

## Executive Summary

The draft Water Conservation Policy for Upstream Oil and Gas (October 2016) (WCP) articulates a preference for the use of alternative water sources over high-quality non-saline sources. Currently, the ability of multi-stage hydraulic fracturing (MSHF) operators to use many alternative sources (e.g. treated municipal effluent, produced and flowback water) is restricted by the existing regulatory system, where clear and functional definitions for alternative sources do not always exist, and there is not a clear regulatory and approvals process to enable their use.

To support broader utilization of alternative water sources in MSHF projects, regulators and industry are transitioning towards a risk-based regulatory approach, where appropriate. To support this transition, the Petroleum Technology Alliance of Canada (PTAC) engaged WaterSMART Solutions Ltd. and Catapult Water Midstream (the project team) to develop a high-level risk assessment framework for MSHF projects involving the use of treated municipal effluent and produced and flowback water. Throughout the project, the project team worked closely with representatives from PTAC and engaged representatives from the Alberta Energy Regulator (AER) and Alberta Environment and Parks (AEP).

The key output of the project is the Screening-Level Risk Matrix (SLRM), a functioning spreadsheet tool which provides users with a high-level assessment of the risks associated with the use of alternative water sources for MSHF projects. At this time, the SLRM is designed for projects involving treated municipal effluent and produced and flowback water, although it can be expanded to include additional alternative water sources in the future.

The SLRM assesses the risks to human and environmental health in terms of the consequence of acute exposure to an alternative water source and the likelihood of exposure occurring. The consequence of exposure is assessed quantitatively, by comparing the concentration of readily measurable key indicator contaminants in the alternative water source to established guidelines. Likelihood is assessed qualitatively, using a series of binary questions (i.e. Yes/No) about the location, materials, duration, and operations of the project. Operators can complete the SLRM at an early stage of project development, in the absence of detailed mitigations and project controls, to rapidly differentiate between low and higher risk projects. Ideally, projects identified as low risk by the SLRM can undergo a streamlined approval process, while higher risk projects will be subject to detailed review, including the application of suitable mitigations.

The SLRM is intended to fit within the evolving regulatory context and support the transition to risk-based regulation of MSHF projects; it is not meant to replace a detailed risk assessment or any other components of the application review process. For example, the SLRM can be used to support the Phase 1 Screening Level Risk Assessment required by the draft Alberta Water Reuse and Stormwater Use Guidebook (January 2019) and can help identify projects for which a Phase 2 Detailed Chemical Risk Assessment is necessary. The design of the SLRM, with strictly quantifiable components and binary question responses, also lends itself to potential integration with the AER's OneStop.

As part of the project, a meeting was convened with representatives from PTAC, the AER, and AEP to discuss opportunities for regulatory streamlining (i.e. “Red Tape Reduction”) and how the SLRM might align with the future risk-based regulatory environment. At this meeting, all parties were aligned on the overarching goal of enabling MSHF operators to increase their use of alternative water sources in an efficient and environmentally responsible way.

The AER and AEP both appeared receptive to the concept of the SLRM, and some edits were suggested throughout the meeting. It was revealed the AER utilizes an internal risk assessment approach which is similar to the SLRM. However, it was noted some of the steps associated with potential utilization of the SLRM in the application approach, such as OneStop integration or regulatory changes, would be difficult to execute in the near term. Multiple teams within the AER (e.g. pipelines and storage) would need to be involved, and this effort would compete for resources and manpower with other AER priorities.

In this context, and keeping in mind the broader transition to risk-based regulations, the next step is for PTAC operators to use the SLRM to submit applications for MSHF projects using treated municipal effluent and produced and flowback water. As companies share experiences gained from each application (and iteration), the process will be improved until there is a clear system in place within the existing regulatory context to enable MSHF operators to make more use of alternative water sources. This effort could feed the development of codes of practice, or similar regulatory instruments, to streamline the application process and/or provide direction to operators regarding risk mitigations.