

## Review Comment Table

<b>Board:</b>	SLWB
<b>Review Item:</b>	S17L8-003 - Transport Canada - Closure and Reclamation Plan & Water Quality Management Program - Versions 1.0
<b>File(s):</b>	<a href="#">S17L8-003</a>
<b>Proponent:</b>	Transport Canada
<b>Document(s):</b>	<a href="#">Closure and Reclamation Plan - Version 1.0</a> (2.2 MB) <a href="#">Water Quality Monitoring Program - Version 1.0</a> (2.6 MB)
<b>Item For Review Distributed On:</b>	Mar 5 at 15:54 <a href="#">Distribution List</a>
<b>Reviewer Comments Due By:</b>	Mar 26, 2018
<b>Proponent Responses Due By:</b>	Apr 4, 2018
<b>Item Description:</b>	<p>Transport Canada, Prairie and Northern Region - Environmental Services, Contaminated Sites (TC) has submitted Version 1.0 of its Closure and Reclamation Plan for the Norman Wells Airport Hydrocarbon Contaminated Soil Treatment Facility Project in accordance with Part I, Condition 1 of Licence <a href="#">S17L8-003</a>. TC has also submitted Version 1.0 of its Water Quality Monitoring Program in accordance with Part E, Condition 5 of the Licence S17L8-003. These submissions require Board approval.</p> <p><b>Reviewers are invited to submit questions, comments, and recommendations on the Closure and Reclamation Plan and/or the Water Quality Monitoring Plan by March 26, 2018.</b></p> <p>*NOTE* Proponent Response deadline was extended to April 4, 2018</p>
<b>General Reviewer Information:</b>	All documents that have been uploaded to this review are also available on our public registry. If you have any questions or comments regarding this review or the Online Review System, please contact Board staff identified.
<b>Contact Information:</b>	Sabrina Sturman 867-598-2413

## Comment Summary

Environment and Climate Change Canada: petrel liu				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
7	General File	<b>Comment</b> <a href="#">(doc)</a> ECCC Cover Letter		

		<b>Recommendation</b>	
1	Topic: Depth of Groundwater Monitoring Wells Reference: Closure & Reclamation Plan ver. 1: Section 2 Background, pg 1	<p><b>Comment</b> The proponent states that "All three monitors (monitoring wells) were found to be damaged and were subsequently abandoned and replaced by BluMetric in Jan. 2018. All three monitoring wells were completed to a depth of approximately 2 meters below ground surface." The proponent then suggests that "the nearest surface water body is the Mackenzie River which is located approximately 500 meters south of the site". Given that the Mackenzie River is only 500 meters downgradient, and a possible groundwater flow (either shallow or deeper flows) through the wooded area to the river, it is not clear how or why the 2 meters depth of the monitoring well were deemed to be adequate. It is possible that water infiltrated through the contaminated soil will go down beyond a depth of 2 meters and then seep into the river unnoticed. A deeper monitoring well would be able to intercept any deeper groundwater flow that drains into the Mackenzie River.</p> <p><b>Recommendation</b> ECCC recommends that the proponent provide rationale for choosing a 2 meters depth for monitoring wells as appropriate.</p>	<p><b>Apr 4:</b> The groundwater table is known to be shallow at the airport and is anticipated to be within 1 to 1.5 mbgs. The objective of the wells is to install screens that would intersect the groundwater table as the contaminant of concern is petroleum hydrocarbons which would be present on the surface of the groundwater. These wells will achieve this objective.</p>
2	Topic: Sampling Groundwater Monitoring	<p><b>Comment</b> Proponent states that "samples should be collected from within the</p>	<p><b>Apr 4:</b> This was guidance from the draft GNWT Landfarm Guideline and</p>

