

Soil and Groundwater Remediation Guideline Calculator
Project GL “20-RRRC-10”

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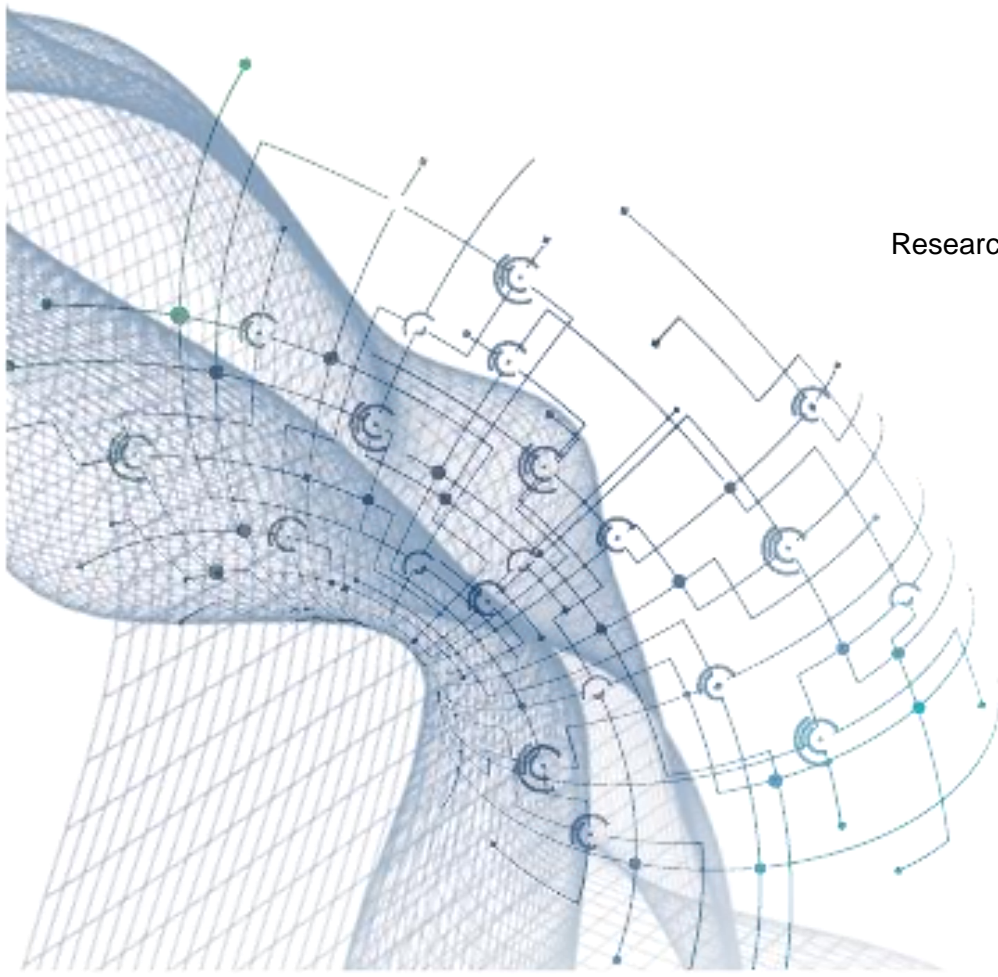
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1.0 INTRODUCTION

This is a progress report (Deliverable 6) associated with Task 7 – ‘Refine the calculator based on testing and validation’ – for the **Soil and Groundwater Remediation Guideline Calculator** Project (GL “20-RRRC-10”). As outlined in the Research Agreement, APPENDIX I, page 3, this deliverable is an update on the tool testing and validation activities for the project and outlines feedback provided by testers and further calculator improvement activities.

