

February 19, 2019

Peggy Evans, P.Geol.  
Manager, Risk Assessment and Remediation  
PO Box 9342 Stn. Prov Govt  
Victoria, BC  
V8W 9M1

### **RE: Plume Stability under Detailed Risk Assessment**

Recently the Ministry of Environment and Climate Change Strategy (ENV) posted the following policy decision regarding plume stability in detailed risk assessment to their CS e-link.

#### ***Requirements for Demonstrating Plume Stability under SLRA/DRA***

*The ministry advises the following based on recent queries regarding demonstration of plume stability under Detailed Risk Assessment.*

*Ministry policy requires that groundwater contamination plumes be demonstrated to be stable or shrinking when using a risk assessment approach at contaminated sites. Requirements for demonstrating plume stability are specified in section 7 of Protocol 13: Screening Level Risk Assessment. The requirements are summarized as follows:*

*“The demonstration of stable or decreasing contaminant plumes must include the evaluation of groundwater conditions within and at the margins of contaminant plumes and provide evidence of both stable or decreasing substance concentrations and no additional vertical or lateral migration or rebound effects. A minimum of 2 years of groundwater monitoring and geochemical data (including seasonal variations over a 2-year period) demonstrating stable or decreasing groundwater concentrations and conditions is necessary.”*

*The above requirements apply to Screening Level Risk Assessment (SLRA). By association, the requirements also apply to Detailed Risk Assessment (DRA). However, in consideration of the more detailed and site-specific nature of DRA, the ministry acknowledges that there may be other means of evaluation/lines of evidence that may be used under DRA to demonstrate plume stability. Accordingly, the ministry’s expectations for assessment of plume stability under DRA are as follows:*

- *Meet the requirements specified in SLRA; or*



- *Meet the requirements specified in SLRA with a minimum of 1 year of quarterly groundwater monitoring and geochemical data (including assessing groundwater conditions over the range of seasonal/temporal variations) coupled with other methods of evaluation/lines of evidence that in sum demonstrate plume stability (e.g., partial/complete source removal, conservative modelling...).*

*Trend analysis (e.g., Mann-Kendall test,  $\alpha=0.05$ ) of the monitoring data used to support demonstration of stable or decreasing concentrations is implicitly required as part of assessment of plume stability under either SLRA or DRA. The plume stability assessment should also be carried out by a qualified professional hydrogeologist.*

*The above DRA expectations are deemed to apply to current submissions. The expectations are planned to be incorporated into ministry guidance in the near future.*

*Please direct any comments or feedback on plume stability assessment to [George.Szefer@gov.bc.ca](mailto:George.Szefer@gov.bc.ca).*

With respect to plume stability requirements in Protocol 13, we note that the protocol also states, “Additional guidance on the assessment of plume stability can be found in Technical Guidance 8 “Groundwater Investigation and Characterization”. In Technical Guidance 8, we note that the general requirements for demonstrating plume stability are not necessarily applicable to all sites:

*“The site investigation should obtain a sufficient number of samples to establish the magnitude of temporal concentration variations or to allow predictions to be made with reasonable certainty. Where seasonal effects may be significant, or where concentrations are likely to vary significantly for other reasons, then at least quarterly sampling should be performed over at least one year.”*

The new ministry expectations for DRA appear to go beyond that which is stated in the guidance by making data acquisition over a minimum of one year a mandatory requirement for all sites, regardless of other information that may be relevant to the assessment.

To assess the effects of the new requirements, the Contaminated Sites Approved Professional Society (CSAP) convened a series of internal discussion groups and also completed an informal survey of its members, a review of its Performance Assessment findings, and a review of the last 80 submissions to CSAP. The results of that assessment are presented below.

### **Internal Discussion Groups**

The new requirements for plume stability were discussed during several informal internal discussion groups within CSAP and with its stakeholders. The following themes emerged:

- The new requirements for plume stability caught many members by surprise. Plume stability has been considered by Approved Professionals (APs) on many sites for many years, and several methods have been used for assessing plume stability.
- Unlike many previous changes initiated by ENV, the requirements were announced without a comment or grandfathering period. Many APs were



in the final stages of making a submission and were satisfied with the evidence of plume stability, but suddenly found they could not meet ENV's new requirements.