	<p>Reference: Closure &amp; Reclamation Plan ver. 1: Section 5.4 Investigation of underlying Soils, Pg 8</p>	<p>footprint, including the area under the berms, to a depth of approximately 0.15 meters below ground surface, representing an approximate volume of 750 meter cube to be investigated." It is likely that all contaminants have been depleted from the shallow horizon and samples with 0.15 meters in depth do not appear to be good representative samples to detect the levels of contaminant in the soil. <b>Recommendation</b> ECCC recommends that the proponent choose samples at a deeper level in order to have more adequate representation of contaminants in the soil.</p>	<p>based on the Yukon Guidance document for Landfarm operations. TC will extend test pits to 1-1.5m and will use field screening to guide sampling.</p>	
3	<p>Topic: Duration of Groundwater Monitoring Reference: Closure and Reclamation Plan ver.1: Section 9 Post-closure monitoring, pg 10</p>	<p><b>Comment</b> Section 9 of the Closure and Reclamation Plan (CRP) states that "Groundwater monitoring will continue to occur twice annually until the groundwater quality observed in the downgradient wells meets the groundwater quality criteria or meets the groundwater quality observed in the upgradient monitoring well." The proponent did not describes exactly what constitutes "meeting" the criteria/upgradient quality. This should be clarified in the plans. Groundwater quality monitoring should be continued until results indicate that the quality consistently meets the required levels and is stable. Meeting criteria for a single</p>	<p><b>Apr 4:</b> Agree - monitoring will be conducted until the trend is seen over two consecutive seasons of stable groundwater measurements.</p>	

		<p>season would not provide sufficient data to assess whether groundwater quality has stabilized.</p> <p><b>Recommendation</b> ECCC recommends that the proponent should continuously monitor groundwater quality until the results indicate that groundwater quality has stabilized and consistently meets the required levels over consecutive seasons.</p>		
4	<p>Topic: Groundwater Monitoring Results Reference: Closure and Reclamation Plan ver.1: Section 2 Background, pg 1</p>	<p><b>Comment</b> Section 2 of the Closure and Reclamation Plan (CRP) states that "All 3 groundwater monitoring wells were assessed and found to be damaged, and were subsequently abandoned and replaced in January 2018." The Closure and Reclamation Plan does not mention whether any monitoring data was collected from these wells. Provision of this information would support an assessment of the proposed approach for closure and monitoring.</p> <p><b>Recommendation</b> ECCC recommends that the proponent include all groundwater monitoring results for this facility in the plan, along with any available supplementary materials (ex. tables, reports, summaries).</p>	<p><b>Apr 4:</b> No historical groundwater monitoring data is available for the site and the wells were too damaged to sample. The new wells will be sampled in the spring and fall in 2018.</p>	
5	<p>Topic: Potential Frozen Ground Water Monitoring Program for Wells Reference: Water Quality</p>	<p><b>Comment</b> Section 3.4 of the Water Quality Monitoring Program states that: "Norman wells is located in a an area of The Northwest Territories characterized by extensive</p>	<p><b>Apr 4:</b> Experience in this region has shown that thawing of wells is not required. The shallow groundwater table will be thawed in May-June and</p>	

	<p>Monitoring Program: Section 3.4 Hydrogeology, pg 2</p>	<p>discontinuous permafrost (50-90%) (NRcan, 1999)."  There is potential for the groundwater monitoring wells to be frozen during the monitoring periods, therefore have the potential to prevent collection of groundwater samples. This potential scenario should be addressed in the Water Quality Monitoring Program by the proponent.  <b>Recommendation</b> ECCC recommends that the proponent includes procedures (ex. thawing the wells) in the Water Quality Monitoring Program to address the potential scenario that groundwater monitoring wells are frozen during the sampling period.</p>	<p>will continue to be able to be sampled until September-October, thus facilitating two rounds of groundwater sampling.</p>	
6	<p>Topic: Discharge of wastewater/contact water Reference: Closure and Reclamation Plan ver.1: Section 5.2 Water Management, pg 6</p>	<p><b>Comment</b> Section 5.2 of the Closure and Reclamation Plan addresses water management, specifically, the testing and discharge of potential standing water from the landform. However, the plan does not specify wastewater discharge location(s). Details on discharge of wastewater and contact water should be provided.  <b>Recommendation</b> ECCC recommends that the proponent adding the following information to the appropriate management plans: location of discharge of wastewater/contact water; specify whether discharge is to surface waters or land; and, if land, the distance to</p>	<p><b>Apr 4:</b> These details will be provided to the Lands Inspector prior to discharge. Exact location will be determined this spring but will be adjacent to the LTU with a slow release. No known surface water bodies are nearby.</p>	

