

Development of a Reduced Analytical Suite of Upstream Oilfield Metals for Groundwater Monitoring

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13-AU-SGRC-04

Current analytical techniques (e.g., ICP-MS) allow for convenient and simultaneous analysis of a wide range of metals in environmental samples. Perhaps for this reason, soil and groundwater monitoring programs at upstream oil and gas facilities often track a large number of individual metals, many of which have no known connection to oilfield operations. Some of these metals will exceed Tier 1 soil or groundwater guidelines from time to time as a result of natural variations in background concentrations, and potentially distract the focus of the monitoring program from the metals that are related to the operation of the upstream facility.

It is proposed to conduct a thorough scientific review of the eighteen metals included in the Alberta Tier 1 guidelines (aluminum, antimony, arsenic, barium, boron, cadmium, chromium, copper, iron, lead,

manganese, mercury, nickel, selenium, silver, sodium, uranium, and zinc) to determine which could reasonably be expected to be present in soil or groundwater in significant concentrations as a result of upstream operations. The intention is that this list of "Upstream Oilfield Metals" could be used in appropriate circumstances as an analytical suite for soil or groundwater monitoring that would be smaller and more focused than the current suites of metals typically used.

Policy Issue

Additional Science for the Refinement of Regulatory Guidelines/Directives/Policies/Criteria. The degree of conservatism current in some regulatory guidelines can be linked to some unnecessary remedial efforts throughout the petroleum industry. The development of accepted scientific studies to reduce these conservatisms would ultimately lead to a reduction in perceived waste going to landfill and a reduction in remedial costs.

Knowledge Gap

Refinement or development of risk-based soil quality guidelines for selected trace metals (eg. Molybdenum, antimony, beryllium, and cobalt).

2014 MEMS_Metal in Groundwater Presentation

2015 MEMS_Development of a Reduced Analytical Suite of Upstream Oilfield Metals for Groundwater Monitoring