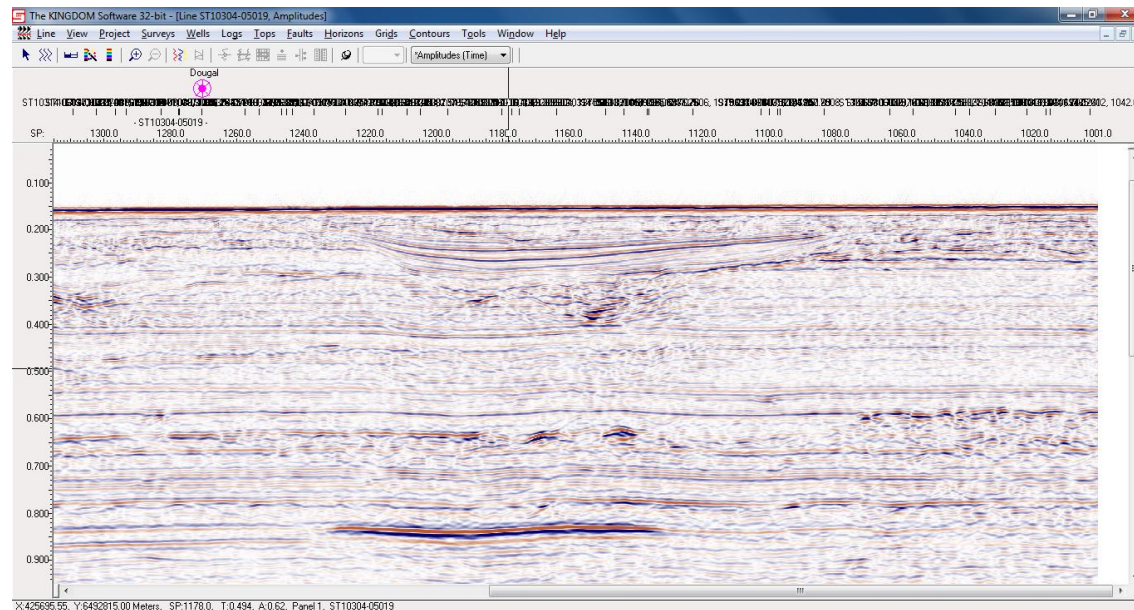


Geohazard interpretation Truth or Myth?

Stavanger 6th December 2011

Extract from a Site Survey Report anno 2011

Shallow gas detection is normally made, in the first instance, by recognition of anomalously high amplitude, usually phase reversed reflectors ('bright' spots), allied to a number of other characteristics, such as acoustic masking, velocity pulldown, structural closure, edge effects, frequency reduction, and basal 'flat' spots.



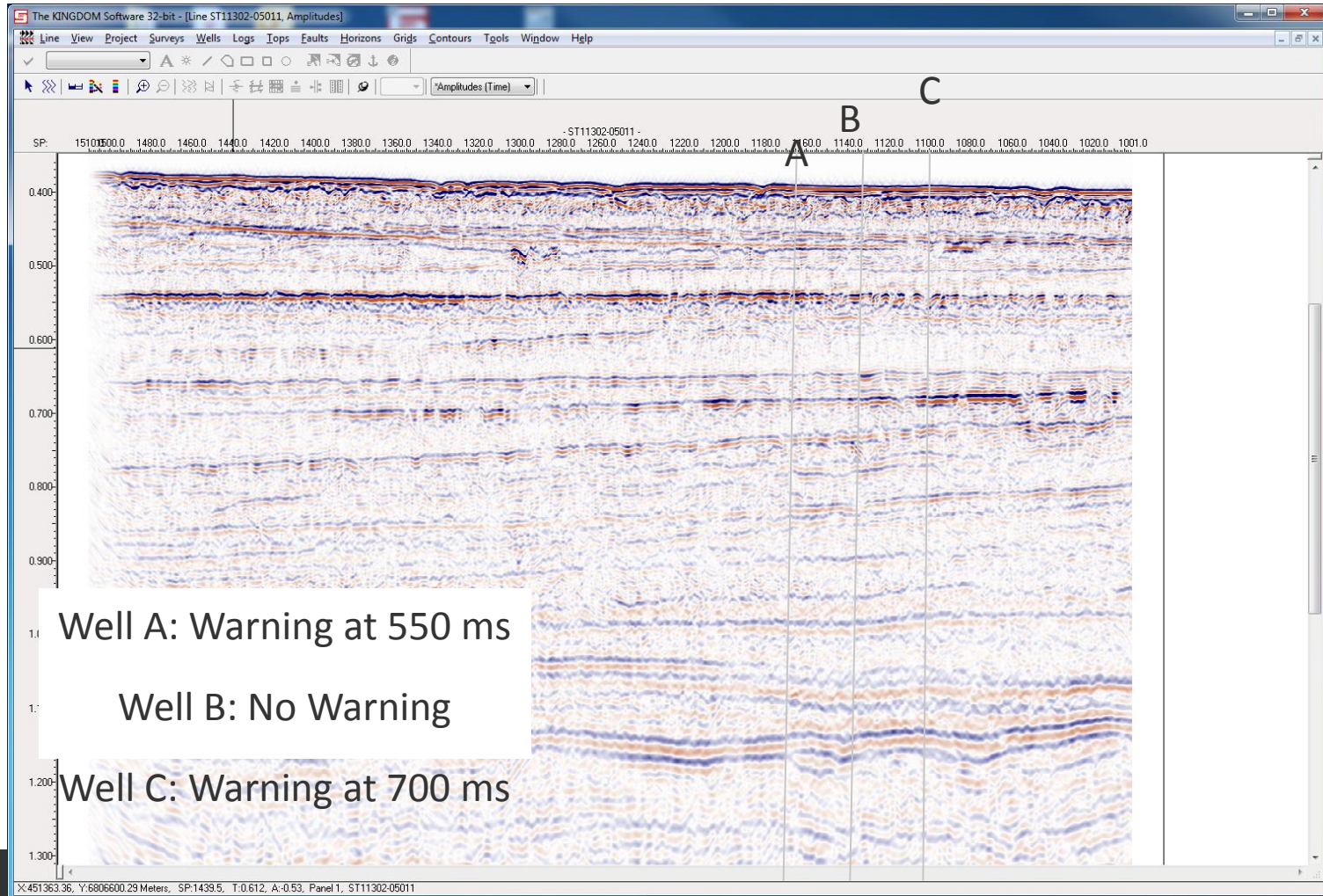
Extract from a Site Survey Report anno 2011

Risk	Model Probability	Typical Characteristics
High	Gas most probable model	High amplitude with 3 or 4 other well defined features (positive AVO, closure, phase reversal etc)
Moderate	Gas a likely model	High amplitude with 2 other subsidiary gas related features
Slight	Gas a possible model	1 or 2 gas related features or high amplitude alone.

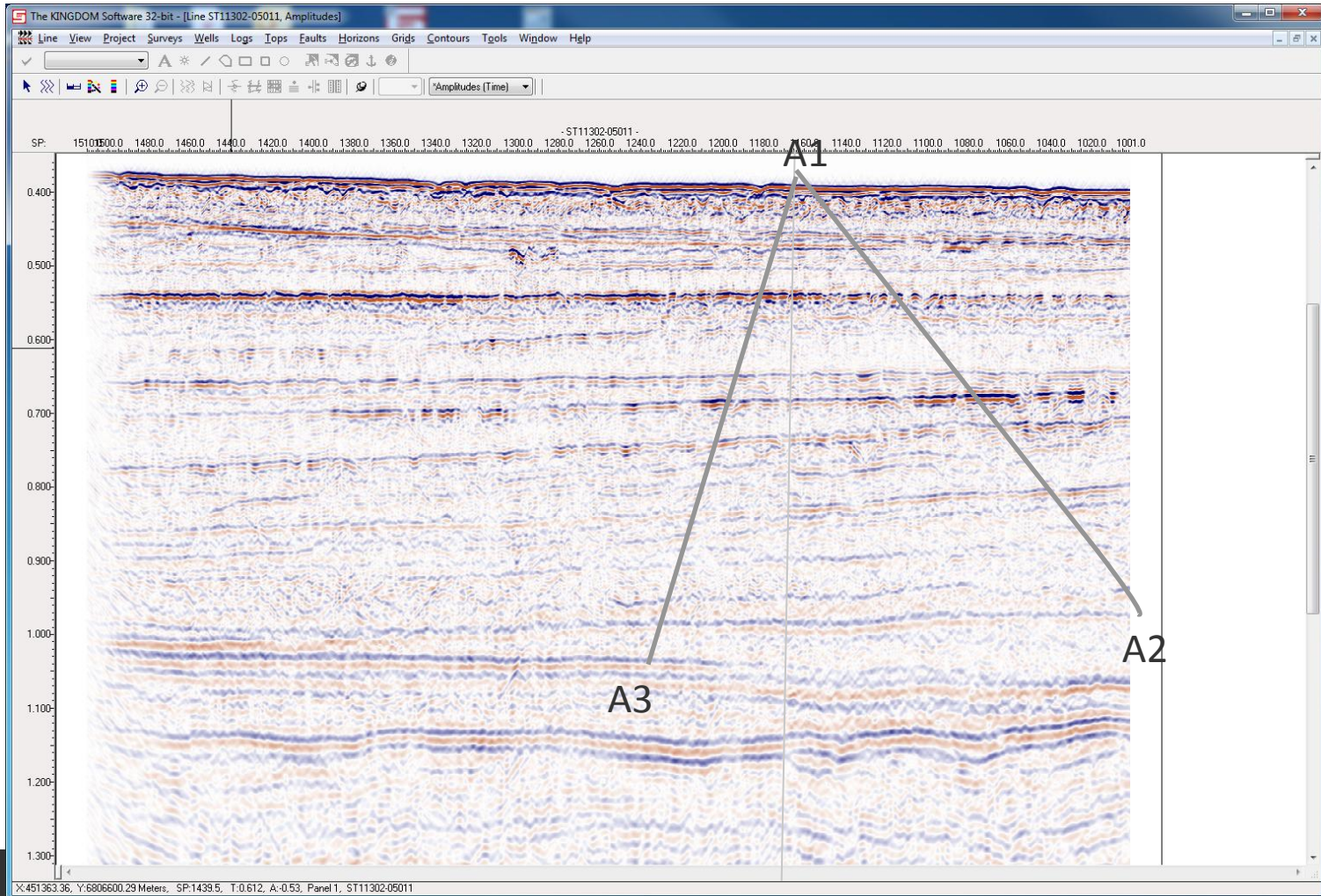
Reasons Why Predicted Gas is not seen when drilling

