CASE STUDY

Nanometrics

STRATEGIC INTELLIGENCE fueled by SCIENCE

Monitoring Natural and Induced Seismicity

Horn River Basin, Northern BC, Canada

The Problem:
GeoScience BC identified a requirement to better understand the effects of hydraulic fracturing in the Horn River Basin. The dissemination of precise and accurate geotechnical information to the public is the foundation of their work. The challenge faced by GeoScience BC and the project partners (Canadian Association of Petroleum Producers (CAPP), BC Oil and Gas Commission and Natural Resources Canada) was how to accurately distinguish between natural and induced seismicity while monitoring ongoing hydraulic fracturing operations.

Our Solution:
Nanometrics was awarded a contract by Geoscience BC in October 2012 for a turnkey seismic network in the Horn River Basin area and the installation was completed shortly thereafter in the spring of 2013. The Nanometrics seismic network will help the project partners and operators to distinguish between natural and induced seismicity. Geophones have traditionally been used to measure vibrations in these applications, but they lack the low frequency performance and low self-noise required to detect smaller events over larger areas. The Trillium Posthole was chosen for this project because it is a much more sensitive instrument with lower detection thresholds and less overall cost of deployment. The seismic network also uses Libra II real-time VSAT communications equipment. This array demonstrates Nanometrics unique ability to monitor seismicity in real-time and distinguish induced events from natural events. The entire deployment is managed by Nanometrics and provides real-time data to Natural Resources Canada facilities in Sidney, British Columbia.

Permitting for the network was completed in late February 2013, leaving a very short window of opportunity to install the stations before the spring breakup. Nanometrics seismic engineering work crews completed the installation within three weeks, installing the network in the sub-surface muskeg, an ever-challenging topography. The remote site design was very challenging as adequate support had to be provided for the VSAT antenna and a system designed to economically install the posthole seismometer below the permafrost. A stable platform was built on four 20ft screw pile footings to support the VSAT antenna, solar systems and batteries. A fifth, 25ft deep screw pile was used as a "borehole" for the Trillium 120 Posthole seismometer.

The real-time data from this network is sent via Libra VSAT to the Geological Survey of Canada, Sidney, BC, for processing and further distribution to the IRIS Data Management Center. The project partners are excited about the high quality data they will receive from the seismic array so that they can better monitor hydraulic fracturing operations. Nanometrics has successfully and consistently delivered real-time critical seismic data in national networks located in some of the world's harshest environments. These gold standard instruments have been the preferred choice of world-renowned seismological organizations, such as USGS and IRIS/PASSCAL.

Carlos Salas, Vice President, Oil and Gas for Goscience BC stated, "British Columbians are concerned about the effects of hydraulic fracturing and the addition of Nanometrics, a technical leader in the seismology field, will ensure the high standard of data necessary to properly assess the risks."