



March 18, 2014

File #: 32936-20/037/Lemon Creek

Wayne Smook  
Sr. VP Airport Services  
Executive Flight Centre  
200- 680 Palmer Rd. NE  
Calgary, AB T2E 7R3

Dear Mr. Smook:

**Re: Review of Lemon Creek Spill: Environmental Monitoring Plan Interim Report**

Thank you for your submission of SNC Lavalin Inc's document *Lemon Creek Spill: Environmental Monitoring Plan Interim Report* dated February 14, 2014. I have reviewed the document and have a few comments and questions, which are summarized below. I have also provided comments on this report from Jeff Burrows (Senior Fisheries Biologist, Ministry of Forests, Lands, and Natural Resource Operations), Stephen Dankevych (Senior Contaminated Sites Officer, Ministry of Environment), and Roger Parsonage (Regional Director of Health Protection, Interior Health Authority).

**1. General Comments**

- There is some contradictory information provided about the persistence of Jet A1 fuel (i.e., the report mentions on a few occasions that the Jet A1 fuel only persists for days to weeks, but then states that partitioned components may still be present).
- The Slocan Valley is not considered a contaminated site, so supporting information explaining the use of certain CSR benchmarks would be useful (e.g., BC and federal guidelines do not exist for certain contaminants).
- There are some really useful figures provided in Appendix A-2. However, they are difficult to read when printed on 11 x 17 paper. Is there another way to present the information so it is more legible?

**2. Executive Summary**

- The executive summary will need to be reviewed and updated based on SNC's modifications to the report in response to these comments.
- Comment from Jeff Burrows: *The executive summary is qualitative, not quantitative.*

### 3. Water Quality

- For water (and sediment), it would be useful to include data collected immediately after the spill for comparison to demonstrate the declining concentration at the various sites.
- Section 3.3 indicates that the next targeted sampling is planned to target a sustained rainfall after the 2014 freshet. As approved in the study design, water sampling should be conducted during spring freshet to determine if the high spring flows liberate remaining product.
- Table 3.1 does not include the observation that despite the mostly frozen channel, fuel odour was noticed within Lemon Creek near the confluence with the Slocan in November (by SNC and MoE).
- In some instances, MDLs for some parameters were too high to allow comparison with appropriate guidelines and benchmarks. While this is noted as a footnote in the summary tables, this should be acknowledged in the main body of the report as it prevents making definitive conclusions about whether or not these samples were below benchmarks. Future water sampling **must** use the lowest possible MDLs, such that results are suitable for comparison to relevant benchmarks (e.g., ideally 5 X lower).
- Objectives are not the same as guidelines. Please ensure appropriate terminology is used.
- Note: sample SW13-04 also had detectable levels of PAHs on Sept 13 (Appendix A Table 1), which was not noted in Section 3.5.2.

### 4. Porewater

- Provide additional details in Section 3.3 describing when and where porewater sampling was attempted along Lemon Creek.
- 2 samples had PAHs > MDLs. Please correct the document to reflect this.
- Comments provided by Stephen Dankevych:
  - *SNC has provided a more robust assessment of the potential for groundwater impacts from the spill in Lemon Creek than previously undertaken. SNC provided several lines of evidence to support the fate and transport analysis based on the chemical properties of Jet Fuel A and field observations in surface water, sediment and groundwater wells in the vicinity of Lemon Creek. They characterize the risk to receptors to be low. Although this assessment seems reasonable, Jet Fuel A can be persistent in the environment and, unfortunately, the resulting conceptual site model is unverified by actual porewater data.*
  - *Porewater sampling was attempted in Lemon Creek but was unsuccessful due to the course nature of the sediments/soils. There are other means by which porewater samples could be retrieved but they would involve a much greater level of effort and expenditure of resources. In the absence of porewater data, SNC has suggested the following: "...if the MoE still has a concern over drinking water quality from Mr Hubert's well and/or the other adjacent water wells: 66324, 79310 and 79311, additional sampling of the well and sampling of the three deeper wells will provided higher value than any further investigation of porewater or groundwater in the area." I am in agreement as it would be prudent to continue monitoring all the drinking water wells with the potential for contamination from the spill.*

## 5. Sediment Quality

- Sediment assessment should include total organic carbon and grain size for all samples as these parameters are important explanatory variables to support interpretation of sediment chemistry. The high variability of these variables shown in Table 2 confirms the need for this assessment.
- MoE and SNC communicated (email from Cory Bettles November 15, 2013) regarding concerns related to elevated HEPH in side channels downstream of Lemon Creek. Given that the community highlighted specific concerns within these areas and will likely question the rationale for not sampling here, it would be useful to include some discussion in the report with SNC's supporting rationale for not sampling these areas.

## 6. Periphyton

- MoE requested that the EMP consider the unusual abundance of periphyton in the affected area. The only mention of increased algal growth following the spill is provided in the introduction of the report on page 2. Additional data collected from the impacted area, including qualitative observations, photos, and coordinates of algae, should be provided in this report.