		the closest surface water body.		
<b>GNWT - ENR: Central Email GNWT</b>				
<b>ID</b>	<b>Topic</b>	<b>Reviewer Comment/Recommendation</b>	<b>Proponent Response</b>	<b>Board Staff Response</b>
8	General File	<b>Comment</b> <a href="#">(doc)</a> ENR Letter with Comments and Recommendations with Metadata Template Attached <b>Recommendation</b>		
9	General File	<b>Comment</b> <a href="#">(doc)</a> Attachment: Metadata Template <b>Recommendation</b>		
1	Topic 1: Closure and Reclamation Plan - Treated Soils	<b>Comment</b> Section 1 of the Closure and Reclamation Plan (CRP) notes that the final destination for treated soils has yet to be determined. ENR notes that the Water Licence application dated November 14, 2017 stated that "(o)nce the soil meets criteria, it will be deposited at site and re-graded." Does the statement in the CRP imply that material may now be moved off site or simply that the precise location within the site has not yet been determined? <b>Recommendation</b> 1) ENR recommends that Transport Canada clarify if treated soil will be deposited at site or whether it may be transferred and deposited elsewhere.	<b>Apr 4:</b> The treated soils will be kept on site and spread within the the LTU footprint. The exact location and grading of the site has yet to be determined.	
2	Topic 2: Closure and Reclamation Plan - Underlying Soils	<b>Comment</b> Section 5.4 notes that there have been documented incidents of tearing of the geomembrane which may have created contaminant migration beyond the facility. A sampling program is outlined	<b>Apr 4:</b> The final destination of any impacted soils will be dependent on the total volume of soil requiring disposal. The local Norman Wells Landfill will be used if approved,	

		<p>and it is stated that if concentrations are above criteria, soil will be excavated and disposed of at a licensed facility. Limited information on this option is provided.</p> <p><b>Recommendation</b> 1) ENR recommends that Transport Canada provide additional information on potential locations to transfer and deposit contaminated soils should this option be required.</p>	<p>otherwise the soil will need to be shipped south to another licensed facility such as KBL at Hay River.</p>	
3	Topic 3: Water Quality Management Program - Water Storage	<p><b>Comment</b> Section 6.2 of the Water Quality Management Program states that water should be pumped into holding tanks if overflow is occurring or imminent. In response to ENR's comments on the Landfarm Operations and Maintenance Plan (O&amp;M Plan), Transport Canada provided comments on March 14 stating that no tanks are present at site but two 8m<sup>3</sup> vacuum trucks which could be used in emergencies prior to water being transferred off-site to tanks with capacity of 600 m<sup>3</sup>.</p> <p><b>Recommendation</b> 1) ENR requests that Transport Canada clarify if the same process of using vacuum trucks as noted in the O&amp;M Plan still applies.</p>	<p><b>Apr 4:</b> Yes - vacuum trucks would be used as indicated in the O&amp;M Plan. This water would be transferred to a holding tank while water quality parameters are verified.</p>	
4	Topic 4: Water Quality Management Program - Response Framework	<p><b>Comment</b> Section 7.2 of the Water Quality Management Program states that if groundwater appears to have been impacted by activities at the facility, additional actions</p>	<p><b>Apr 4:</b> Noted - licence requirements will be followed.</p>	

