

### Source Quality Control

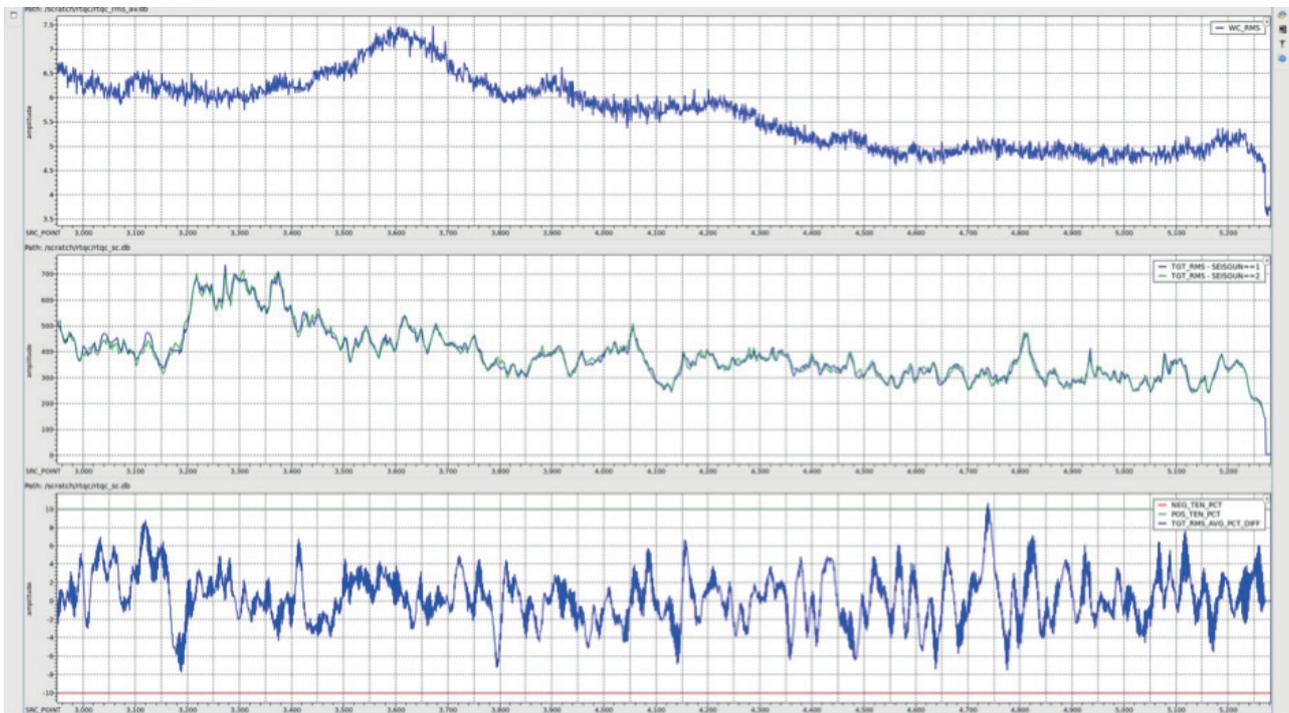


Shearwater Source Quality Control uses Far field signatures generated from near field hydrophones

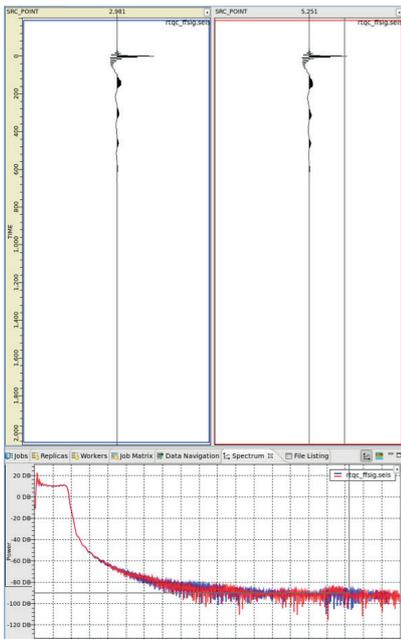
- Real time far field signature estimation reconstructed from near field data
- Graphical display of calculated far fields and comparison with reference signature
- Individual hydrophone comparisons for air leak detection

The Shearwater analysis of shot to shot variation in the signal window strength during acquisition allows for comparison of the source arrays to ensure consistency of source output.

The FFSIG module computes a real time far field signature for each shot based on the associated near field hydrophone measurements using a least-squares inversion method. During the acquisition of the survey, these calculated far field signatures are compared to a standard reference to ensure consistent and predictable source output.