- Well Moved outside an anomaly
- Countermeasures makes it very difficult to detect Gas
- Wrong Interpretation

«Avoiding Anomalies «-Problems



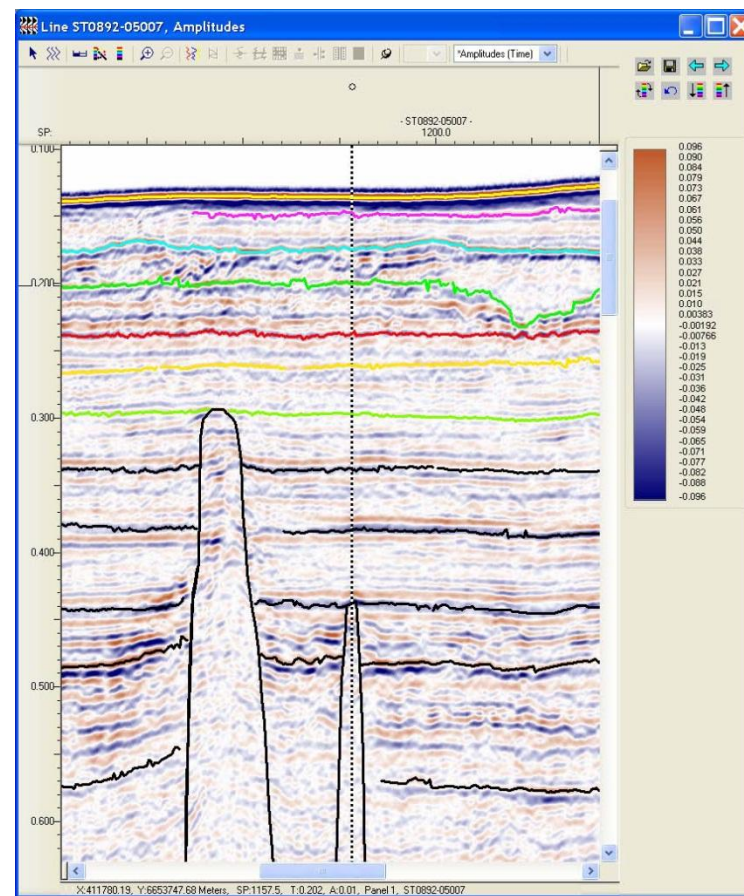
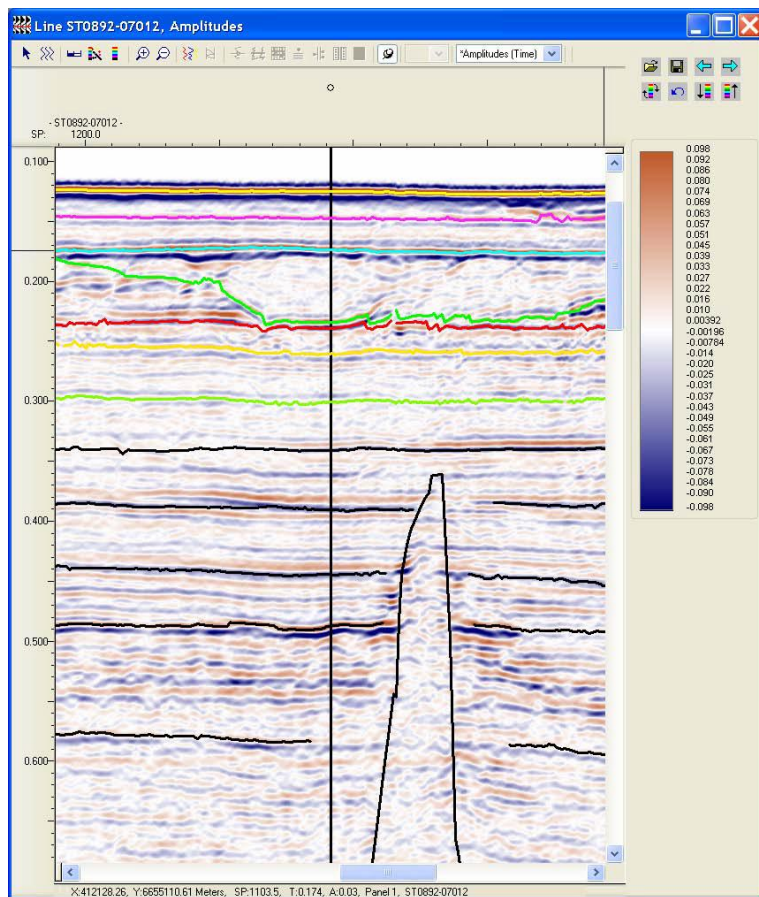
«Avoiding Anomalies «-Problems



