

TLS Report PNR1z – Final

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Version	Section	Revision Information	Date	Reviser
0.1	All	Draft Publication		Senior Geoscientist

Documents are reviewed as per proposed review date, or sooner if a significant change to the operation has taken place, to ensure relevance to the systems and process that they define.

Event Summary

During the injection operations of sleeve 14 for the hydraulic stimulation of PNR1z a seismicity related traffic light system amber light threshold was exceeded. The seismic event had a local magnitude of 0.4 ML. The seismic event hypocenter shown in the map and x-section by the blue dot, was roughly 773 m from the injection point.

Event Classification

Green Event	Amber Light	Red Light	Trailing Event (<=0.5ML)	Trailing Event (>0.5ML)
	X			

Event Details

Magnitude (ML)	Date	Time (24hr) BST	
0.4	23/10/2018	15:45:32.35	-

Hypocenter Information

X [mEast] BNG	Y [mNorth] BNG	Z [mTVDGL]	
335728	432741	-3000	-

Error / Uncertainties

P Trace Quality	S Trace Quality	Trace Quality	Min Ellipsoid size (m)	Mid Ellipsoid size (m)	Max Ellipsoid size (m)
0.87	0.5	0.45	106	138	226

Ground Motion & Well Integrity

Max PPV (mm/sec)	Average PPV (mm/sec)	Fit to GMPE (mm/sec)	Annular Pressure Change (psi)
0.15	0.05	<0.1	0

Injection Information

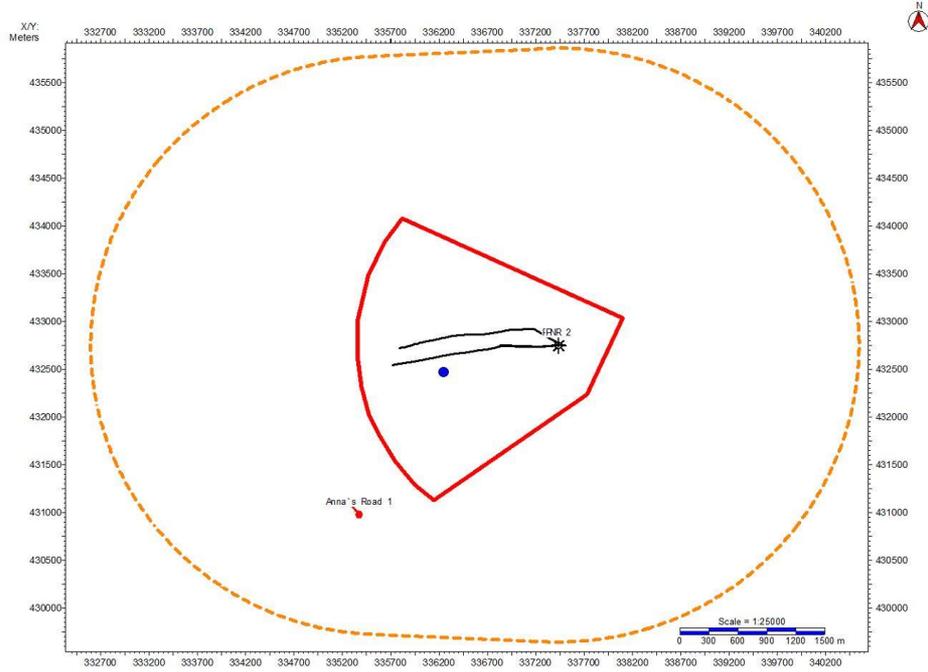
Sleeve	Fluid Volume Injected (m ³)	Proppant Volume Injected (tonnes)	Average Rate (m ³ /min)	Max Treatment Pressure (surface) (bar)	Average Treatment Pressure (surface) (bar)
14	129	2	3.6	527	482

Stage (cumulative)	Fluid Volume Injected (m ³) (cumulative)	Proppant Volume Injected (tonnes) (cumulative)	Flow Back (m ³) (cumulative)
6	1511	117	195

