2013 Assessment of the Environmental Significance of Vapour Emissions During Ex Situ Remediation Activities Compared to Landfill Disposal, 2013 Summary Report

Onsite ex-situ soil remedial technologies involve the excavation of contaminated material and treatment onsite, potentially resulting in the release of volatile chemicals to ambient air. The resulting volatile emissions may include greenhouse gasses as well as compounds that may impact ambient air quality for humans or ecological receptors. Meridian Environmental Inc. (Meridian) previously completed a comparative assessment of emissions during ex-situ remedial activities and land fill disposal (Meridian 2011) as well as a follow-up study that included data collection from an ex-situ remediation project, an evaluation of biofilter technology, and development of an emission comparison spreadsheet tool (Meridian

2012, draft) for the Petroleum Technology Alliance Canada (PTAC).

Field emissions data were collected from a single site in 2012 in order to determine whether the data would be usable before committing further funds to field data collection. The sampling program was generally successful. However, while the site chosen had the highest volatile petroleum hydrocarbon concentrations of identified candidate sites and sampling was scheduled to occur during the treatment of the most heavily contaminated materials from the site, the soil analytical results showed that volatile hydrocarbon concentrations were very low even prior to the ex situ treatment, believed to be due to prior handling and manipulation of the soils. As a result, the reduction in petroleum hydrocarbon concentrations during treatment was negligible, and the air sampling results do not reflect situations where volatile hydrocarbon concentrations are significantly reduced during treatment.

Based on these data gaps Meridian proposes a follow-up project consisting of collection of emission data from up to three ex-situ remediation projects for calibration of the previously developed mode. The collected site data will also be used to update the spreadsheet tool.

Emissions from industrial processes and remedial efforts in the oil and gas industry are subject to

considerable uncertainty surrounding their quantity and composition. During development of the Meridian emission model, several assumptions were made that significantly influenced emission output values. In particular, there is a paucity of real-world data on emissions from ex-situ remediation and no previously existing modelling approaches were identified. Meridian developed a model to predict emissions from ex-situ remediation based on models derived for excavation; however, several of the model inputs could not be reliably quantified with existing data. The 2012 follow-up study included collection of emission data during one ex-situ remediation to be used for model calibration. While the methodology used to collect the required data was shown to be effective, the amount of data collected was insufficient to calibrate the model. The proposed work is intended to provide sufficient data to effectively calibrate the previously designed model.

Overall, the purpose of this research is to allow remedial decisions to minimize occupational safety risks and environmental impacts at oil and gas sites with volatile organic contaminants, and ensure effective use of remedial technologies that will meet regulatory requirements. Calibration of the emission model will allow the spreadsheet tool to be confidently used in screening-level air quality assessment and evaluation of life cycle emissions for ex-situ treatment and landfill disposal options.

2013 MEMS_Sampling Letter _Vapour Emissions from Ex Situ Remediation
2013 MEMS_Vapour Emissions Spreadsheet Tool
2014 MEMS_Vapours Presentation
2014 MEMS_Sampling Letter _Vapour Emissions from Ex Situ Remediation