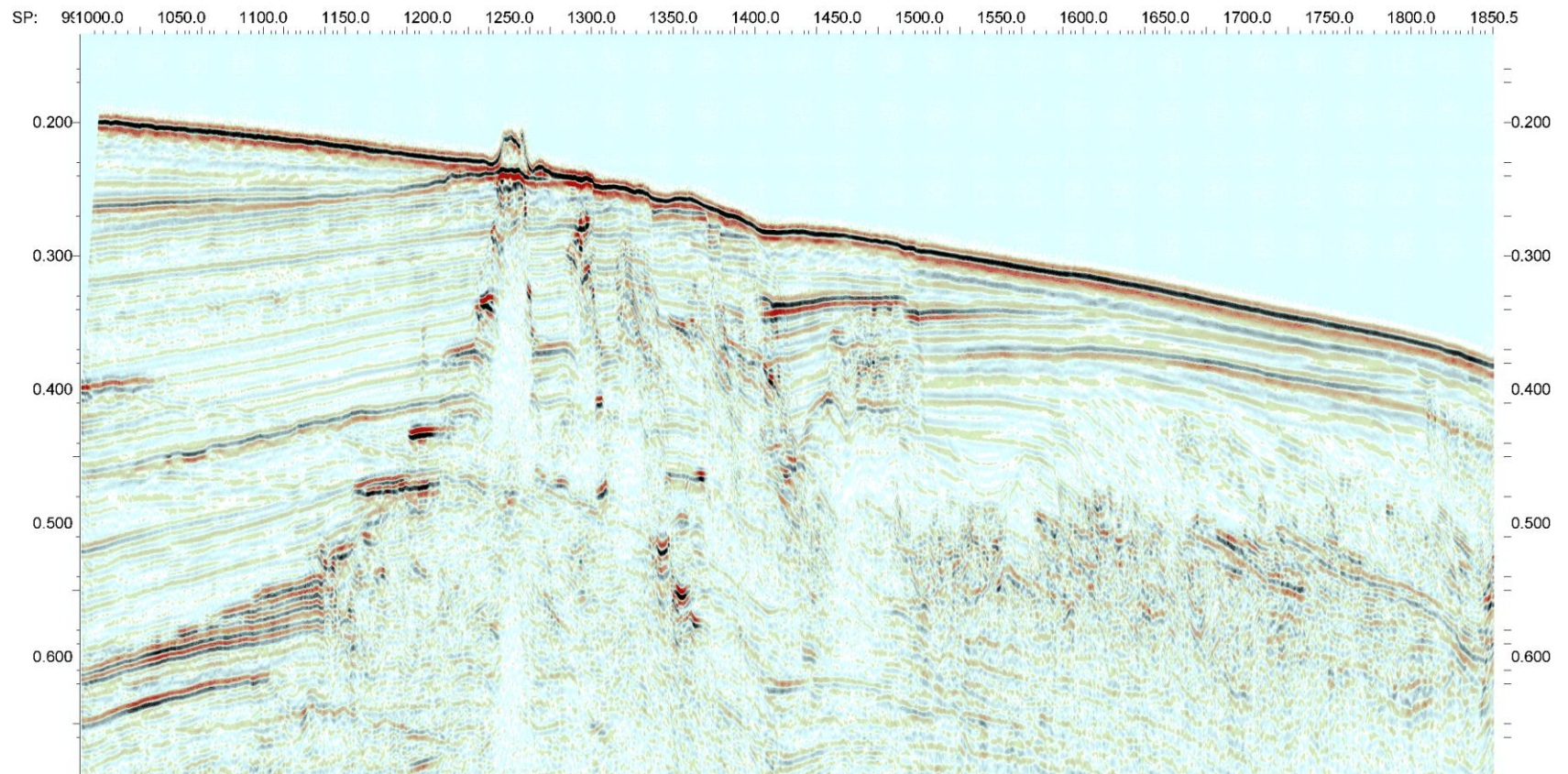
Real Case studies



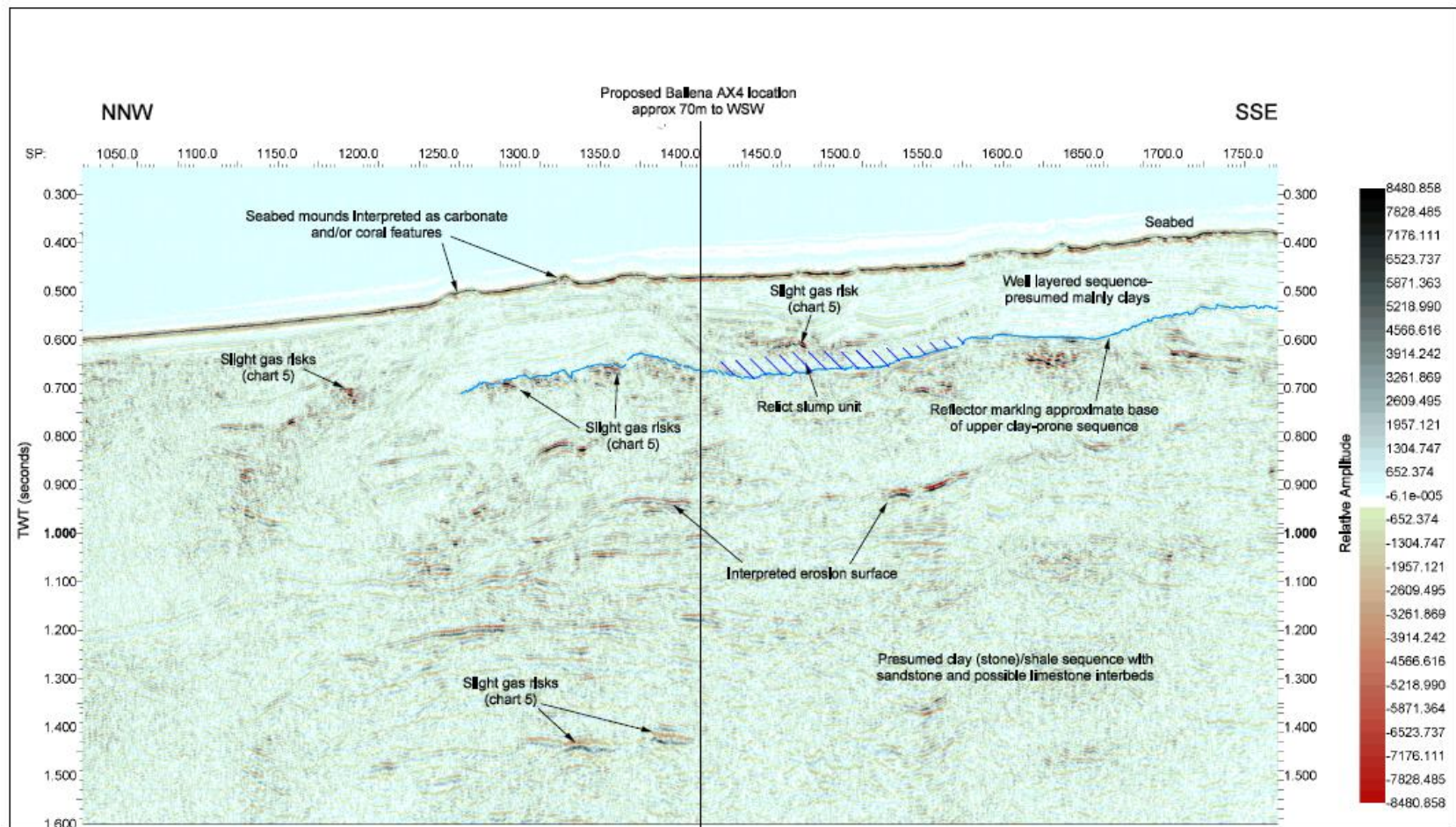
Chimneys



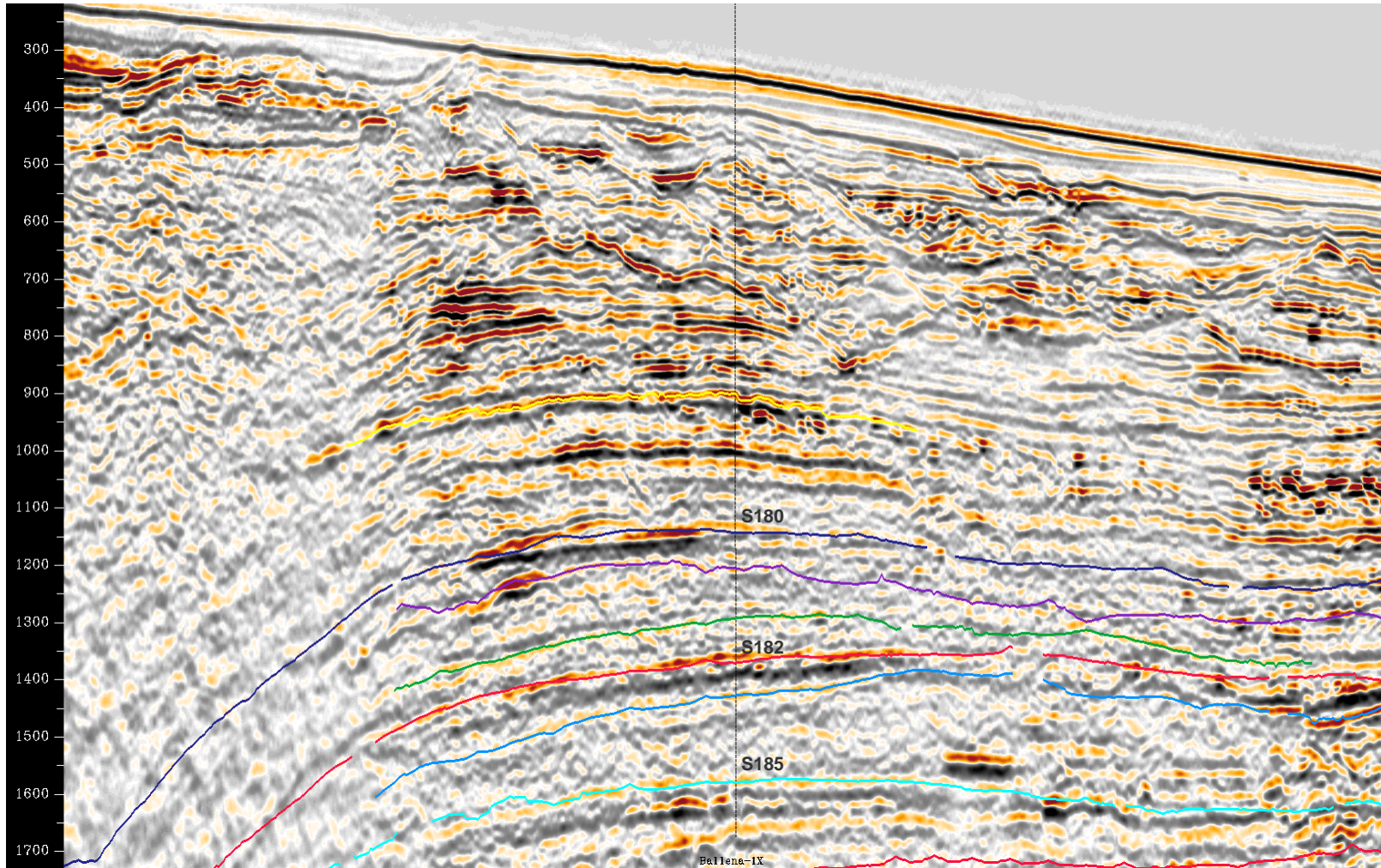
Chimneys



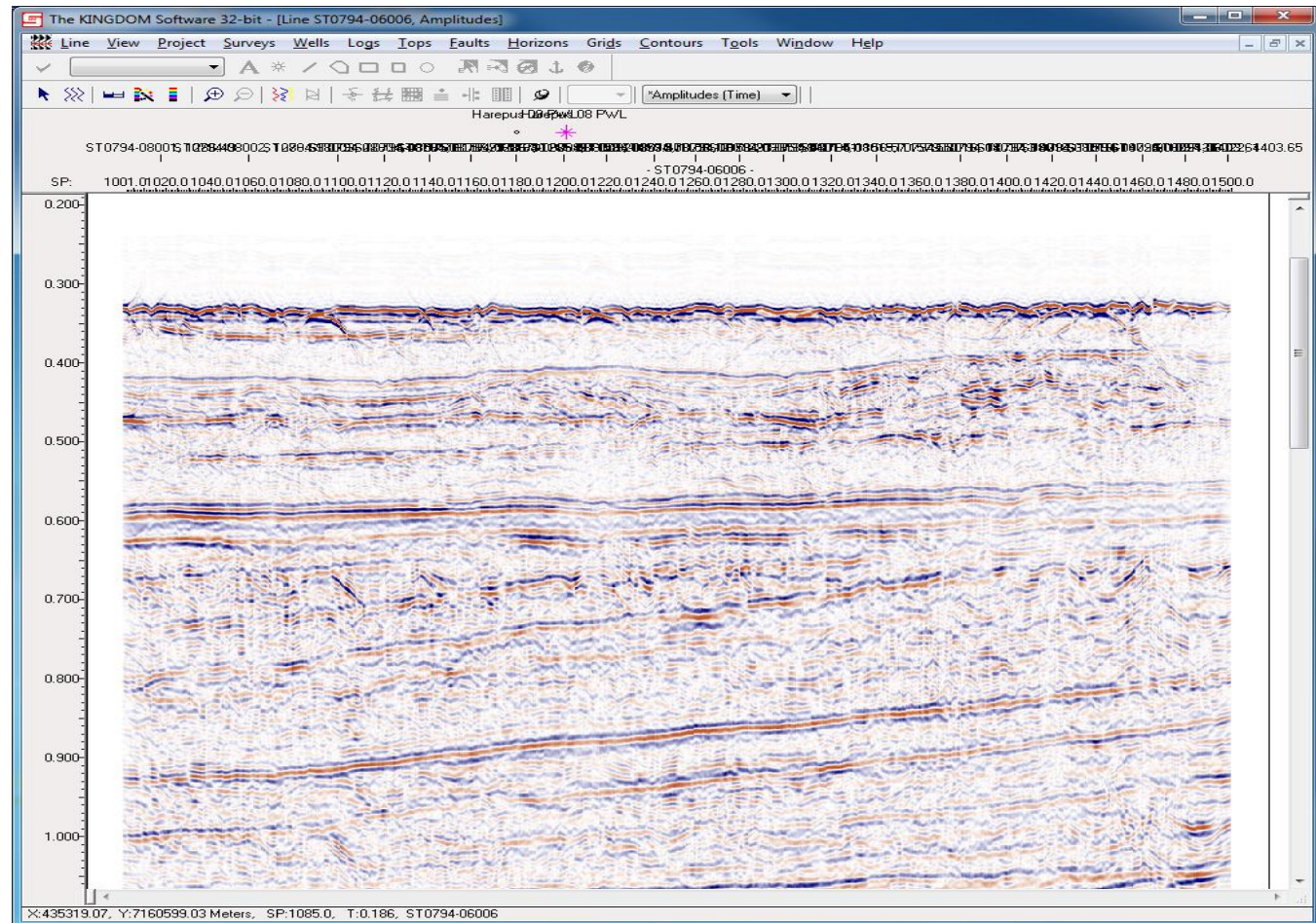
Chimneys



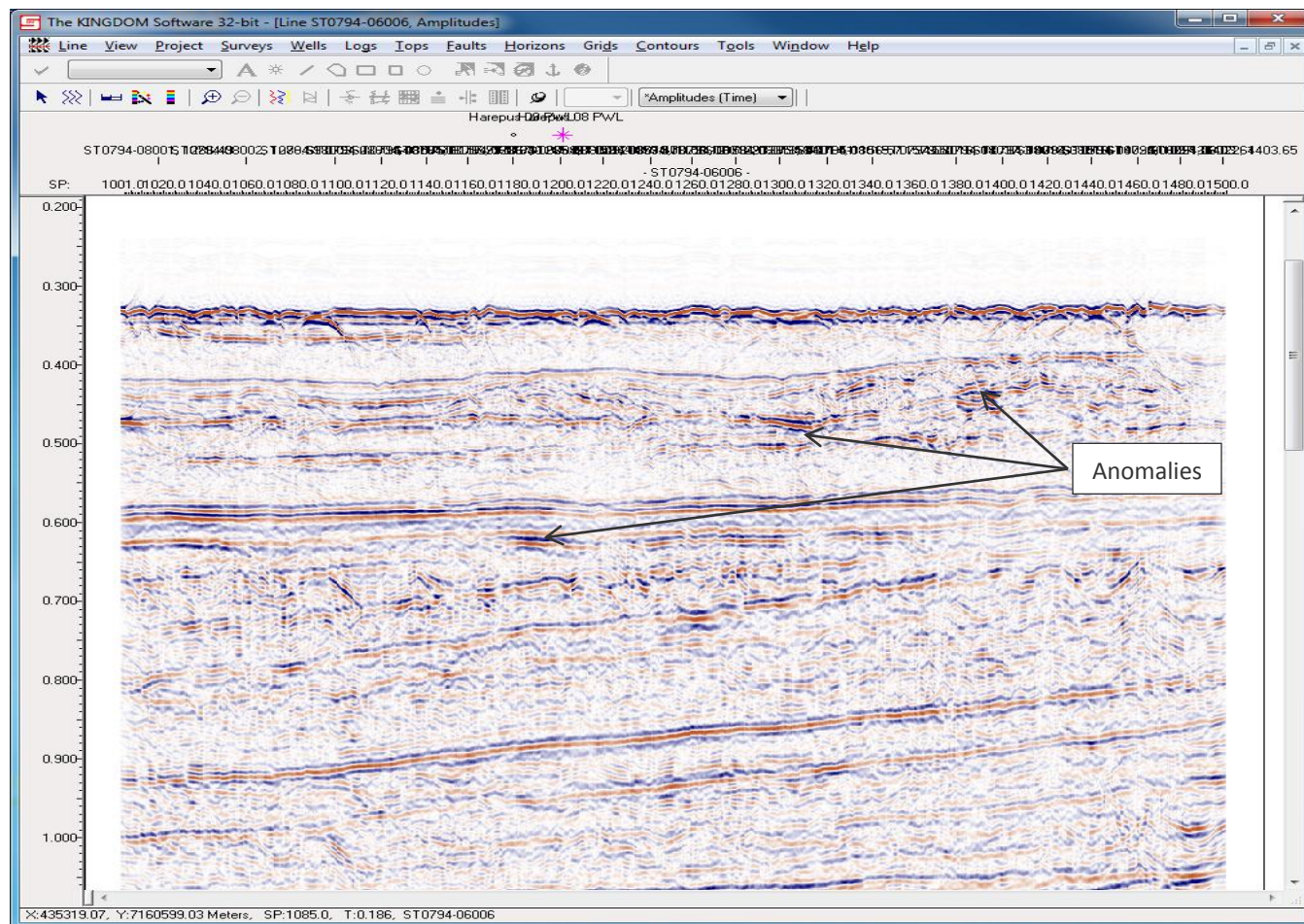
