

North Shore Environmental Consultants Inc. (North Shore) and Waterline Resources Inc. (Waterline) are pleased to provide Petroleum Technology Alliance Canada (PTAC) with a review of Phase 2 Environmental Site Assessment (ESA) data from past drilling waste disposal locations to better understand the effectiveness of the Alberta Energy Regulator (AER) document “Assessing Drilling Waste Disposal Areas: Compliance Options for Reclamation Certification” (ADWDA, AER 2014).

The intended outcome of this work program is to evaluate the salinity and drill stem test (DST) endpoints as these conditions/calculations occurred in the highest frequency.

A total of 1681 sites were reviewed with 510 candidate sites identified for statistical evaluation. A summary of the results are noted below:

- Overall, meeting the salt calculation in CO₂ (mud products only) was a good predictor of actual Tier 1 exceedances during the Phase 2 ESA. When the salt calculation met the CO₂ endpoint, 75.6% of the sites passed Tier 1/D50 for disposals pre-October 22, 1996 and 66.7% for disposals post-October 22, 1996.
- Exceeding the Salt Calculation in CO₂ (mud products only) was a poor predictor of actual Tier 1 exceedances during the Phase 2 ESA. It correctly identified Tier 1 exceedances 50.5% of the time for disposals pre-October 22, 1996 and 18.8% for disposals post-October 22, 1996.
- Exceeding the salt calculation in CO₂ (where DST returns contributed >50% to the CO₂ endpoint) was a ‘Poor’ to ‘Very Poor’ predictor of actual Tier 1 exceedances during the Phase 2 ESA. It correctly identified Tier 1/D50 exceedances 17% of the time when the 350,000 mg/L chloride default was used and 27% when the 215,000 mg/L chloride default was used. In contrast, the use of site-specific chloride values (tested concentration or resistivity) were shown to be ‘Fair’ predictors of actual Tier 1 exceedances at 40%.

Recommendations for the salinity and DST endpoints are as follows:

Compliance Option 2 – Salt Calculation and DST Returns	Recommendation
Salt Calculation Pre-October 22, 1996 Disposals	22.5% Increase Revise endpoint from 0.026 to 0.032
Salt Calculation Post-October 22, 1996 Disposals	22.5% Increase Revise endpoint from 0.035 to 0.043
DSTs – Default Chloride Concentration 215,000 mg/L	Adopt township boundary chloride concentrations (Technical Memorandum: Default Chloride Inputs for Compliance Option Calculations. Waterline March 2022; see Appendix A)