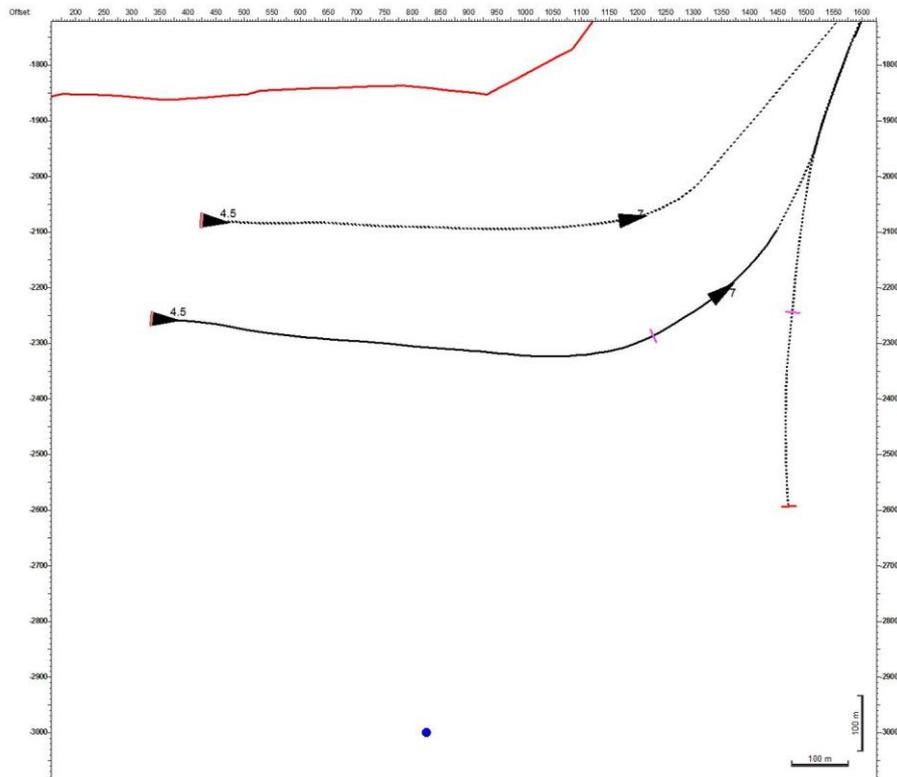
Forward Injection Schedule / Additional Mitigation

Waiting Time (hr) (<0.0ML)	Next Stage	Proposed Volume (m ³)	Mini Frac	Additional Mitigation
-	-	-	Yes/no	

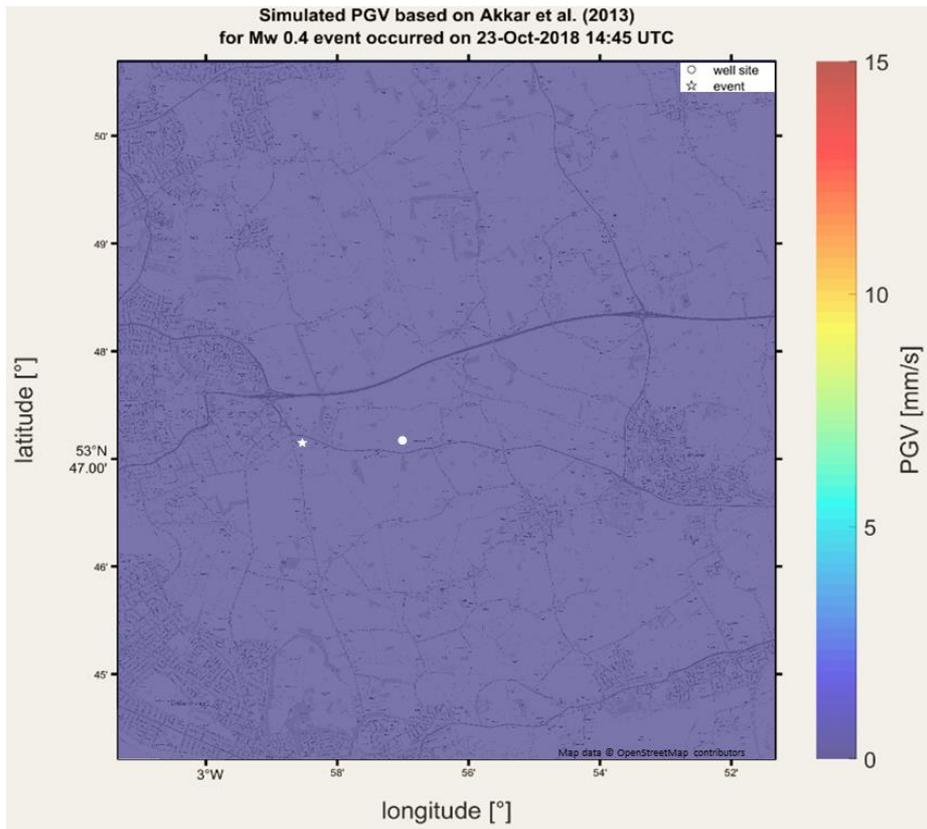
Base Map



Cross Section



Shake Map



The location of the sensor sites has been redacted on the basis of commercial confidentiality and public safety

Attenuation Curve