Chimneys



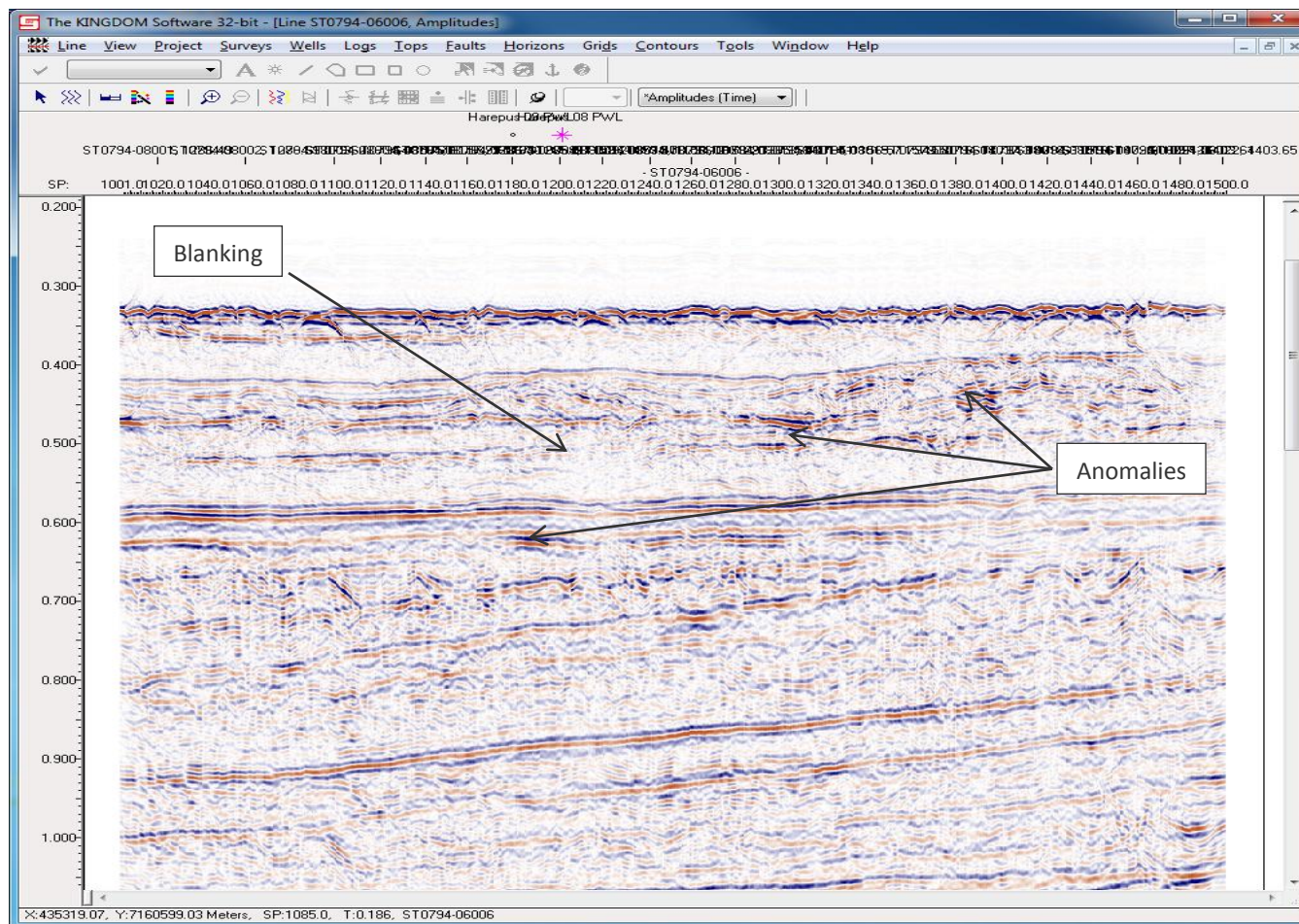
Gas Kick Case 1



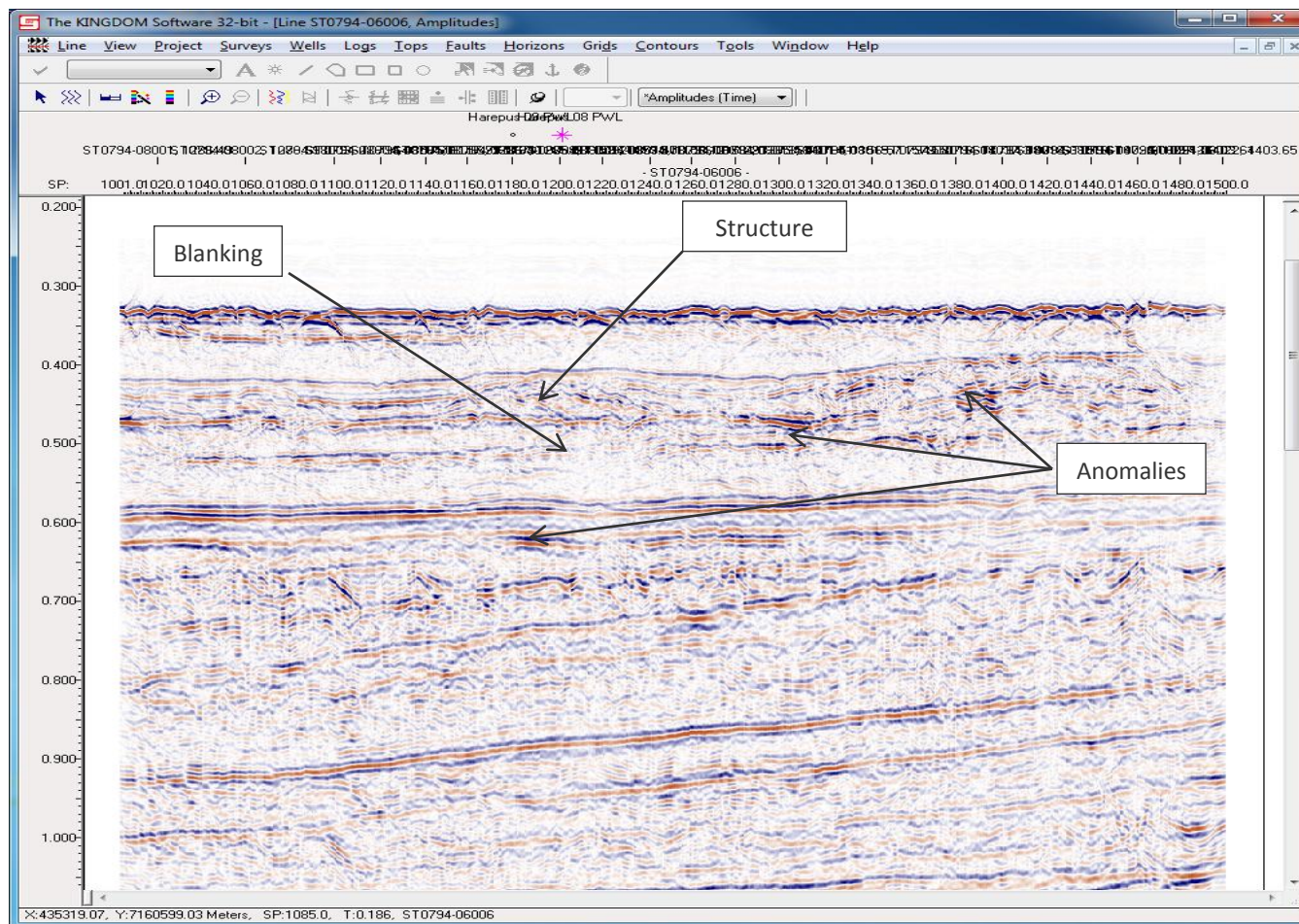
Gas Kick Case 1



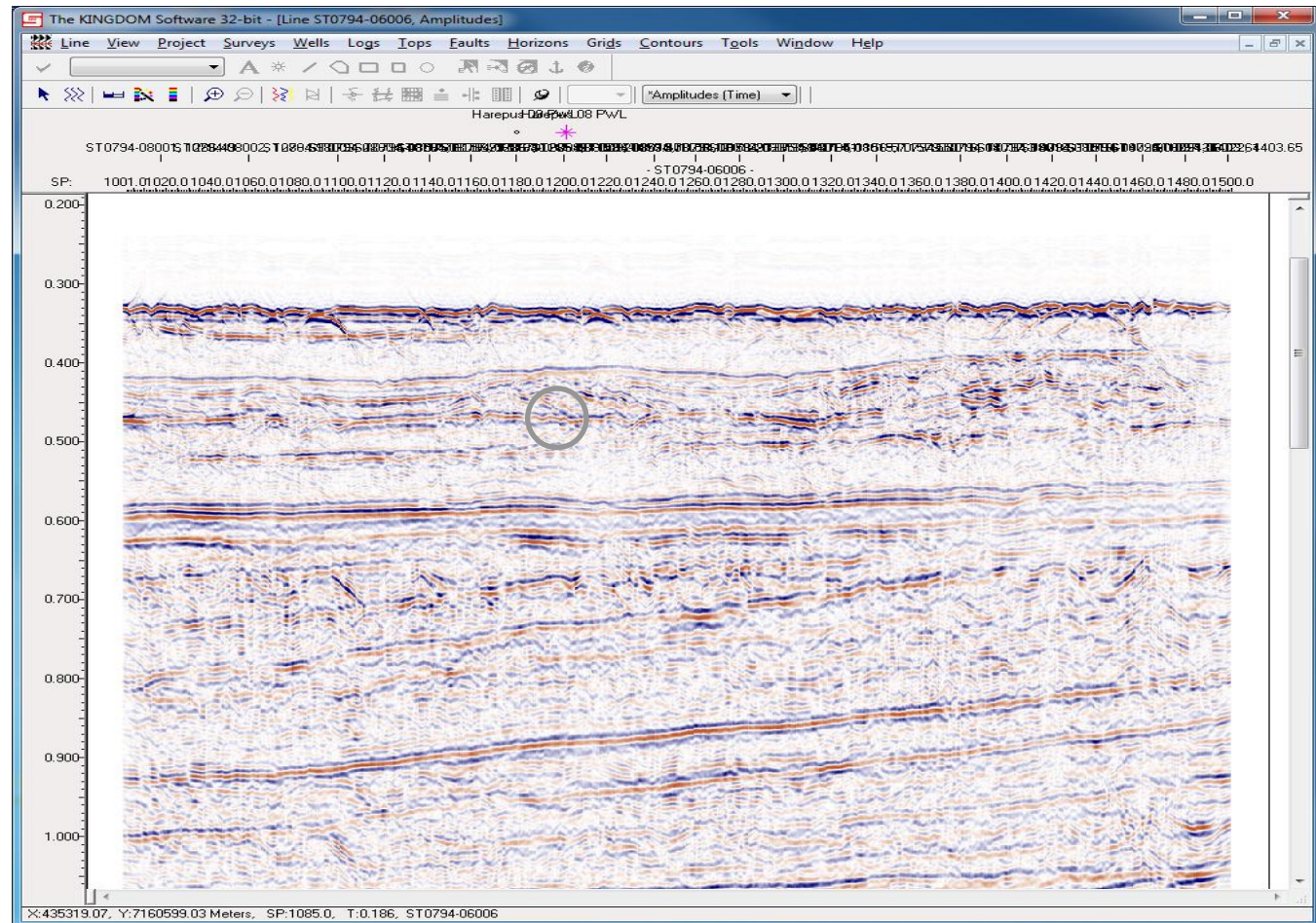
Gas Kick Case 1



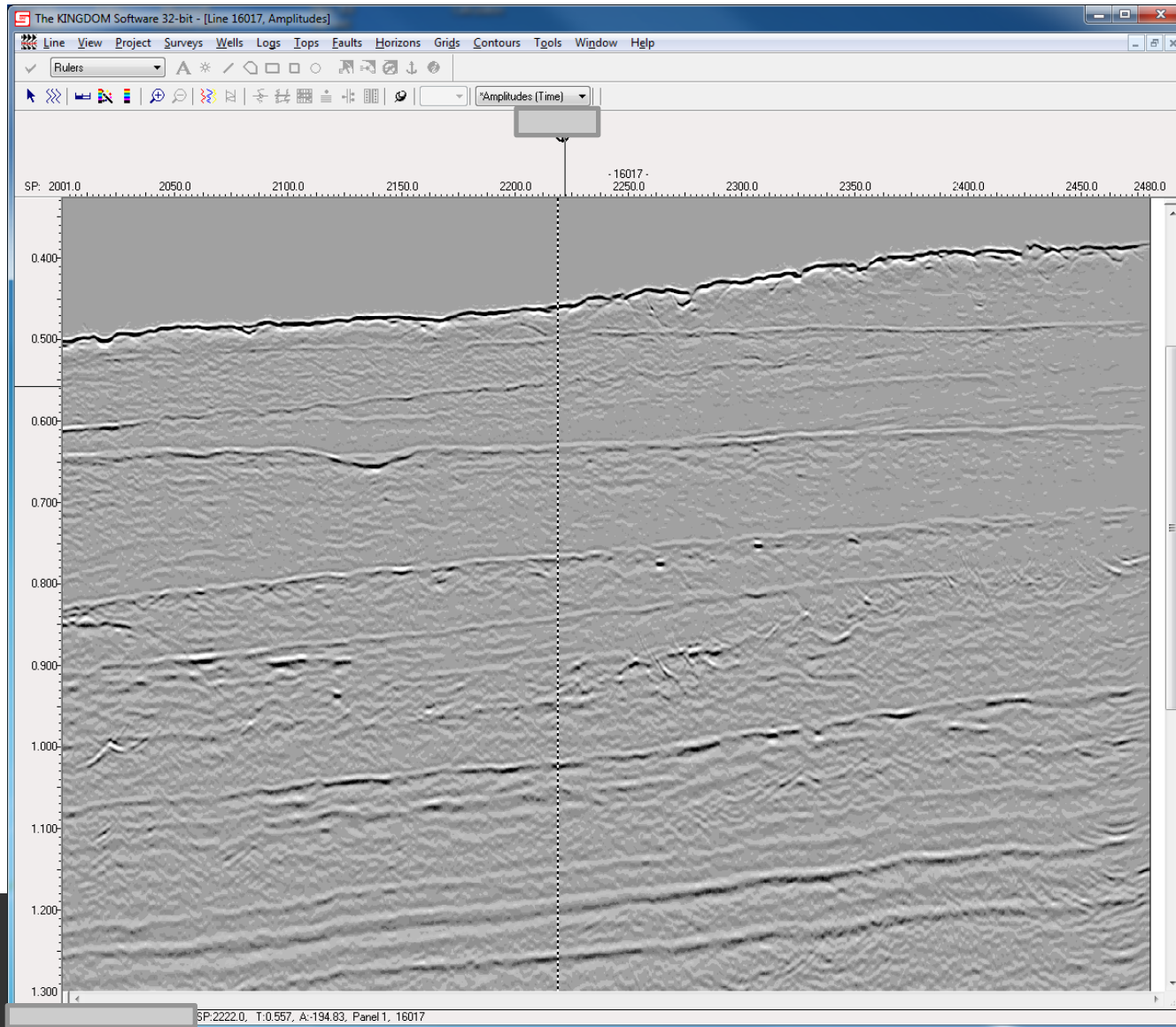
Gas Kick Case 1



