**Paper A10**

# The need for independent post-survey quality control to check the high failure rate of geohazards predictions

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Unanticipated geohazards are the single highest cause of project or drilling failures. Sound project management and decisions can only be made on the basis of reliable and accurate geohazards predictions and risk assessment. Yet interpretation and geohazards prediction skills are seldom considered in the selection of geohazards survey contractor. In any geohazards survey contract, the interpretation of the geophysical data and geohazards prediction receive the least attention and remain the least important factor, despite being the sole cause of any geohazards disaster.

Despite the technological advances in data acquisition and increasing sophistication in data processing and imaging software, interpretation expertise in engineering geohazards surveys continue to be stuck in the "muddy waters" of mystic yesteryears. Reflectin on the past 30 years of experience in the industry, it is clear that modernization has largely bypassed this critical skill in geohazards prediction. The many factors contributing to this stagnation are highlighted in this paper to jolt the industry into realizing this neglect and its dire consequences. Not only has the development of interpretation skills stalled; there seems to be an industry-wide deterioration of geohazards assessment and interpretation capability as well. When fundamentally-flawe interpretation is blindly and repeatedly copied without due geological consideration and lessons learnt from past disasters seem forgotten, it is time to sit up and remedy this untenable situation before things get worse.

The fact that such serious mistakes could routinely slip through top geohazard specialists and contractors, speaks volumes of the interpretation malaise affecting the industry. Some of the more crucial and costly interpretation failures are highlighted to argue for the need for independent quality control (QC) on geohazards assessment and interpretation. The current emphasis on fiel QC during data acquisition is understandable since data acquisition cost is many times the cost of post-survey interpretation. As the fina site survey results can only be as good as the expertise behind the interpretation, it pays to QC the geophysical interpretation, given the number of past failures.

Being a poor cousin to the exploration sector, the lack of experienced interpreters has always been an industry-wide problem as experienced and talented geophysicists seek professional advancement in the more lucrative exploration sector. Under current industry's practice, geophysical contractors bear the sole responsibility of geophysical interpretation. Although all geophysical data acquired technically belong to the Clients or project owners, very seldom were the data requested for quality control purposes.

Besides minimizing human errors and providing experienced guidance, expert QC consultants can readily identify shortcomings in the contractor's interpretation expertise that are normally not apparent during the fast-paced fiel acquisition phase. Furthermore, interpretation work is normally quoted on lump sum basis; thus making it difficul to quantify the amount of interpretation work or time input. With the constant shortage of experienced geophysicists, post survey QC is a necessity to look after the Clients' interests.

Without post survey QC, the interpretation of site survey data is often reduced to over-simplifie charting and meaningless choices of low-moderate to high-moderate risk of gas hazards. Even when favourable site conditions or geological factors were apparent in the site survey data, opportunities to capitalize on them for project benefit were normally ignored; basically because there were no instructions from the Client to do so. Without a knowledgeable QC review, such valuable information might not even surface for due consideration.

By their ambiguous nature, interpretation errors are conveniently attributed to various factors such as limited work scope, resolution, accuracy, penetration etc, rather than technical incompetence. Furthermore, failures to detect potential geohazards or geotechnical problems are not easily recognized as mis-interpretation as they do not necessarily manifest into immediate disasters. Investigation into past major disasters such as the 1990 Barton Blowout, revealed how an initially flawe interpretation (in the early eighties) was blindly adopted; leading to subsequent mis-interpretation in later surveys (by no less than 3 survey contractors) which further compounded the initial mis-interpretation. If the present authors had not persisted on disputing the flawe survey results, the truth might never have surfaced. Immediately after the blow-out, the Barton-A platform was evacuated and destined for shutdown on the perceived fear of platform instability and imminent collapse due to the "unstable soft sediment within the sub-seabed depositional basin". A QC review of the past surveys' interpretation revealed an appalling series of site survey mis-interpretation and over-turned the impending shutdown of the platform. Now more than 19 years later, the said platform had not failed as initially feared following the blowout. This is one of the many prime examples where costly disasters could have been averted, had the early erroneous interpretation and geological inconsistencies been detected by routine QC on geophysical interpretation.

Even though it was geologically inconsistent to have a large depositional basin at the apex of an outcropping anticline structure, the highly faulted complex structure was nevertheless mistakenly interpreted as such. Although abnormally high circulation losses were reported in all the drilling preceding the fateful blowout, the pre-drill site surveys continued to chart patches of cement on the seafloo as coral outcrops despite evidence to the contrary. The disbelief that drilling cement meant to seal the well-bores could resurface through the pervious faults was proven to be true when ROV recovered cement fragments from the erroneously charted "coral outcrops". The series of interpretation errors epitomize the need for independent expert QC on geophysical interpretation. Sadly the Barton Blowout is not an isolated case.



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