## 7. Benthic Invertebrates

- Benthic monitoring will be an important tool to document the recovery of Lemon Creek following the spill.
- Note that the Columbia Basin Reference Condition Approach model is considered a preliminary model and is scheduled for an update by Environment Canada in 2014.
- Provide a short discussion on the difference in abundance observed at the different sites.
  - Were 0 organisms found at LCB100 and 101 (Figure 9.2)? If this is the case, how was it possible to determine taxonomic composition for these sites (Figure 9.3)?
- Provide further clarification on issues with taxonomic identification. As identified in the EMP study design, samples were supposed to be identified to lowest possible taxonomic level (e.g., genus and species).

## 8. Fish Tissues

- Objectives of fish tissue sampling should be articulated.
- The approved EMP targeted 5 mountain whitefish from the Slocan River and Brilliant Reservoir (i.e., not 3 – 5).
- The fish sampling program did not include a reference site. Fish collected at both Slocan River sampling locations (i.e., Lemon Pool and Little Slocan confluence) were exposed to jet fuel following the spill.
- The statistical analysis of fish tissue sampling is questionable. A sample size of n=4 and 3 individuals is likely too small to detect a statistical difference with any confidence.

Wouldn't it be more appropriate to use a t-test rather than an ANOVA, which is intended to compare more than 2 groups? What hypothesis is being tested? Both groups of this mobile species were likely exposed to fuel following the spill.

- The US EPA (1993) document referenced in Section 4.5.1 is used to support the small sample size for fish tissues. However, this document outlines detailed statistical procedures to determine appropriate sample sizes, which were not used in this study. I believe the rule of thumb of  $n = 10$  is intended to reflect a sample size of 10 from **both** the reference and exposed sites, not a combined value from all areas.
- Based on the results presented, I disagree with the conclusion that PAH levels are similar to background levels. These results indicate that mountain whitefish within the Slocan River downstream of the spill have similar and detectable levels of phenanthrene, likely associated **with** the fuel spill. To determine whether endpoints have been met, additional fish sampling is required, which requires an actual "reference" area not influenced by the fuel spill.
- Fish tainting was removed from the monitoring program without discussion with MoE. While it is intended for the monitoring program to be adaptive and responsive to scientific findings, this study component was part of an approved study design submitted to MoE. As specifically indicated in comments provided to EFC (and SNC) on the study design: *Changes to the program must be approved by MoE and should be posted on EFC's Lemon Creek website.*
- Supporting comments from Jeff Burrows: *The fish consumption safety sampling of mountain whitefish, while rationalized, seems weak (Slocan @ Lemon  $n=4$ , Slocan @ Little Slocan  $n=3$ , Brilliant Reservoir  $n=0$ ) to me. Does the EPA recommendation of  $n=10$  actually mean a total or at each site? No control site. It seems to me that to truly satisfy the public, this should be repeated and with the addition of rainbow trout from Brilliant Reservoir as we had direct questions about this.*

## 9. Fish Communities

- Comments from Jeff Burrows:
  - *The fish community work seems fine to me in general. Juvenile rainbow numbers near Lemon Creek, in the Slocan, were unexpectedly low. It would be good if the snorkel program continued in 2014.*
  - *In this program I would like to be reassured that the R&E (Umatilla dace, shorthead sculpin) remained in their pre-spill range and relative densities. I can't see how to conclude that from the report but perhaps that will be addressed in sampling and analysis this coming year.*

## 10. Human Health

- Specific comments provided on behalf of the Interior Health Authority from Roger Parsonage:
  - *Are there any health concerns? No. Based on the available information at this time there is no reason to believe an environmental health hazard exists.*
  - Key observations from IHA:

- *Our previous assessments of the product spilled suggests it is not likely to cause a persistent environmental health risk. The results provided in this report are consistent with this hypothesis.*
- *Based on the data there does not appear to be any increased risk to human health associated with consumption of Mountain Whitefish downstream of the spill. It should be noted, however, that the sample size for the fish-tissue assessment was below the proposed target in the assessment plan and what is generally considered appropriate for environmental impact assessments.*
- *The report indicates petroleum hydrocarbons and PAHs levels in the area are well below drinking water safety standards and guidelines. The report does not, however, provide evidence to rule out high water flows (i.e. during spring freshet; rain events) transporting contamination to banks and slower moving sections downstream. Follow up observations were conducted in November 26-28, 2013 when snow and ice made it difficult to view banks and side channels. Further observation should be conducted during spring (including at the Hulbert Property) to confirm the clean-up was effective.*
- *It is recommended that tissue testing (e.g. for PAHs) is conducted on invertebrates, not just Mountain Whitefish.*

A written response to these comments and questions, prepared by a qualified professional, is requested. Please let me know if you have any questions.

Yours truly,

Jolene Raggett, R.P.Bio.  
Environmental Impact Assessment Biologist

cc: Robyn Roome, EP Regional Director, Kootenay Okanagan Regions  
Brad McCandlish, Senior Environmental Protection Officer  
Cory Bettles, Practice Lead, SNC Lavalin