

Bulletin 2015-07

February 19, 2015

Subsurface Order No. 2: Monitoring and Reporting of Seismicity in the Vicinity of Hydraulic Fracturing Operations in the Duvernay Zone, Fox Creek, Alberta

The Alberta Energy Regulator (AER) announces issuance of Subsurface Order No. 2 (order), dated February 19, 2015, regarding the monitoring and reporting of seismicity in the vicinity of hydraulic fracturing operations in the Duvernay Zone, in the Fox Creek area of Alberta.

Energy development in Alberta has been observed to induce subsurface seismic events since the 1960s. Most of these events have been too small to be felt or to cause surface impacts and were mainly recorded by federal seismic arrays aimed at studying west-coast earthquakes. Since 2008, the AER, through the Alberta Geological Survey (AGS), has been directly monitoring natural seismicity levels in Alberta and assessing subsurface energy resource operations (mainly completion activities such as hydraulic fracturing) for potential links to induced seismicity. In those efforts, the AER and AGS have been working alongside federal and university researchers to understand the links between new energy development and risks associated with induced seismicity.

During the drilling seasons of 2013/14 and 2014/15, the AER and AGS observed unexpected persistent patterns of seismic events above background levels west of the community of Fox Creek, Alberta. Based on the timing of these events, the AER and AGS believe that they may be associated with multistage hydraulic fracturing in the Duvernay Zone. On January 14 and 23, 2015, events exceeding 4.0 local magnitude (M_L) were recorded in this area. On February 3, 2015, the AER issued *Bulletin 2015-03: Observed Seismicity and Oil and Gas Operations; Operators' Responsibilities* to highlight licensee responsibilities to ensure safe operations at all times during hydraulic fracturing operations.

Until the AER and AGS can further study these seismic events and their potential connection with subsurface completion operations in the Fox Creek area, and in order to ensure orderly and safe development of the Duvernay Zone and public safety, the AER has issued the order. The order imposes new seismic monitoring and reporting requirements for hydraulic fracturing operations in the Duvernay Zone in the Fox Creek area.

Before conducting hydraulic fracturing operations in the Duvernay Zone in the area encompassed by the order, licensees must assess the potential for induced seismicity caused by or resulting from hydraulic

fracturing operations and adopt, and be immediately prepared to implement, a response plan to address potential seismic events. Licensees will be required to monitor for seismic activity in the vicinity of their hydraulic fracturing operations and follow a “traffic light” process with staged action thresholds. If there are no seismic events observed, operations can proceed as per the AER’s usual requirements. The order requires licensees to immediately report to the AER observed seismic events of 2.0 M_L or greater in the vicinity of their operations and at that time invoke their response plan. While this seismic magnitude level is considered out of the ordinary for most fracturing operations and is too small to be felt at surface or to cause impacts, licensees must still report events of this magnitude to the AER.

The order requires licensees to cease hydraulic fracturing operations altogether if a seismic event of 4.0 M_L or greater is detected in the vicinity of their operations. In these circumstances, licensees will not be permitted to resume operations without AER consent.

The AER notes that there have been no reported impacts to infrastructure from seismic events in the Fox Creek area. However, the AER has issued the order as a protective and cautionary measure to require and facilitate monitoring and reporting in an effort to better understand possible induced seismicity in this area while allowing appropriate development to proceed. The newly established subsurface order process lends itself well to establishing subsurface requirements for a particular area of the province pending consideration of other potential regulatory tools and instruments and full stakeholder consultation.

The AER will continue its own monitoring and study of natural and induced seismic activity across Alberta through the AGS and its research partners as a separate activity to the above industry monitoring of its operations, and the AER will continue to respond appropriately to seismic events or trends if they become evident in other areas of Alberta.

Questions about this bulletin can be directed to inquiries@ aer.ca or 1-855-297-8311.

<original signed by>

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Attachment 1 – Subsurface Order No. 2: Duvernay

