

TLS Report PNR1z

Management System:	HSE	File Name:	TLS_RED_14122018_13:41:05_PNR1z.docx	
Approver:	Senior Geoscientist	Version No:	1	
Reviewer:	HSE&P Manager, Frac Manager, Technical Director	Date of Issue:		
Author:		Proposed date of Review:	n/a	
Version	Section	Revision Information	Date	Reviser
0.1	All	Draft Publication		Senior Geoscientist
1.0	All	Final Publication	14/12/18	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

During operations of sleeve 40 of PNR1z, a seismicity related traffic light system red light threshold was exceeded. The seismic event had a local magnitude of 0.86 ML. The seismic event hypocenter shown in the map and x-section by the blue dot, was roughly 124 m (downhole) 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
0.86	14/12/2018	13:41:05	40

Hypocenter Information

X [mEast] BNG	Y [mNorth] BNG	Z [mTVDGL]	Distance to Nearest Injection Point (m)
336616	433061	1952	564

Error / Uncertainties

P Trace Quality	S Trace Quality	Trace Quality	Min Ellipsoid size (m)	Mid Ellipsoid size (m)	Max Ellipsoid size (m)
0.81	0.47	0.36	118.181	143.648	456.922

Downhole Hypocenter Information

X [mEast] BNG	Y [mNorth] BNG	Z [mTVDGL]	Distance to Nearest Injection Point (m)
336416	432767	2251	124

Ground Motion & Well Integrity

Max PPV (mm/sec)	Average PPV (mm/sec)	Fit to GMPE (mm/sec)	Annular Pressure Change (psi)
0.416	0.126	0.3	0

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Injection Information

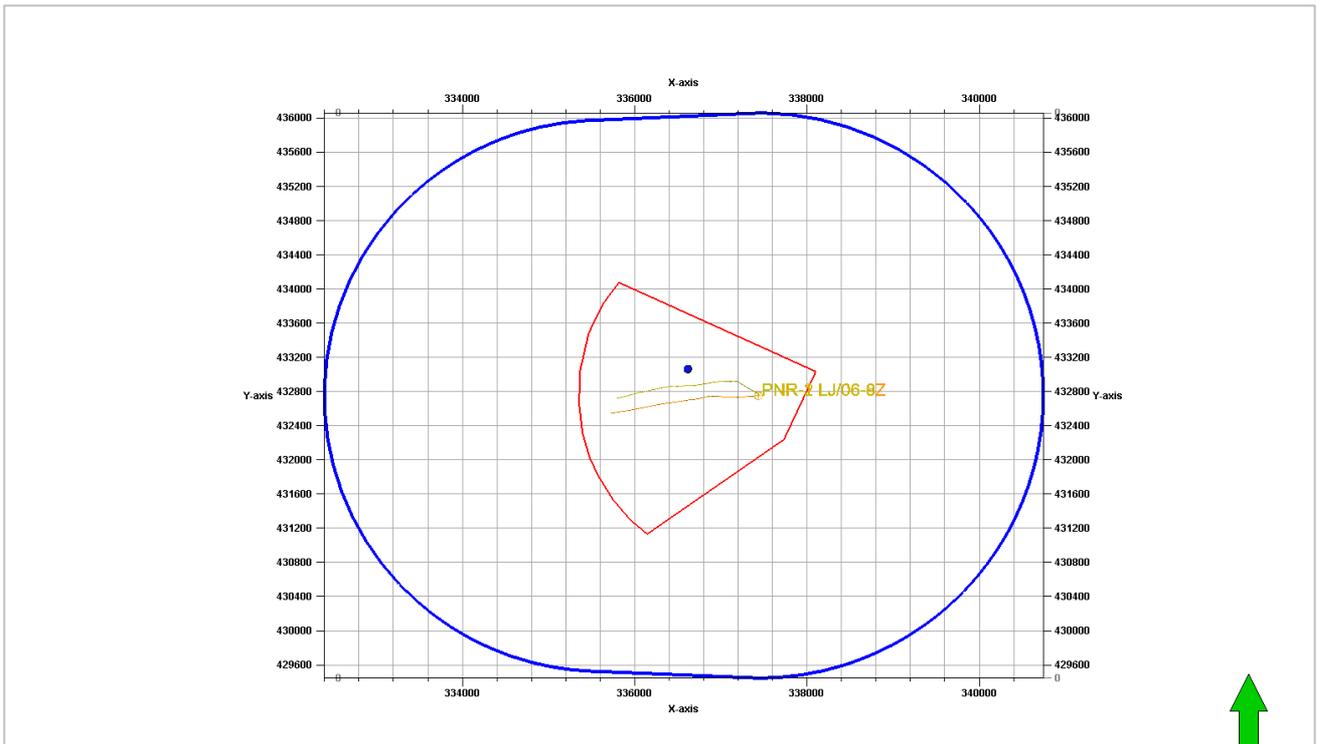
Sleeve	Fluid Volume Injected (m ³)	Proppant Volume Injected (tonnes)	Average Rate (m ³ /min)	Max Treatment Pressure (surface) (bar)	Average Treatment Pressure (surface) (bar)
40	250.4	19.65	2.85	545	474