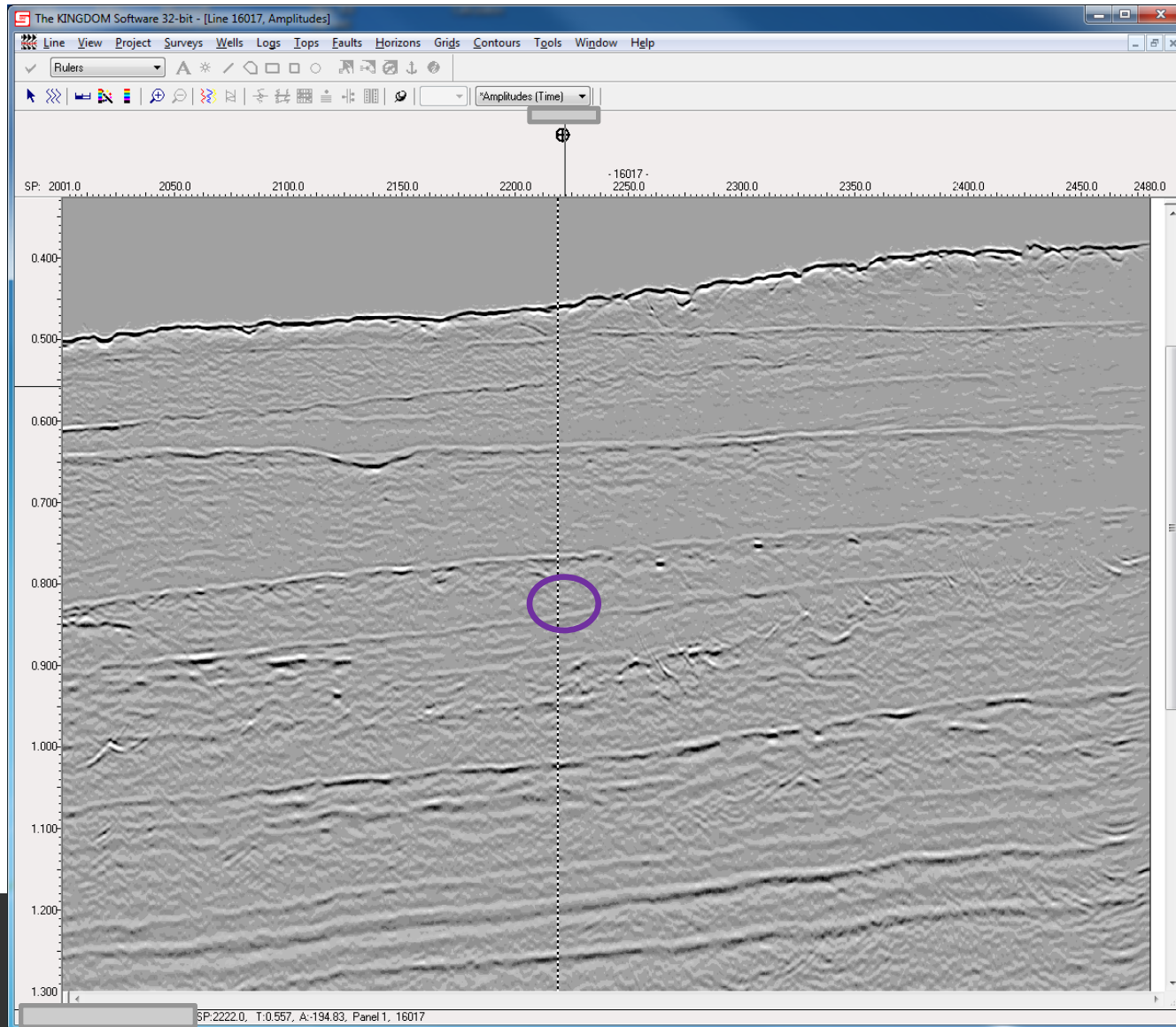
Gas Kick Case 1



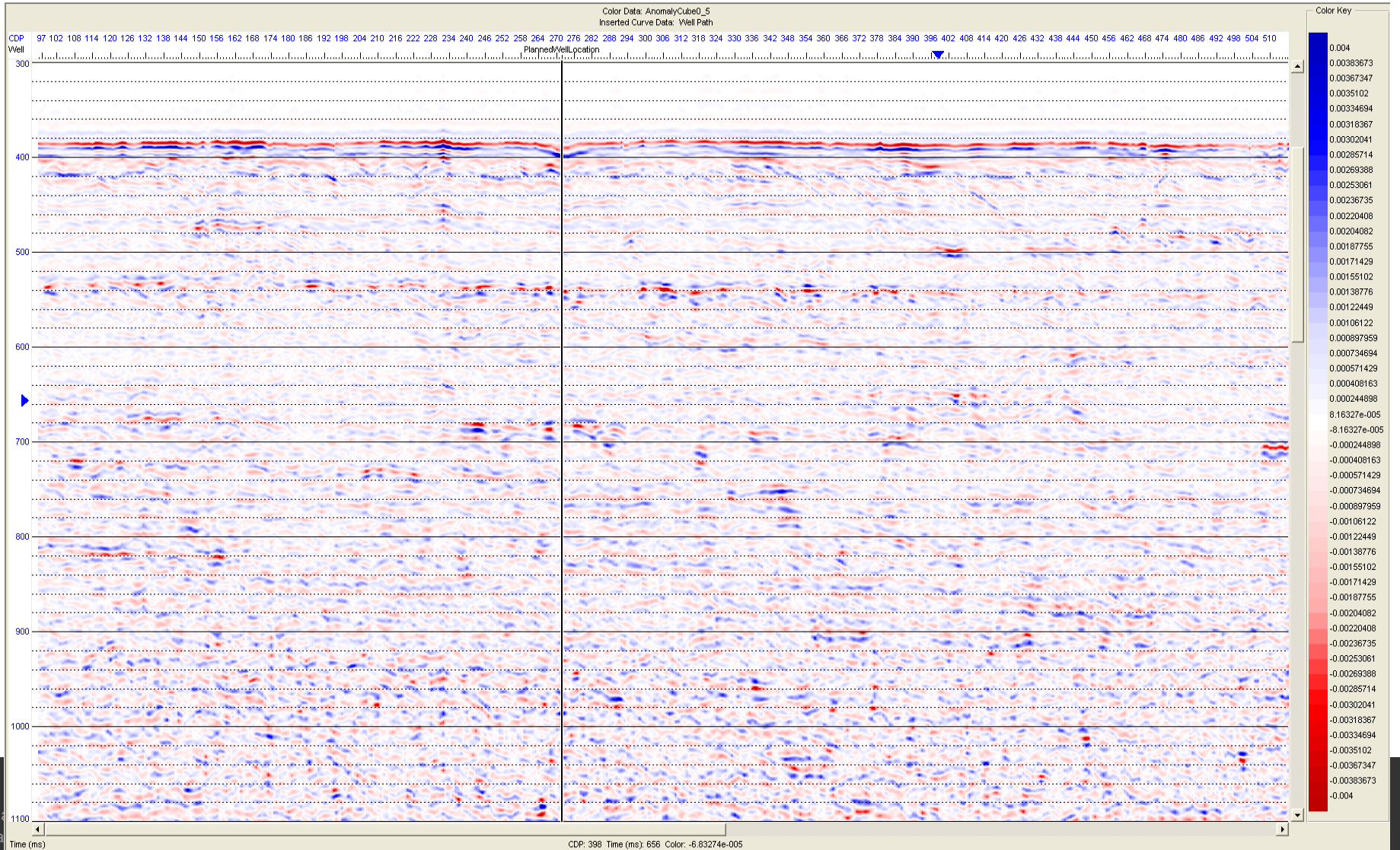
Gas Kick Case 2 (Spot the Gas....?)



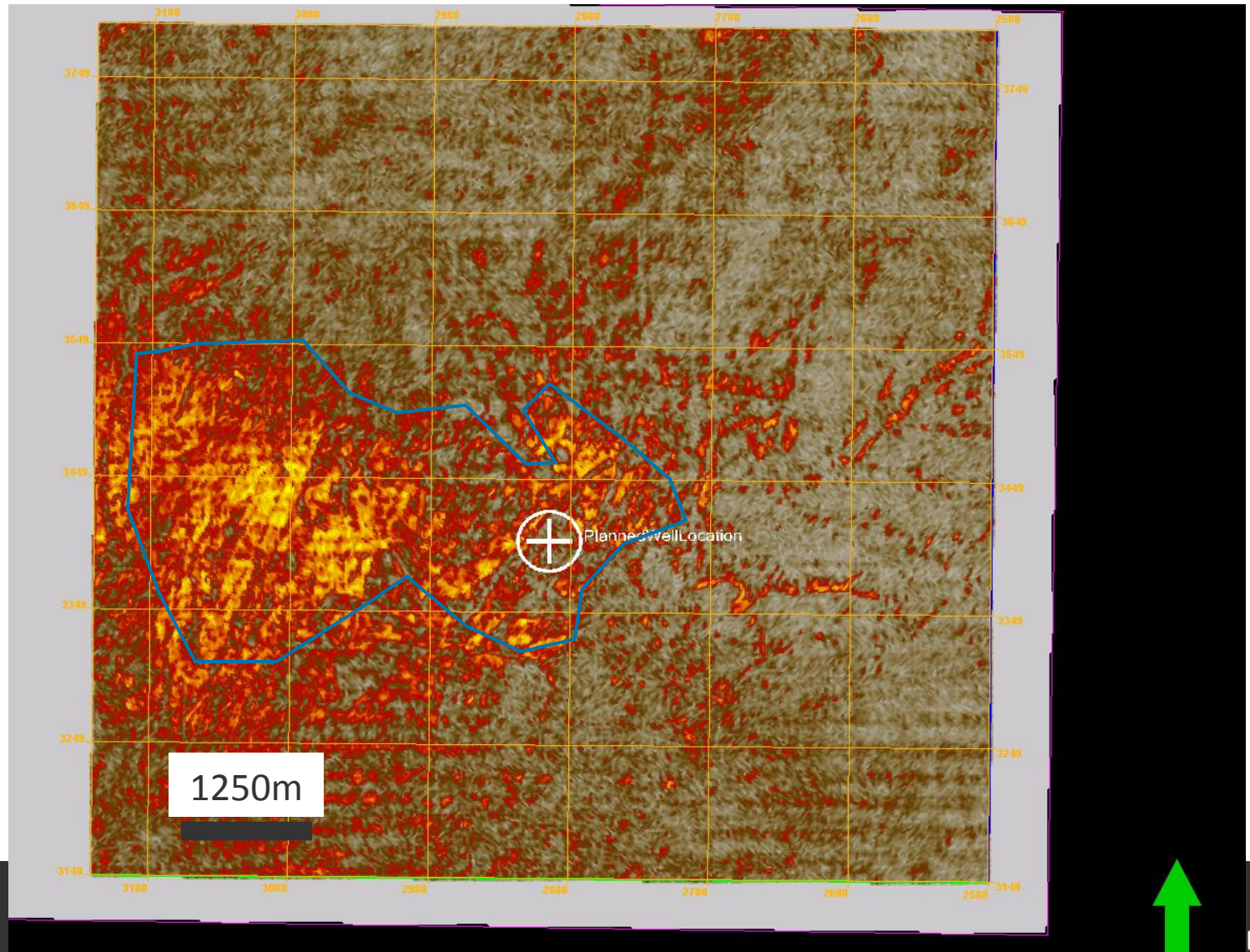
Gas Kick case Case 2 (Spot the Gas....?)



Shallow Gas Case 1 (AVO Anomaly)



