



Date: March 17, 2017

File: 105809

**Re: Input from Ministry staff to be addressed and responded to as part of Final Closure Plan pursuant to the amended Spill Prevention Order (SPO) issued by Minister Polak on March 15, 2017**

On January 27, 2017, the permit was suspended and a SPO was issued for the site at 460 Stebbings Road.

On February 23, 2017, the permit was canceled.

On March 15, 2017, the SPO was amended. Under the amended SPO, the Named Parties may elect to permanently close the landfill or to remove all Contaminated Soil from the Facility. If the Named Parties elect to permanently close the landfill, then the Named Parties must comply with the provisions set out in Part A: Final Closure (sections 3 – 7) including submission of complete up to date As-Built plans and specifications of the existing Facility by April 17, 2017, and a Final Closure Plan by May 31, 2017.

The Sperling Hansen Associates (SHA) Closure Plan dated February 18, 2017 (SHA Feb 2017 closure plan), and the WSP Addendum Review of Contact and Non-Contact Water Management Systems, dated February 20, 2017 (WSP Feb 2017 Review), were intended to address an active permit including new landfill cells, landfilling, leachate (contact water) treatment and discharge of treated leachate into the settling pond, settling pond discharge, posting of updated security based on cost estimates, progressive closure, and eventual final closure and post-closure, occurring over decades. As the permit has been canceled and the SPO amended, large parts of these reports are no longer relevant or valid, and the SHA Feb 2017 closure plan requires many amendments to satisfy the more focused SPO requirements for a Final Closure Plan. The ministry has also recently received a letter from South Island Resource Management (SIRM) dated March 9, 2017, Re: Pollution Prevention Order 108608 Supporting Documentation, and attached SHA letter dated January 30, 2017, that includes information with regard to the landfill geomembrane cover installation and status.

If Final Closure is chosen, the amended SPO requires the submission of comprehensive and detailed information as well as information that addresses and responds to any input from ministry staff (SPO section 4.). Accordingly, this memo provides input from ministry staff in the form of the following items which need to be addressed and responded to as part of the Final Closure information submissions, including references to sections of the above mentioned reports and previous information and reports.

After complete up-to-date “As-Built” plans and specifications of the existing Facility are received, additional input from ministry staff may also be provided to be addressed and responded to as part of the Final Closure Plan submission.

- 1) Complete up-to-date “As-Built” plans and specifications of the existing Facility.
  - a) Previous information referred to a seepage blanket above the bedrock (e.g. Active Earth Engineering Ltd. Seepage Blanket Details, dated December 10, 2013; Environmental Appeal

- Board decision of March 20, 2015 (para 491 etc.); SHA Feb 2017 closure plan (section 3.2)). The WSP Feb 2017 Review (page iv), states that “As built drawings for the PEA do not clearly indicate if a seepage blanket was installed”.
- b) Ministry Inspection Record 27734 dated August 11, 2016, indicated that actual construction of the landfill cell(s) differed from submitted As-Built plans and specifications (e.g. base liner anchor trench was not installed/complete), and requested that accurate As-Built plans and specifications of the facility including cross-section details of the landfill cells be submitted (e.g. “SIRM will submit accurate As-Built cross-section details for PEA Cells 1A, 1B and 1C, certified by a QP, including all details (e.g. leak detection works, all layers, anchor trenches, etc.)”).
  - c) Brimmell Engineering Ltd. letter re: As-Built for Encapsulation Cell 1C, dated July 4, 2016 (page 2) states: “The narrow, southerly end of the Encapsulation Cell 1C site has yet to be finalized due to a problem with outcropping bedrock on the west side (photo). This report will be updated when the south end has been finalized. Until this is done the contaminated fill is to be kept back at least 1.5 m from the existing south end of the LLDPE liner, and sloped up to the north at 1.5:1.”
  - d) The WSP Feb 2017 Review states “The size of the Contact Water Pond surveyed in June 2016 is smaller than the as-built size in the Active Earth documents.” (page iv).
  - e) The SIRM letter dated March 9, 2017, and SHA letter dated January 30, 2017 (pages 3 & 5), indicates that the geomembrane cover installation is not fully complete and that additional detailed welding of patches, tie-in to the basal liner, pipe penetration boots, 3rd party review and QA/QC testing, and final inspection/completion report, as well as reinstalling the ‘tire-chain’ securing system on the crest and side slopes, are required.
  - f) The SHA January 30, 2017 letter (page 4) also indicates “SIRM constructed an additional contact water lined storage pond near the Water Treatment Plant onsite. The new pond adds approximately 75m<sup>3</sup> of storage capacity for contact water.”
- 2) Assessment of the adequacy of the existing Facility and, if applicable, recommended revisions.
    - a) Include assessment of all works including seepage blanket, landfill base liner, anchor trenches, leachate collection and leak detection works, landfill cells, and leachate storage pond(s). The WSP Feb 2017 Review (page iv & sections 1.1.4, 2.4.1, 2.4.2) indicates the contact water pond is not large enough to handle the contact water that would be generated by a 200 year storm with snow melt (i.e. for wheel wash and containment pond catchment area).
    - b) With regard to landfill stability (static and seismic), the Landfill Criteria for Municipal Solid Waste, Second Edition, June 2016 (LCMSW - sections 5.4, 5.8, 5.9, 10.3 item 3.) specifies geotechnical and seismic assessment of slope stability, that consideration is to be given to the requirement for texturing and asperity size of the primary geomembrane to ensure stability of the fill in all circumstances including earthquake loading, and final slopes not steeper than 3H:1V (33 %). SHA Feb 2017 closure plan also proposed a 60 mil double textured HDPE geomembrane liner (Figure 6-1, etc.), that detailed design address slope stability of each cell for deep seated circular and/or block failure (section 6.1.3), and final slopes of 3H:1V (section 4.2, Figure 4-3, etc.). Information submitted pursuant to the permit (e.g. Active Earth Engineering Ltd. As-Built report dated July 30, 2015, etc.) indicates the landfill base liner is smooth (SOLMAX documentation), and the SHA letter dated January 30, 2017, indicates the east slope of the existing landfill cell is 2.5H:1V (Figure 1).