		<p>may occur such as additional monitoring and/or the installation of additional wells to determine the extent of the plume. While this information will be provided in the Annual Report, it is unclear how the Board and the Inspector will be notified or involved while these decisions and assessments are being made.</p> <p><b>Recommendation</b> 1) ENR recommends that Transport Canada outline a strategy which includes the notification and involvement of the Inspector and the Board when determining appropriate response actions should groundwater contamination be suspected.</p>		
5	Topic 5: Closure and Reclamation Plan - Infrastructure Removal	<p><b>Comment</b> Section 5.3 states that the geotextile liner will be excavated and removed using heavy equipment and hauled for disposal at the Norman Wells Solid Waste Disposal Facility (SWDF) site.</p> <p><b>Recommendation</b> 1) ENR recommends that Transport Canada provide written approval from the Town of Norman Wells indicating the SWDF (landfill) is designed and licenced to dispose of such industrial wastes.</p>	<b>Apr 4:</b> Noted.	
6	Topic 6: Water Quality Data	<p><b>Comment</b> Data regarding the water quality of lakes and rivers in the NWT that is collected on a regular basis by industry, as part of their various monitoring programs, represents a significant source of water quality data.</p>	<b>Apr 4:</b> Noted - the requirements of the water licence will be followed.	

		<p>This data could inform decision makers about trends and natural variation in water quality in the territory, as well as the cumulative effects from multiple use activities within an area or region. However, in order to use this data to understand water quality conditions in the NWT, the data must first be available in an accessible format.</p> <p><b>Recommendation 1)</b> NWT CIMP recommends that Transport Canada should submit water quality data associated with their Annual Water Use Report to the public registry in an accessible format (e.g., csv or spreadsheet file).</p>		
7	Topic 7: Metadata Standards	<p><b>Comment</b> It is important to provide metadata that provides context for the water quality data. Metadata refers to a description of data that was collected as part of a water quality sampling program, and includes field conditions and a description of laboratory analyses conducted. Metadata standards are required to ensure the proper use and interpretation of the data by the users.</p> <p><b>Recommendation 1)</b> NWT CIMP recommends that Transport Canada complete the attached metadata template annually in the same spreadsheet as the associated water quality data and submit it to the Board to be posted on the public registry in an</p>	<p><b>Apr 4:</b> Noted - the requirements of the water licence will be followed.</p>	

		accessible format (e.g., csv or spreadsheet file).		
Sahtu Renewable Resource Board: Colin Macdonald				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	Closure and Reclamation Plan â€œ Page 1	<p><b>Comment</b> This Closure and Reclamation Plan is submitted as Draft as additional details regarding the extent of reclamation required, and the final destination of treated soils have yet to be determined for the project;</p> <p><b>Recommendation</b> A full review of the Plan can be conducted without all the necessary information. Review of this draft report is premature if some details have yet to be decided.</p>	<p><b>Apr 4:</b> The full plan will be submitted when complete as further data is required.</p>	
2	Closure and Reclamation Plan â€œ Pg 2	<p><b>Comment</b> Groundwater monitoring wells; no reason for the damaged wells was given. Is it due to ice damage? Permafrost slumping? Will the new wells become damaged the same way?</p> <p><b>Recommendation</b> Please provide an explanation for the damaged wells and the provide some assurance that the new wells will not be impacted in the same way. Constantly constructing new wells may interfere with long-term monitoring data at each well.</p>	<p><b>Apr 4:</b> It is suspected that these wells were damaged due to frost jacking. The new wells were installed using techniques to minimize frost jacking as recommended by the drilling company and a hydrogeologist, both of which have extensive Northern experience.</p>	
3	Page 5 Closure Procedures	<p><b>Comment</b> Soil disposal - an option after removal of soil is to store it temporarily on-site. Should the soil remain in the LTU until a final use for the soil is found? This would</p>	<p><b>Apr 4:</b> Only treated soil which meets the water licence criteria will be stored outside of the LTU. This soil will be spread on the site as</p>	