Shallow Gas Case 1 (AVO Anomaly)



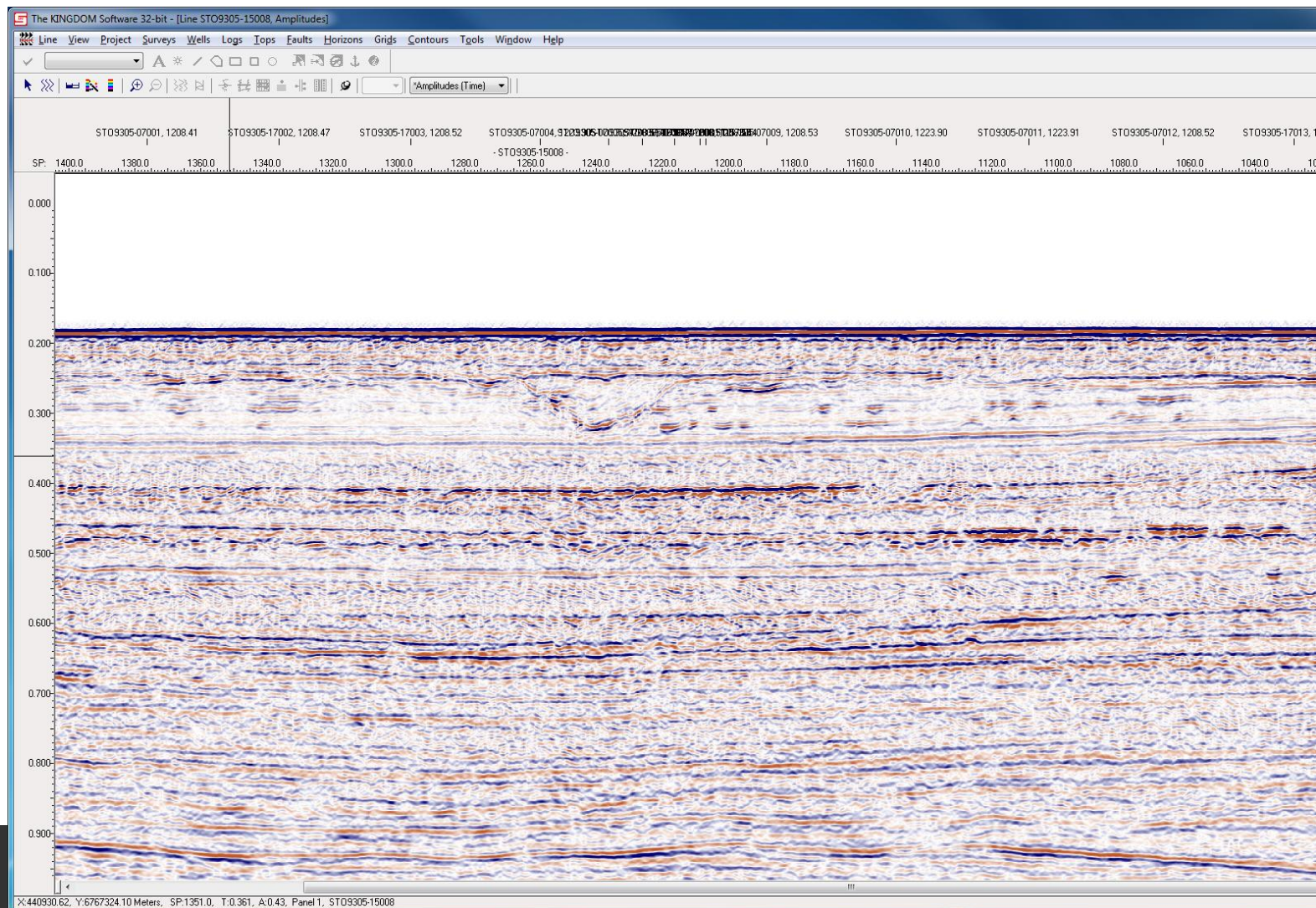
Some Technology Advances

1986	2011
Single Channel Echo Sounder	Multichannel Echo Sounder
Analogue Paper records	Digital Files
48 Channels Streamers	96-120 Channels Streamers
140 Cu In Air Gun	Sleeve Gun Clusters
Single Channel Multielectrode Sparker	Multichannel mini airgun
Seismic Interpretation on paper records	Seismic Interpretation on Work Stations
No 3D Seismic Used	3D Seismic Used
Reports on paper	PDF-Files