Stage (cumulative)	Fluid Volume Injected (m ³) (cumulative)	Proppant Volume Injected (tonnes) (cumulative)	Flow Back (m ³) (cumulative)
17	3450.95	227.4	667.57

Forward Injection Schedule / Additional Mitigation

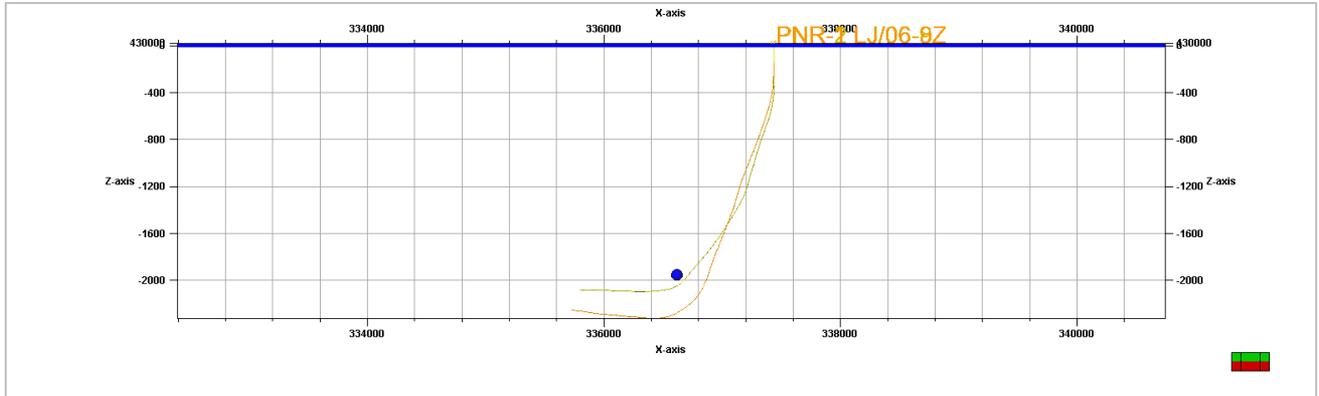
Waiting Time (hr) (<0.0ML)	Next Stage	Proposed Volume (m ³)	Mini Frac	Additional Mitigation
18	41	400	no	

Base Map

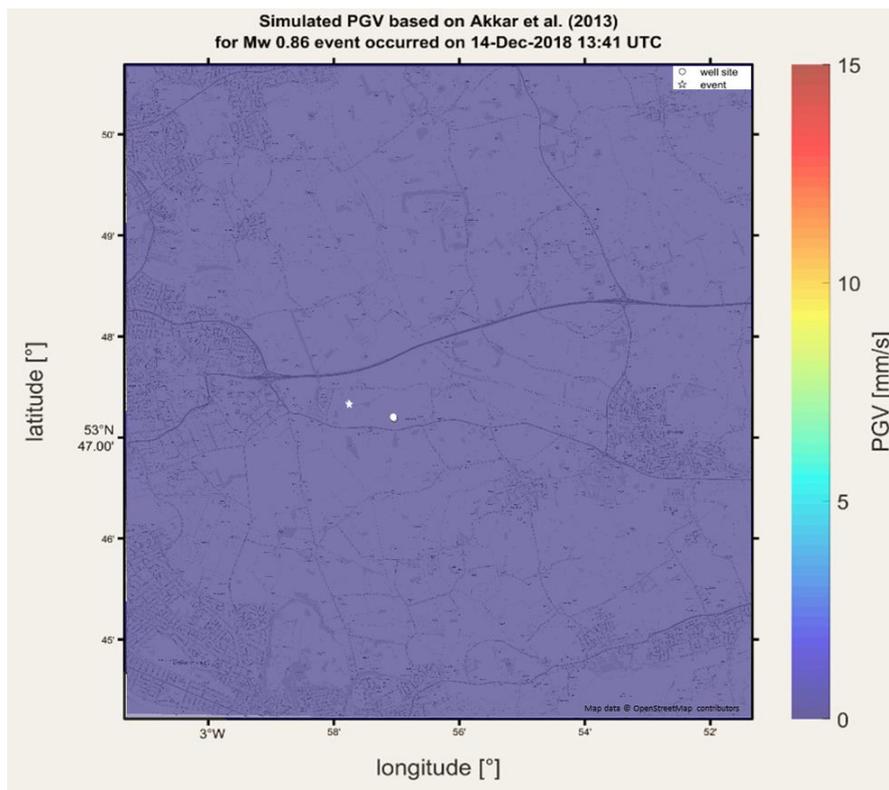


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Cross Section (From South)



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

