Environmental Monitoring of Oil and Gas Sites Using Satellite Imagery

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As part of its efforts to operate in a sustainable manner, the oil and gas industry has a responsibility to restore land that is no longer being used for oil and gas production. Satellites with advanced imaging capabilities can be used to monitor reclamation and remediation efforts to ensure corrective actions have been achieved and restoration is progressing as planned. This presentation describes methods that draw on multiple types of satellite based imagery to provide operationally effective means for long term monitoring. The approach supports regional scale monitoring for integrated resource management focusing on well site reclamation, linear disturbance (such as seismic lines, road, and pipelines right-of-way) monitoring. The techniques have been tested over an oil and gas region in Alberta, Canada using an extended time series of satellite images from three satellites: Landsat (USA), Sentinel (Europe), and Radarsat-2 (Canada). The sensors on these satellites have very different imaging characteristics that have been combined to maximize the amount of information that can be obtained. The techniques used are semi-automated and show promise as an operational tool, enabling oil and gas operators to efficiently access up-to-date site environmental status information, particularly in extensive, remote areas where onsite inspection is difficult.