

Tu P05

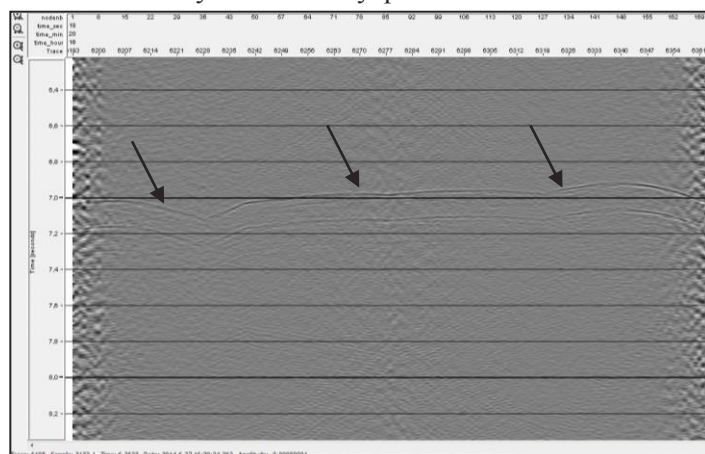
Customized Injection Monitoring Solution Using PRM Technology

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SUMMARY

Octio has installed a permanent monitoring system at a waste injection site at the Oseberg field on the Norwegian continental shelf. This system comprises a small ocean-bottom seismic array of 4C stations, designed for both passive monitoring of microseismic events and active seismic surveys (see Lindgård and Matveeva 2013 and Løvheim 2013). The system was designed and installed in a Demo 2000 project supported by the Research Council of Norway and Statoil, and has provided real time data since its installation in 2013. The results from the first year of monitoring show that the system is able to characterize different passive energy sources from sub-hertz up to Nyquist frequency. These passive sources include weak regional earthquakes ($M < 4.5$) and microseisms from ocean wave oscillation (see Bjerrum et. al., 2014). During the summer 2014 a 4D baseline active survey was successfully conducted. The Oseberg installation is an example where a system is dedicated to injection monitoring over a limited area. The system will provide early warning for caprock integrity issues using passive and microseismic monitoring.

During the first phase of monitoring no injection was carried out in the dedicated injection well, however activity from nearby production wells were recorded. One example is a perforation shot



carried out in a well 500 m west of the PRM system at a depth of 2650 m. The perforation shot contained 0.8 kg explosives per meter. On the figure above, this perforation shot has been marked with arrows. Notice the clear sea surface multiples following the perforation shot. Only a frequency filter with 15 – 70 Hz bandpass has been applied to the data in this image.

Acknowledgements

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References

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L. Bjerrum, T. Matveeva, J.E. Lindgård, H.I. Rutledal, A.C.S. Yde, 2014, Comparison of noise characteristics on an un-trenched and trenched cable deployed in the north sea for a PRM system, '14 EAGE Conference paper.