- The members were unaware of an issue or concern on the part of ENV with regard to how APs were exercising professional judgement in demonstrating plume stability.

Based on the internal discussions, CSAP completed additional research into the items identified above.

### **Survey of its Members**

Since the 2017 Omnibus changes, CSAP has noticed a large decrease in the number of submissions. November and December, 2018 saw an increase in the number of submissions, back to near-normal levels, indicating a return to pre-Omnibus activity. An informal survey of the larger CSAP firms was completed to determine how many submissions those firms have that are nearing completion, and that would be impacted by the changes. An impact was defined as the delay of a submission either to obtain an exemption from ENV for the one year of data or to collect four quarters of data. The review indicated that there are approximately 20 to 25 detailed risk assessment submissions nearing completion. The data from the Member's survey indicates that the new requirements for demonstration of plume stability are causing delays in submissions. The survey also identified an increasing number of submissions going to ENV for P6 approval, drinking water approval, or background approval (P4 or P9) than previously experienced by the members.

### **Review of Performance Assessment Findings**

Since beginning in 2009, CSAP has processed 1,112 submissions for non-high risk sites, with 136 random PAs and 31 non-random PAs. Of the 167 PAs, 142 were found sufficient, 21 were found deficient and 4 are in progress. Of the 21 deficient findings, only one submission was found deficient for the reason of plume stability. In that case, there were two other issues that also resulted in the deficient finding. With respect to plume stability, the information was available to determine that the plume was stable; however, the information was not compiled together with appropriate rationale in the reports presented to the AP for review. In summary, there does not appear to be an issue with plume stability and it is unclear why the additional requirements have been imposed.

### **Review of Submissions to CSAP**

CSAP completed a review of the previous 80 submissions submitted to CSAP to determine the number of pre-approvals accompanying the CSAP submissions. There were 21 pre-approvals identified in the 80 submissions. Considering that about 25% of the submissions are determinations that would not normally have a pre-approval, then about 35% of the submissions for Certificates of Compliance (assuming no AiPs) are requiring pre-approval by ENV staff.

We recognize that this number of pre-approvals places significant demands on ENV staff. Processing pre-approvals for plume stability could double the number of pre-approval requests and would undoubtedly place a much larger demand on ministry staff.



**Recommended Short-Term Action**

It is recommended that ENV staff consider putting into place a nine-month grandfathering period for plume stability requirements under DRA. If there is a submission scheduled for submission in the next nine months, the expectations for plume stability, as implemented previously prior to the new requirements, can be followed. If the submission is scheduled after nine months, there should be sufficient time to collect four quarters of data as per the new policy.

**Recommended Long-Term Action**

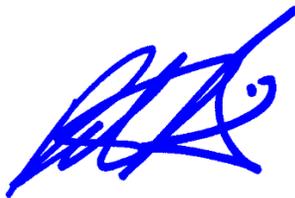
It is recommended that in the long term, hydrogeologists from ENV and CSAP work together to provide a more wholesome approach to evaluating plume stability that takes into consideration the broad range of sites encountered, and provides examples where professional judgement is applicable and where the four quarters of data would be required. This may be similar to the scenarios outlined in Administrative Guidance 15 from actual case studies.

It is expected that there may be different requirements for high risk sites, where the majority of ENV oversight occurs. However, on non-high risk sites where the majority of the CSAP reviews occur, there are other reliable approaches that hydrogeologists should be free to use at their discretion to evaluate plume stability.

**Closure**

Thank-you very much for your consideration in this matter. Please feel free to contact the undersigned regarding any questions or further information that you may require.

Contaminated Sites Approved Professional Society



Peter T. Reid, M.Eng., P.Eng., MBA, CSAP  
President