2.0 BACKGROUND

Challenges with regulatory guidelines often lead to high costs, multi-year timelines and difficulties in reaching regulatory closure. Challenges are often experienced in correctly applying generic Alberta Tier 1 soil and groundwater remediation guidelines (AEP, 2022a), which are modified based on numerous factors such as historical activity carried out at the site, site location, sub-area within site, depth of soil, and the chemical parameter of concern itself. As a result, while these general guidelines are intended to enable a screening process, in practice, many environmental professionals do not apply these generic guidelines correctly and/or use them as the endpoint for the site instead of modifying the guidelines (Tier 2) to create risk-based endpoints (AEP, 2022b). This results in excess soil remediation costs, unnecessary installation of groundwater monitoring wells (with subsequent monitoring and reporting efforts, and decommissioning costs), extended timelines to reach regulatory closure, or the complete inability to meet closure criteria.

This project is developing a web-based Tier 1 and Tier 2 Guidelines Tool (https://app.statvis.com/guidelines/module_one). This Tool will support the correct application of Tier 1 guidelines for screening purposes and the derivation of risk-based Tier 2 Site-specific Remediation Objectives (SSROs) to support capital-efficient contaminated site management and accurate liability calculation, both of which are key in managing Alberta’s current upstream oil and gas liability challenges.

3.0 TESTING AND VALIDATION

3.1 TESTING

The tool prototype, consisting of both Tier 1 and Tier 2 modules, was provided to Alberta Environment and Protected Areas and the Alberta Energy Regulator for testing and validation, as well as selected industry and environmental consulting representatives. Feedback was collected through an online survey with freeform answers collected for the following questions:

1. Was the tool intuitive and easy to use? If not, please indicate any problem areas you encountered.

2. Did you encounter any inaccuracies while testing the tool? Are there inputs you think should be modified?
3. Are there any inputs / additional functionality that you would recommend adding to the Tier 1 Tool?
4. Are there any inputs / additional functionality that you would recommend adding to the Tier 2 Calculator?
5. Are there other regulatory tools you would find helpful?

3.2 FEEDBACK

Feedback on the calculator prototype testing was received from three anonymous external parties in December 2022.

Comments and our responses are consolidated below. Note that some very minor changes have been made to some comments to enhance readability without changing the content (e.g., splitting into multiple comments, removal of duplicated words). The comments have been organized in categories: General, Tier 1, and Tier 2.

It should be noted that the calculator was proposed as a web-based tool with a dual function:

1. A decision-support framework to help environmental professionals select the applicable generic (Tier 1) guidelines based on a series of questions about the site and data available.
2. Facilitate development of risk-based guidelines (Tier 2) in a way that is transparent and streamlined, to ensure confidence by regulators and practitioners that accurate remedial endpoints are being employed.

As a result, several of the comments related to issues that were outside the scope of the project. These issues will be addressed in the two additional project documents: the User Manual and the Frequently Asked Questions.

3.2.1 General User Questions

The generic user questions and responses are summarized below. There was a sense that the tool seems basic for a complex regulatory system.

Question #1
The platform does not refer to the most current versioning of the Alberta Tier 1 & 2 Soil and Groundwater Guidelines.
Answer
Guideline citations and references used during platform development were current at the time of development. Care will be taken to ensure references are updated to the most current version at the time of release for industry use, as well a plan for ongoing platform management and maintenance to ensure the tool remains current.

Question #2
The flow diagram to “Define Remediation Requirements and Implement Remedial Action Plan” is confusing.
Answer
We will explore the benefit to removing and/or replacing the flowchart. If the flowchart stays, we will add a reference plus a link so that the source of the flowchart will be clear.

Question #3
The generic limitations and intent of the guideline generator platform are not transparent.
Answer
This comment is valid and including it in the User Manual will help identify the limitations for professional use. The beginning of the User Manual will state this. The User Manual will be linked as a “README” file and the intent of the tool will be linked as help text on the start page.

3.2.2 Alberta Tier 1 Guideline Module

The frequently asked questions associated with the Tier 1 module component of the Guideline Tool are summarized below and listed based on module step, where applicable. Note that the Guideline Tool supports regulatory documents and does not replace the documents or professional judgement.

3.2.2.1 Step 1 – Site Location

Question #4
The Tier 1 module does not require site identification consistent with the Tier 2 module.
Answer
Site identification screen will mirror the Tier 2 module.

