haynesville production target. As new well data is loaded to these maps it will increase their usefulness for further drilling plans.