		<p>minimize potential hazards from temporary storage.</p> <p><b>Recommendation</b> Provide a rationale for moving, and storing, soil to other areas if there is a chance that there is contamination from any of the compounds that could be present.</p>	described.	
4	Pg 6 Water Management	<p><b>Comment</b> Any water that is anticipated to be discharged from the LTU during closure must meet the effluent criteria outlined in Table 3.</p> <p><b>Recommendation</b> There is no action mentioned for the water if it does not meet the criteria. [Note: Storage in holding tanks is indicated in the second document - mention it here as well].</p>	<b>Apr 4:</b> Noted and accepted.	
5	Page 8 - bottom	<p><b>Comment</b> Additional samples should be collected as necessary should there be any indication of contamination migration from the LTU. How will the areas of contamination be determined? Field tests? Visually?</p> <p><b>Recommendation</b> BluMetric should indicate in the report some method of surveying for contamination to ensure that all contaminated soil is removed.</p>	<b>Apr 4:</b> This is discussed - the sampling methodology will include field screening and submission of soil samples for laboratory analysis.	
6	Page 9	<p><b>Comment</b> ..seeding with local vegetation may be conducted if suitable re-vegetation species are identified.</p> <p><b>Recommendation</b> BluMetric should provide a source of naturally occurring seeds endemic to the area to ensure good re-vegetation rates and</p>	<b>Apr 4:</b> Noted.	

		no invasive species. Oil companies use northern seed mixes on remediated well sites.		
7	Water Quality Monitoring Program	<p><b>Comment</b> General Report- Very few details are provided for characterizing the soil in the LTU or the surrounding environment. A general plan is presented, as specified in the Licence, but there is no plan for sampling background conditions for soil, groundwater or surface water.</p> <p><b>Recommendation</b> Provide details for characterizing background or reference conditions for soil, surface water and ground water. If data will be compared to conditions outlined in the Water Licence then specify sampling design (numbers, frequency, etc.)</p>	<p><b>Apr 4:</b> Applicable criteria are referenced as per the water licence. Soil characterization within the LTU is provided in the O&amp;M Plan for the facility.</p>	
8	Water Quality Monitoring Program -Pg 3	<p><b>Comment</b> The LTU has had several documented rips and tears during its use.</p> <p><b>Recommendation</b> This information hasn't been mentioned in previous plans for the site and it may cause issues with soil and ground water.</p>	<p><b>Apr 4:</b> Liner monitoring was mentioned in the O&amp;M plan and details of documented tears have been provided in the 2017 Annual Report.</p>	
9	Page 4 "Parameters of Concern"	<p><b>Comment</b> It should be noted that no baseline data is available for the site to characterize conditions prior to the operation of the LTU. BluMetric needs to offer a plan to determine background levels of the chemicals to be used as markers of contamination from the LTU. Also, it may be difficult to get a background</p>	<p><b>Apr 4:</b> Accepted. Groundwater quality will be compared to upgradient quality as it enters the LTU site. Transport Canada is not responsible for groundwater quality prior to it entering the LTU site.</p>	

		<p>groundwater quality signal at an airport that probably has contamination at a number of sites.</p> <p><b>Recommendation</b> Provide a plan to characterize background soil, groundwater and surface water, and a sampling plan to delineate the possible chemical effects of the LTU.</p>		
10	Page 5	<p><b>Comment</b> “the operator of the landfarm should take reasonable measures to limit the amount of snow”</p> <p><b>Recommendation</b> This should be a much stronger statement, and steps taken to ensure that it happens.</p>	<b>Apr 4:</b> Noted.	
11	Page 11	<p><b>Comment</b> Water down slope from the LTU will be released if it meets criteria but exceeds the upgradient data (presumably for the majority of chemicals analysed), it will be released. If the upgradient groundwater is contaminated (from other sources on the airport grounds) then water would be released. This is unacceptable.</p> <p><b>Recommendation</b> There needs to be a mechanism to establish that the upgradient borehole is not contaminated and reflects background conditions. There should also be an action for conditions of release if a few chemicals exceed criteria (e.g., some metals) but others (e.g., hydrocarbons) do not exceed.</p>	<b>Apr 4:</b> Clarification required. See Point 9 regarding upgradient groundwater quality.	