

TLS Report PNR1z

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Reviewer:	HSE&P Manager, Frac Manager, Technical Director	Date of Issue:		
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Version	Section	Revision Information	Date	Reviser
0.1	All	Draft Publication		Senior Geoscientist
1.0	All	Final Publication	11/12/18	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.

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Event Summary

After operations of sleeve 38 of PNR1z, a seismicity related traffic light system trailing event threshold was exceeded. The seismic event had a local magnitude of 1.5 ML. The seismic event hypocenter shown in the map and x-section by the blue dot, was roughly 311.3 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	Last Sleeve Injection
1.5	11/12/2018	11:21:15	38

Hypocenter Information

X [mEast] BNG	Y [mNorth] BNG	Z [mTVDGL]	Distance to Nearest Injection Point (m)
336663	432832	2401	311.3

Error / Uncertainties

P Trace Quality	S Trace Quality	Trace Quality	Min Ellipsoid size (m)	Mid Ellipsoid size (m)	Max Ellipsoid size (m)
0.87	0.43	0.39	148.49	148.49	438.206

Downhole Hypocenter Information

X [mEast] BNG	Y [mNorth] BNG	Z [mTVDGL]	Distance to Nearest Injection Point (m)
336350	432763	2274	121.780

Ground Motion & Well Integrity

Max PPV (mm/sec)	Average PPV (mm/sec)	Fit to GMPE (mm/sec)	Annular Pressure Change (psi)
1.37	0.68	0.8	0

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Injection Information

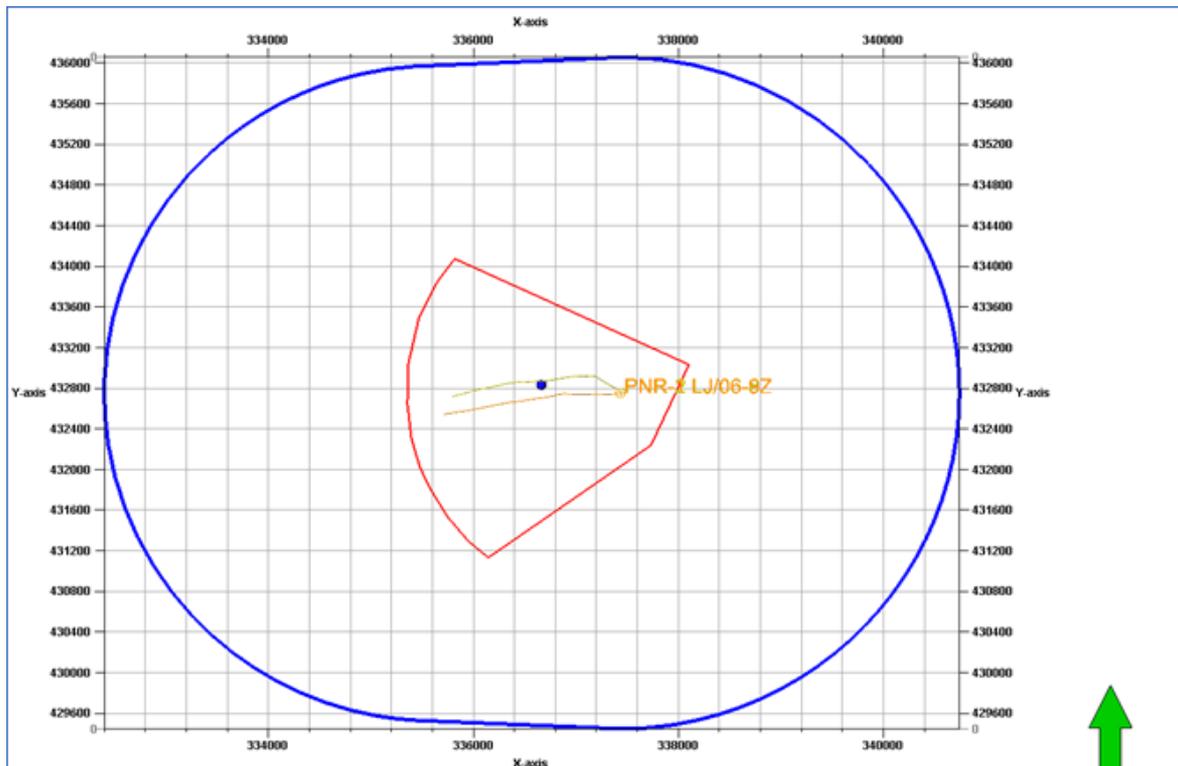
Sleeve	Fluid Volume Injected (m ³)	Proppant Volume Injected (tonnes)	Average Rate (m ³ /min)	Max Treatment Pressure (surface) (bar)	Average Treatment Pressure (surface) (bar)
38	269.7	27.87	3.58	621	527

