Establishing Risk-Based Limits for Elemental Sulphur in Soil - Final Stage 2 Results, Joint Industry Project

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In 2023, seven industry partners came together to fund an applied research project entitled '*Establishing Risk-Based Limits for Elemental Sulphur in Soil*'. The project was initiated and carried out by a team of three project proponents from Matrix Solutions Inc., Waterline Resources Inc., and S2 Environmental. The overarching goal was to develop risk-based guidance for the management of sulphur-impacted soils, leveraging and complementing AEPA's *Guidelines for Landfill Disposal of Sulphur Waste and Remediation of Sulphur Containing Soils* (Alberta Environment 2011) with decades of experience and liaison with the laboratory community.

To complete the project, the team conducted interviews with various industry stakeholders including site managers, landfills and service providers; regulatory representatives; and, analytical specialists. Relevant datasets supplied by industry partners were compiled and reviewed to understand trends and common pitfalls, including the omission of certain key analytical parameters needed for understanding the risks associated with elemental sulphur and its oxidation by-products. A review of literature and guidance documents from other jurisdictions and adjacent industries was completed to combine information into a guide entitled '*Former Sulphur Storage and Handling Areas: Soil Assessment Best Practices*'. Guidance included recommendations on analytical protocol and integration of results into an Excel-based calculator for evaluating the risk of acidification and required amendment for remediating potential and active acidity. Finally, a round robin analytical program was completed to evaluate analytical accuracy, precision and methods.

The presentation will provide a summary of recommended best practices for site assessment, analytical methods and approach for testing and evaluating risks associated with sulphur-impacted soils. A demonstration of the Excel-based calculator tool will be provided along with several case studies. Recommendations for additional opportunities in applied research will be discussed. Finally, we will discuss the potential application of research findings for laboratories, regulators, landfills and industry stakeholders. Ideally, the research will lead to greater sustainability in the management of sulphur-impacted sites and the use of limestone, a non-renewable and costly resource, only when necessary.

Simone Levy

Ms. Simone Levy is a soil scientist with a focus on efficient and sustainable environmental management of industrial sites. Current areas of focus include environmental site assessment and remediation for energy producers; research and process optimization; streamlining internal processes and leveraging digital tools; and, training and support for technical staff and project managers.

James Freeman

Mr. James Freeman has been an environmental consultant for several decades, with most of his career focused in western Canada. He was a founder, director and principal hydrologist at Matrix Solutions before forming PIR-a Corp. in 2016. Through PIR-a, James and the team continue to build practical and easy-to use software to automate aspects of the environmental consulting industry. Since 2018, he has been the Program Director for S2 Environmental and a large remediation program at the former Balzac gas plant and field on the northeastern edges of Calgary.

Sheila Luther

Ms. Sheila Luther has over 20 years of experience with environmental assessment and research projects with a focus on soil reclamation, contamination assessment, and remediation. Her experience includes contaminated soil assessment and remediation, preconstruction and post reclamation assessments for oil and gas industry sites, environmental monitoring, literature reviews, technology transfer, and research on soil water contaminant interactions. Her current roles include Technical Lead for Reclamation and project technical accountable for multiple projects, most with a closure objective.