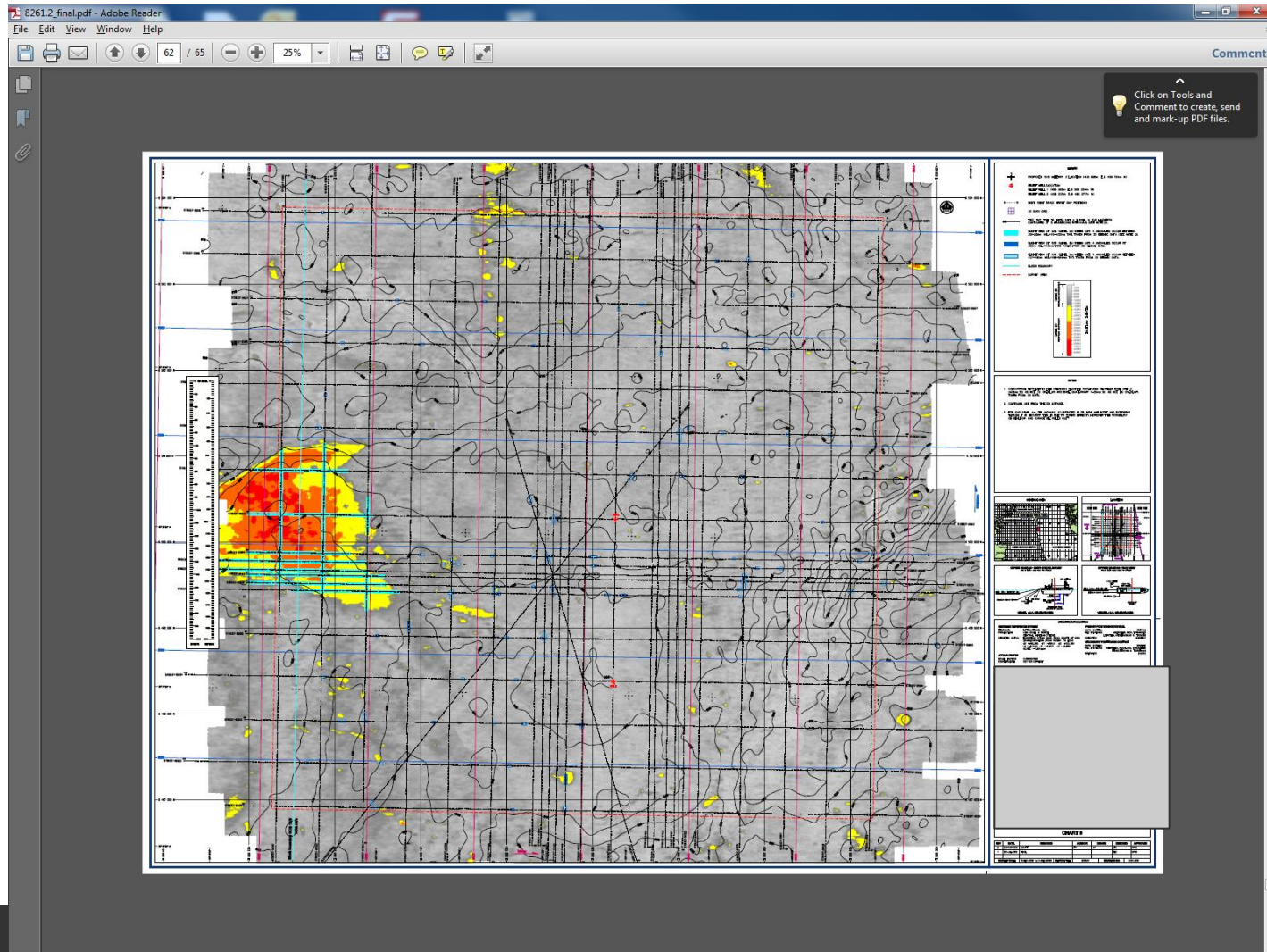
Always think geology when you look at seismic!



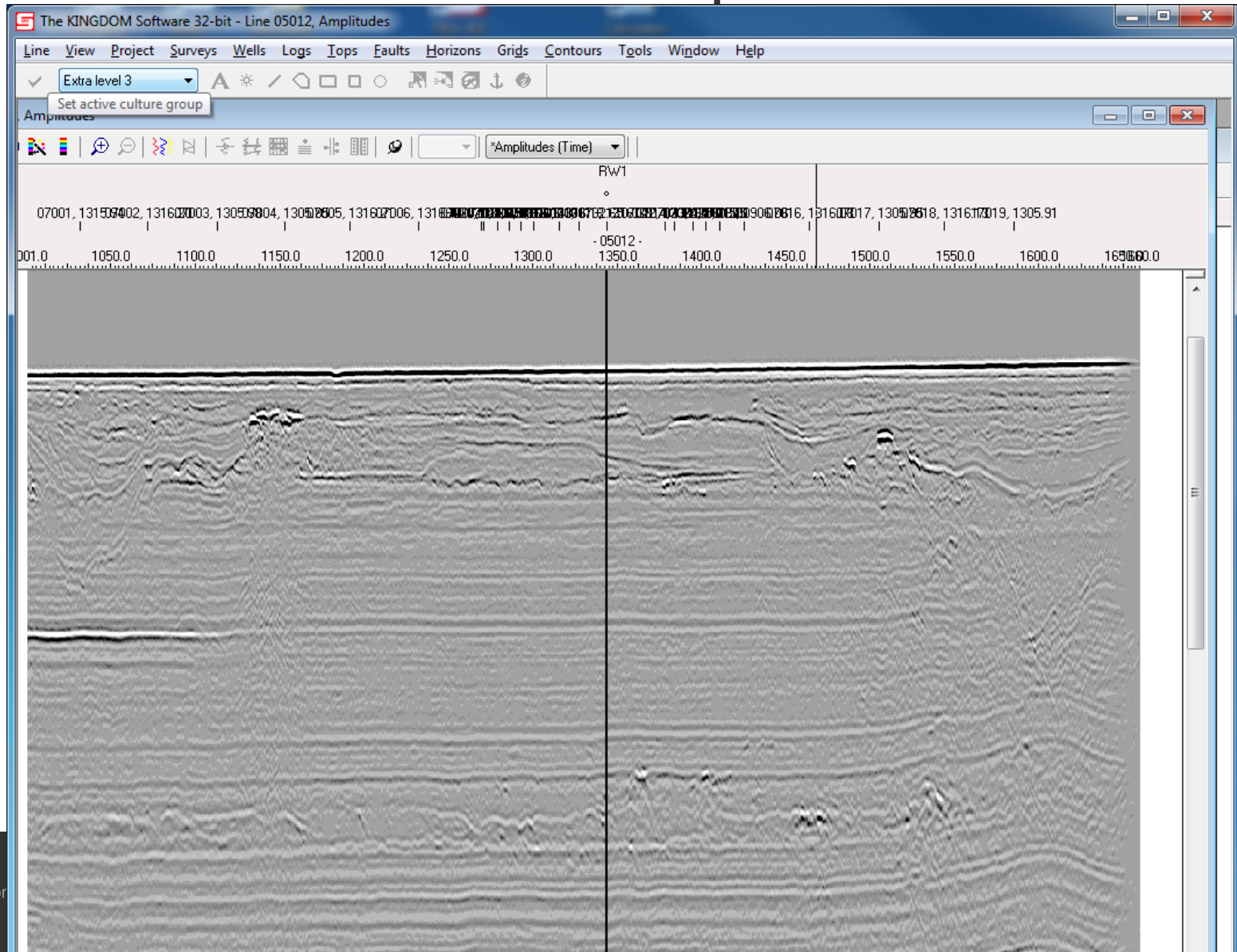
Believe it or not... This reflects real geology!



The art of Geohazard Interpretation



The art of Geohazard Interpretation



Actions to Improve Prediction

- Systemise well information
- Get an understanding for the local amplitude/Gas relationships
- Try and optimize acquisition parameters

Thank you

Shallow Gas interpretation Truth or Myth

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Principal Geologist, Statoil ASA

daglu@statoil.com