Stage (cumulative)	Fluid Volume Injected (m ³) (cumulative)	Proppant Volume Injected (tonnes) (cumulative)	Flow Back (m ³) (cumulative)
17	2937	181	668

Forward Injection Schedule / Additional Mitigation

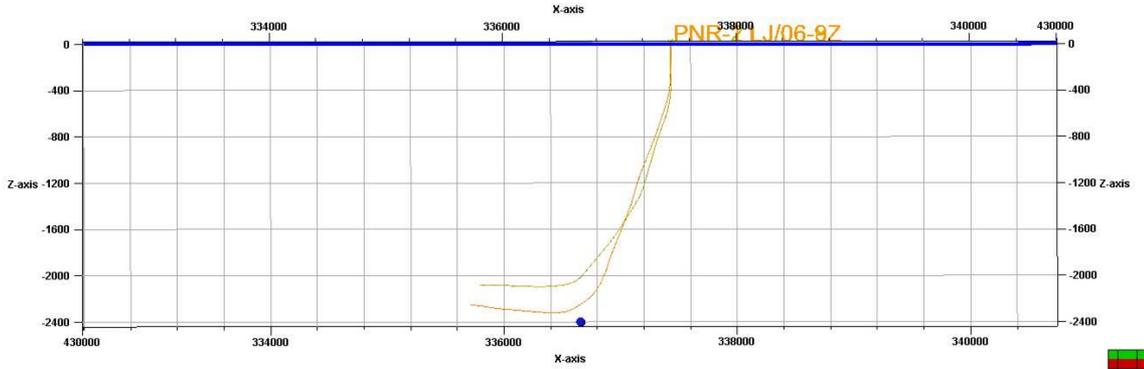
Waiting Time (hr) (<0.0ML)	Next Stage	Proposed Volume (m ³)	Mini Frac	Additional Mitigation
18	39	400	no	

Base Map

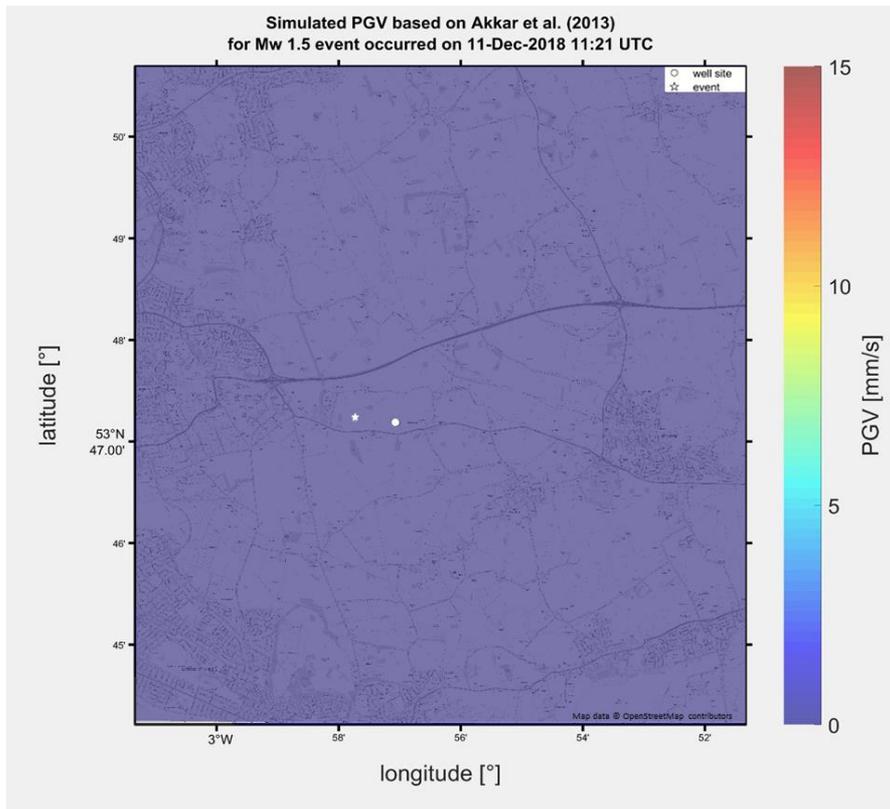


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Cross Section (From South)



Shake Map



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

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Attenuation Curve