- 3) A plan for the management of any contaminated soil stored in the soil management area.
  - a) Include tonnage(s) and type(s) of contaminated soil.
  
- 4) Proposed landfill final cover, stability assessment and hydrologic modeling.
  - a) Previous information refers to 2 m of soil over the geomembrane (e.g. Active Earth Engineering Ltd. closure plan dated October 22, 2013; Environmental Appeal Board decision of March 20, 2015, (para 101); Ministry of Energy & Mines permit section 20 a.)
  - b) The LCMSW specifies a textured geomembrane (Figure 5.5b), final slopes not steeper than 3H:1V (33 %), and stability and hydrologic modeling of the final cover (section 5.8 & 5.9). SHA Feb 2017 closure plan also proposed a 40 mil double textured LLDPE geomembrane liner and detailed design of final cover slope stability and HELP flow modelling (section 4.5 & 6.1.3) and final slopes of 3H:1V. The SHA letter dated January 30, 2017, indicates the geomembrane is smooth (SOLMAX documentation), and the east slope of the existing landfill cell is 2.5H:1V (Figure 1).
  
- 5) A Leachate collection and storage plan including hydrologic modeling.
  - a) The WSP Feb 2017 Review (page iv & sections 1.1.4, 2.4.1, 2.4.2) indicates:
    - i) The size of the Contact Water Pond surveyed in June 2016 is smaller than the as-built size in the Active Earth documents.
    - ii) The contact water pond is not large enough to handle the contact water that would be generated by a 200 year storm with snow melt (i.e. for wheel wash and containment pond catchment area).
    - iii) Contact water pond should be drawn down prior to forecast storm events to maximize retention capacity.
    - iv) The installation of a roof over the SMA minimizes the generation of contact water from the SMA. The gutter installation should be completed to allow water collected from the roof area to be directed away from the contact water pond.
  
- 6) The post-closure period. The LCMSW (section 8.3) indicate that in the absence of technical rationale to determine the contaminating lifespan of the landfill, a lifespan of 50 years shall be used for landfills with less than 100,000 tonnes of MSW in place, 100 years shall be used for landfills with less than 1,000,000 tonnes of MSW in place. In no case shall the post-closure period be less than 30 years.

If the contaminating lifespan is calculated, the LCMSW provide guidance including the contaminating lifespan of a landfill shall be determined using the latest updated environmental monitoring information as specified in Section 8.3 (section 7.4), a technical analysis of the expected contaminating lifespan shall be undertaken by a Qualified Professional (section 8.3), leachate chemistry is also required to assist with determining the contaminating lifespan of the landfill at the time of closure (section 9.1), and, contaminating lifespan assessment of the site for key contaminants (section 10.3 item 11). The SHA Feb 2017 closure plan (section 11.1) provided some rationale with regard to the contaminating lifespan however did not provide a technical analysis of the expected contaminating lifespan that included the latest updated environmental monitoring information, leachate chemistry, and key contaminants, and accordingly was not fully adequate.

Please provide confirmation of the tonnage in the existing landfill. If the contaminating lifespan is calculated, please provide a technical analysis that includes the latest updated environmental monitoring information, leachate chemistry, and key contaminants.

- 7) An environmental monitoring program, including leachate monitoring, to verify that the escape or spill of Leachate into the environment has not occurred.
  - a) The SHA Feb 2017 closure plan indicates there should be a monitoring program put in place to test any groundwater seepage draining from under the landfill to ensure no leakage of the basal liner system is occurring (section 7.3).
  - b) Potential leachate leakage from the leachate storage pond(s) must also be addressed.
- 8) Contingency measures to address any failure of the works or the escape or spill of Leachate into the environment. The LCMSW (section 10.3.4) indicates that a closure plan must include practical and implementable contingency measures to address any failure of the works or non-compliance with the performance criteria. Contingency measures may include the following measures: extraction and treatment of groundwater downgradient of the landfill site, establishment of monitored attenuation zones, and repair and/or installation of shallow leachate collection system.

As indicated, the SHA Feb 2017 closure plan was intended to address an active permit with contaminated soil and effluent discharges, posting of updated security based on cost estimates, progressive closure, and eventual final closure and post-closure, occurring over decades. As the permit has been canceled, the SPO amended, and contaminated soil and effluent discharges are no longer authorized, large parts of the Feb 2017 closure plan are no longer relevant or valid. You may wish to use the SHA Feb 2017 closure plan as the starting basis for the Final Closure Plan required by the SPO, however it will require many significant amendments to satisfy the more focused SPO requirements for a Final Closure Plan.