Question #5
The Tier 1 module does not require land use or dominant grain size data input, which is the basis of Tier 1 guideline application.
Answer
The goal is not to replace professional judgement but to guide professionals to the relevant regulatory documents so that they can determine the best option for their site. However, after discussion with stakeholders, it was decided that land use and dominant grain size information will be added to the site identification stage to document site details and thought processes of the user.

3.2.2.2 Step 2- Site details

Question #6
Sensitive receptors that are present but not accounted for in the Tier 1 land use description prevent application of Tier 1.
Answer
Additional question will be added at Step 3 that includes “Other sensitive receptors that are present but not accounted for under Tier 1”. The title of Step 3 will be changed to Conditions Making Tier 2 Mandatory, and users will be stopped from proceeding with the tool if they click “next” but have answered “yes” to any of the questions stating that Tier 2 guideline is mandatory.

Question #7
An unknown option should be provided for the question “was drilling waste disposed of onsite”.
Answer
“Unknown” option will be added and both drilling waste documents provided. Help text will be edited to ensure that enough evidence is collected to confirm presence/absence of drilling waste disposal areas (DWDA). Note that this doesn’t replace Phase 1 or 2; the goal is to ensure they are reading the additional documents.

Question #8
There should be more information on implications of interprovincial site location.
Answer
More information will potentially be added in the output and disclaimer and any potential complexity will be identified by flagging. In addition, examples of interprovincial site types will be provided in the help text.

Question #9
More information should be provided on the presence of peat.
Answer
The intent of the tool is not to replace governing documents available but to facilitate guideline selection for use on a site. For a detailed discussion of guideline specifics, the user is required to use references provided in the platform and the User Manual.

3.2.2.3 Step 3 – Conditions Making Tier 2 Mandatory.

Question #10
Tier 1 included in module output as potentially applicable, even though a condition on Step 3 – Mandatory Tier 2 Guidelines was selected as present.
Answer
See answer to question #6

Question #11
Selection of “Yes” for any mandatory Tier 2 guideline trigger should not let you proceed with Tier 1 guideline generation.
Answer
See answer to question #6

Question #12
The source length reference is incorrect.
Answer
The citation will be updated with the 2022 guideline reference.

3.2.2.4 Step 4 – Contaminants of Concern

Question #13
Not all parameter groups listed under Contaminants of Concern reflect our current understanding of contaminants of concern (for example, salinity).
Answer
Extra text will be added to Step 4 to clarify that other group of contaminants are covered in Tier 2. Explainer text for other contaminants will be added and will be worded as: “In addition to Tier 1 guidelines, the parameter and/or contaminant groups below have specific regulatory documents that apply”. A note will be added asking the user to “Select all that apply to your site”. A user will also be allowed to proceed without checking any of the boxes as this was identified as a bug currently.

Question #14
Routine parameters of concern, including petroleum hydrocarbon (PHC) and/or polycyclic aromatic hydrocarbons (PAHs) not available for selection.
Answer
The only parameter groups listed on this page are parameters that have a relevant regulatory document that is applicable under generic numeric guidelines (i.e., Tier 1). Explainer text will be added to make this clear.

Question #15
Non-routine parameter or contaminant of emerging concern not available for selection.
Answer
Refer to question #14. “Emerging contaminants of concern” are not available for selection because only parameters with existing regulatory documents providing generic numeric guidelines applicable in Alberta are included.

3.2.2.5 Step 5 – Subsoil Petroleum Hydrocarbon Guidelines for Remote Forested Sites

Question #16
Does this step require completion if my site is in the White Area based on LSD entered in Step 1?
Answer
It requires you to select “No”. Under the current version of the platform, this Step requires completion regardless of site location or land use selected. There is future potential for automation, but GIS capabilities were not included in the current budget.

Question #17
Why does the Petroleum Hydrocarbon Guidelines for Remote Forested Sites appear in the Tier 1 module?
Answer
Remote forested and native prairie protocol options will be removed as Tier 1 options as per internal AER and AEPA interpretations of guideline documents.