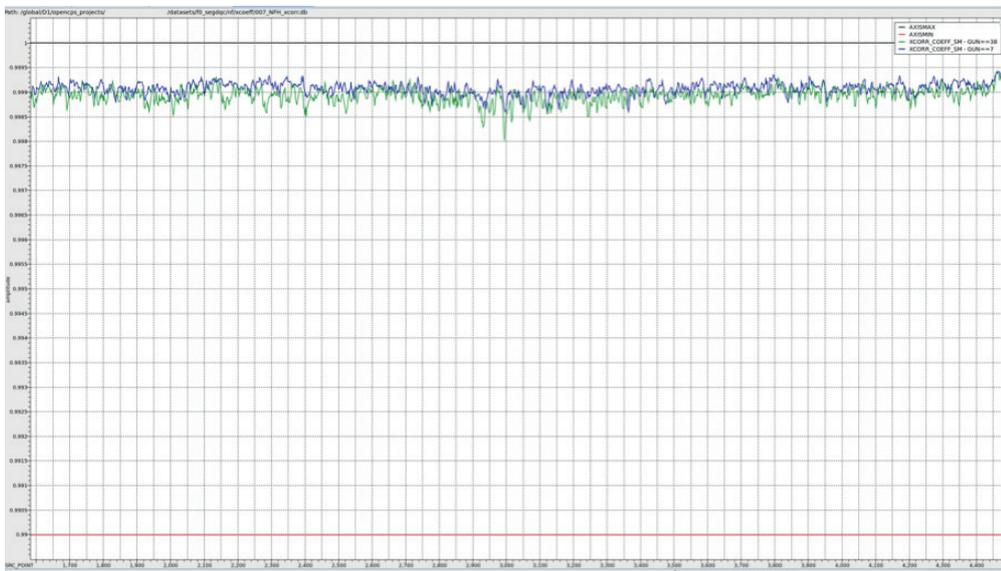


Quality checks on the source array performance are generated during acquisition. The array strengths should track one another closely. The values displayed are obtained from the target RMS values calculated on the centre streamers. The second graph plots the percentage difference between the two source arrays. Differences due to geology, spread layout or sea state should change very little from between successive shots, so this method provides an accurate indication of source energy output and consistency from. Over the course of an entire line, geology, spread layout and sea state will change the calculated output of the sources, but the differences between successive shots should remain small and scattered around the zero line.

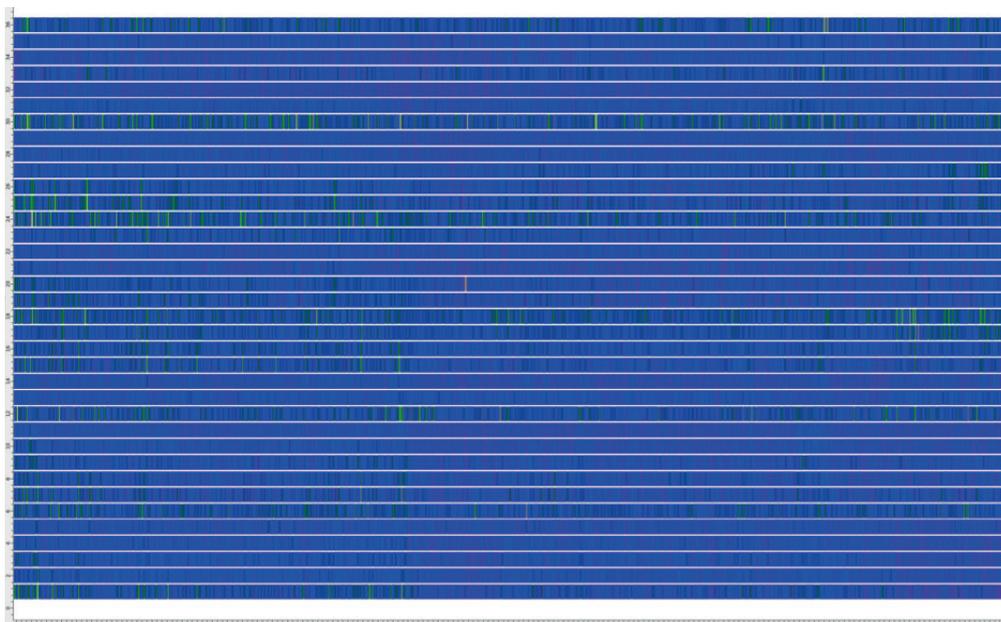


Quality checks on the source array performance are generated during marine acquisition in real time

As an additional QC of the source a far field signature is generated for each shot in real time using the near field data from the recording system. This signature is cross correlated with a reference signature which is calculated at the start of the survey. Both the reference signature and the calculated real time signature are displayed together in the time domain and overlain in the frequency domain.



The cross correlation values between the reference far field signature and the real time calculated far field signature are displayed in a graphical format as the line progresses. This display can highlight gun substitutions, changes in source geometry and source malfunctions.



To further monitor source performance, the cross correlation of each individual hydrophone can be displayed as a map and compared to the reference. This aids in identifying possible air leaks during acquisition.