



Project Summary, Milestones, Payment Schedule and Quarterly Update Reports

Q3 2023/2024

Project Summary

Project Title:	Finalization of Research and Preliminary Selenium Soil Quality Guideline Derivation
Lead Investigator:	Anthony Knafla
PTAC Managed Funds Award Amount \$:	\$72,500 (with extension)
PTAC Committee Sponsor	Shawn Glessing
GL #:	20-RRRC-01
Other Funding Amounts and Sources:	\$29,500
Start Date:	September 30, 2021
Completion Date:	December 2024
Final Report Due Date:	December 2024

This project will generate data and preliminary guidelines for potential adoption in Alberta and by CCME for selenium in soil. Resources are often wasted addressing low level selenium Tier 1 exceedances including investigation work as frequently exceedances occur naturally in shallow soils in Alberta. These potential guidelines would prevent wasted resource expenditures where low level selenium exceedances are encountered.

The work scope includes the following:

1. conduct toxicity testing work with coarse soils to improve upon previous results applicable to this soil texture type,

- a. includes expanding the dataset for saturated paste selenium concentration-toxic response relationships,
 - b. includes running several tests over a longer timeframe to derive defensible soil-plant bio-concentration factors to complete the
 - c. 'checking protocol' for livestock and wildlife risk through consumption of plants as per CCME protocols;
2. conduct toxicity testing work on a limited number of fine soils to improve the saturated paste selenium-plant toxicity relationship;
 - a. includes expanding the dataset for saturated paste selenium concentration-toxic response relationships,
 - b. includes running several tests over a longer timeframe to derive defensible soil-plant bio-concentration factors to complete the
 - c. 'checking protocol' for livestock and wildlife risk through consumption of plants as per CCME protocols;
3. complete the 'checking protocol' calculations and derive final soil quality guidelines for selenium for submission to AEP for review and consideration; and,
4. develop finalized guidelines that have two levels of implementation,
 - a. baseline guideline that does not require simultaneous measurement of sulphate and is conservative in nature
 - b. advanced guideline based on sulphate and other factors such as pH and Redox.

The first key knowledge gap is the absence of an extensive and rigorous dataset on the toxicity of selenium towards soil invertebrates and plants, particularly given the default soil quality guideline in Alberta and Canada is regularly exceeded in background. The second key knowledge gap is the need for a more expansive dataset with dose-response information on the ameliorating effect of sulphate on selenium toxicity. The final knowledge gap is the need to assess the analytical method used to identify selenium concentrations in soil that most accurately reflect the potential for toxicity (such as strong acid digestion versus saturated paste).

Milestone	Expenditures ¹	Quarter ² (e.g., Q2 2021/22)
1 Toxicity testing on plants & inverts	\$21,005.25	Q4 2020/2021
2 Continued toxicity testing	\$11,143.13	Q1 2021/2022
3 Continued toxicity testing	\$11,957.50	Q2 2021/2022
4 Continued toxicity testing	\$12,555.38	Q3 2021/2022
5 Continued toxicity testing	\$5,864.25	Q4 2021/2022
6 Continued toxicity testing (no vendor charges – waiting for demonstration of progress)	\$336.00	Q1 2022/2023
7 Work on environmental guidelines including livestock/wildlife	1,876.88	Q2 2022/2023

¹ All expenditures in Canadian dollars and must include GST and other applicable taxes

² Quarters are based on fiscal calendar e.g., Q3 2021/22 is Oct-Dec 2021

	guidelines. Continued toxicity testing (no vendor charges – waiting for demonstration of progress)		
8	Waiting on results from Element Labs	\$790.65	Q3 2022/2023
9	Received barley in fine soil data – review data and communicate with Project Champion	\$1172.06	Q4 2022/2023
10	Discovery of end of research with research provider – no notification – develop alternate plan	\$1,155.00	Q1 2023/2024
11	Housekeeping activities	\$170.63	Q2 2023/2024
12	Setup lab for completion of remaining experiments, start preliminary work	\$7212.09	Q3 2023/2024
Total		\$63,802.05	

Quarterly Update: Q3 2023/2024

Exception Highlight for the Quarter:

1.	Setup lab for continuity of experiments. Darlene Lintott whom previously was completing the experiments is an employee with Equilibrium and is assisting with the setup to maintain quality, consistency, and continuity.
2.	Equilibrium's ecotox lab is in final stages of national accreditation and will be providing accredited results for the project.

Update on scope, key questions, gap analysis and work performed this quarter (include any requests for assistance to PTAC or the committees)

See quarter highlights.

Budget Summary Update (excluding GST)

Revenues and Expenditures	Total Budget	Budget to date	Project charges this quarter	Project charges to date	Variance of budget to actuals to date	Forecasted Total Project (no. of quarters of actual plus	Variance of total budget to forecast

Funds received And from whom	\$72,500 (PTAC)	\$11,736.14 (remaining)	\$6868.66	\$60763.86	To be discussed	\$72,500	To be discussed
Expenses							

Variance analysis (includes changes to invoicing schedule)

1.