3.2.3 Tier 1 Module Output

3.2.3.1 Output Discussion

Individual points were made about the output not being included unless there was specific feedback to address. The original output was a table of the questions answered and which guideline documents they triggered. It was requested that Statvis change this to include relevant portions of regulatory documents as outputs. Based on the comments a table with step, question and answer will be provided, and relevant regulatory documents with hyperlink will be added.

Question #18
Has a concordance table been considered for the Tier 1 model output?
Answer
Concordance table will be included in future platform versions, as well as reference to specific section numbers.

Question #19
Does product output require verification that guideline references are correct?
Answer
<p>The Tool will point users to the generic website location for regulatory documents (e.g., for Tier 1 – https://open.alberta.ca/publications/1926-6243) rather than the pdf link (Tier 1 - https://open.alberta.ca/dataset/842becf6-dc0c-4cc7-8b29-e3f383133ddc/resource/018c0139-ae40-4537-af72-23458c8c58c7/download/aep-albertatier1guidelines-aug24-2022.pdf). The generic link lists all versions of the Guideline, and it is up to the user to select the one that applies.</p> <p>As discussed in Section 1, a component of platform completion requires a maintenance plan be put in place to ensure the platform deliverable remains current. However, user validation of platform output is and will continue to be required as liability associated with site condition data collection and interpretation, as well as professional sign off, lies with the user. This will partially be addressed by the disclaimer and partially addressed by the new output format.</p>

3.2.4 Alberta Tier 2 Guideline Module

Frequently asked questions associated with the Tier 2 module are summarized below and listed based on module step, where applicable.

3.2.4.1 Generic Tier 2 Guideline Module Questions

Question #20
The generator only appears to work for petroleum hydrocarbon (BTEX and PHC F1-F4) parameters?
Answer
For Phase 1 of platform development, focus was given to establishing pathway exclusion and guideline modification for more common organic parameters of concern (i.e., BTEX and PHC F1-F4 parameters). Discussion for future phases of this project will decide what should be included and what is too complicated for this type of tool.

Question #21
There isn't a space for Tier 2 pathway exclusion elements under the current version.
Answer
Only guideline modification was in scope for the current phase of the tool. Guideline exclusion is a possibility for future phases of the project pending approval and funding. Funding has been requested from PTAC.

3.2.4.2 Step 1 – General Input Parameters

Question #22
The requirement for site address is confusing and implies the platform is for upstream sites exclusively.
Answer
Address will be changed to be more inclusive – Address/Location/Site Name/Site Identifier. Default text will be removed.

3.2.4.3 Step 2 – Alberta Tier 2 Adjustable Parameters

Question #23
Default parameters don't appear to reset by making selection from "Site-Specific" back to "Default".
Answer
Original default numbers will be added for reference in columns beside cells. Future versions of the Tool could automatically reset values.

Question #24
No guidance available in platform for allowable range for parameter modification or minimum data required to support a modification.
Answer
The current version of the platform relies on a User Manual (currently in draft stages as the platform is being developed) to supplement data input requirements and provide more detailed support, including allowable ranges for parameter modification and minimum data requirements in Step 2, and will be made available for review once module outputs are refined. However, the User Manual will not replace the requirement for use of applicable guideline document to validate the overall conceptual site model and generator output. Illustrative ranges in Tier 2 table may be incorporated in future versions of the tool.

3.2.5 Tier 2 Model Output

Question #25
Tier 2 module does not currently provide an output printout.
Answer
A printout that shows site information, input values and resulting guidelines will be added. Also, as the output only provides the calculations, an addition to the printout will include how they got to the number using a worked example as an output.

Question #26

Does current output deliverable meet regulator review requirements.

Answer

Data that was used to arrive at the input will be included in the output. Future versions of the tool may provide a worked example of a guideline calculator to provide a visual demonstration that calculations are happening properly.

3.3 NEXT STEPS

The calculator will be finalized as per the commitments to changes above. In addition, a training session presentation and an online training video will be developed for all potential users, and in-person training sessions (3) will be conducted.

4.0 ACKNOWLEDGEMENTS

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5.0 REFERENCES

AEP (Alberta Environment and Parks), 2022a. *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*.

AEP (Alberta Environment and Parks), 2022b. *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*.