Conducting a Climate Change Resilience Assessment in Support of Remedy Selection

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As climate change impacts become more severe around the globe, the environmental industry has increased focus on what implications this may have for remediation activities on contaminated sites. At a community in northern Canada, a climate change resilience assessment (CCRA) was conducted to identify potential risks for the proposed remedial options relative to a range of anticipated changes in climate events. The results were used to define potential adaptation measures and actions for four adjacent sites with hydrocarbon impacts. The findings of the CCRA will support the selection of remedial options that are resilient to projected effects of climate change.

The CCRA was completed using a commensurate approach to the Public Infrastructure Engineering Vulnerability Committee Protocol. It conforms to ISO 31000 Risk Management guidelines to identify and evaluate key climate risks that could affect the proposed remedial options under the current climate (past 30 years) and predicted climate change scenarios by 2050 and 2080.

In total, nine climate events with quantified data for current and future climate scenarios were selected for the CCRA (e.g., summer mean temperature, days below -25°C, high intensity and high-volume rainstorm).

Each of the climate events and time horizons was reviewed in relation to the proposed remedial options and their anticipated impacts. A resiliency rating (low, medium, or high) was assigned to each climate event, for each time horizon, for each remedial option. These ratings considered safety, efficacy, and the environment. Safety consequences considered risks to members of the public/community and staff (i.e., workers who implement the remedy). The efficacy consequence category considered the ability to successfully implement the remedy and the effectiveness of the remedy during the occurrence of the identified climate events. The environmental category captured ecosystem level consequences, such as impacts to air, water and land, and ecosystem function and service.

Of the six alternatives considered, one was determined to have high resiliency and five were determined to have moderate resiliency. These results will be incorporated into the final remedy selection. Additionally, whichever remedy is selected, the identified potential risks and proposed adaptation and mitigation measures for climate events and time horizons categorized as moderate to high risk, will be incorporated into the remedial design. This presentation will present a summary of the methodology used for this assessment, the findings of the assessment including potential risks and adaptation measures, and lessons learned.

Lindsay Shaw

Lindsay Shaw is an accomplished geologist with five years of dedicated experience in the field of environmental remediation. Her expertise spans a range of technical domains, including environmental site assessment, 3D visualization of soil and groundwater data, as well as specialized proficiency in natural source zone depletion (NSZD). Notably, Lindsay has recently transitioned into project management for public and private clients in Canada.

She earned her Master of Science in Geology from the University of Ottawa, where her research centered on pioneering methodologies for field precipitation of carbonate minerals. This innovative approach developed an economic tool for the isotopic apportionment of CO_2 derived from hydrocarbon degradation within NSZD studies.