

Toolkits for Sustainable Remediation of Petroleum Hydrocarbons, by François Beaudoin, P.Eng., PMP, GHD, and Ian Hers, Ph.D., P.Eng., Hers Consulting

An excellent sustainable remediation guidance that is available are the Contaminated Sites Approved Professional Society / Shell **Toolkits for Sustainable Remediation of Petroleum Hydrocarbons**, a four-volume set of tools designed to integrate the latest science into a decision-framework to identify, evaluate and optimize remedial options for petroleum hydrocarbon-contaminated sites (embodying many principles that apply to all sites). These toolkits include an approach for remedial decision-making that considers the role of natural attenuation processes, and guidance and tools on conducting sustainability evaluations.

Conceptual Site Model (CSM) and Case Studies, Toolkit 1, and **Methods for Monitoring and Prediction of Natural Source Zone Depletion (NSZD) and MNA**, Toolkit 2, were published in 2016 to help document the science on NSZD and natural attenuation. **Evaluation of Remediation Technologies for Petroleum Hydrocarbon Sites**, Toolkit 3, and **Methods for Sustainable Remediation**, Toolkit 4, were published in 2021 (<https://csapsociety.bc.ca/csap-toolkits/>). Topics covered include:

- developing and building upon an effective CSM;
- identifying concerns/risks and remedial objectives;
- evaluation of natural attenuation;
- selecting remedial measures and performance / transition metrics in context of sustainable approaches; and
- optimizing remedial approaches, including transition to other remedies or natural attenuation / NSZD and site closure.

By providing clarity on what is sustainable remediation, how to implement it, and the benefits that can be gained by using such an approach, this toolkit aims to eliminate the common barriers to adoption of sustainable remediation practices. Practitioners will find methodologies and approaches they need in order to adapt the proposed roadmap to their needs and objectives, and to reinforce the business case for integrating sustainability principles into their contaminated site management processes.

On May 12, 2022, a workshop was held on the Toolkits with authors of the Toolkits and expert panelists. The authors are Ian Hers, Ph.D., P.Eng., CSAP, Hers Environmental Consulting, Inc. (HEC), François Beaudoin, P.Eng., PMP, GHD, Parisa Jourabchi, Ph.D., P.Eng., ARIS Environmental Ltd., and Linda Kemp, P.Eng., WSP Golder . The workshop presentations and summary of panel discussions is available at <https://csapsociety.bc.ca/about/professional-development-workshops/>