

Review Comment Table

Board:	WLWB
Review Item:	Behchoko - Type A Water Licence Application (W2014L3-0002)
File(s):	W2014L3-0002
Proponent:	Community Government of Behchoko
Document(s):	Water Licence Application (2 MB) Solid Waste Facility - Landfill Berm As-Builts (218 KB) Solid Waste Facility - New Site Design Specifications (2 MB) Landfarm Assessment - 2013 (2 MB) Spill Contingency Plan - 2014 (2 MB) Hazardous Waste Management Plan (3 MB) Solid Waste Facility - Proposed Management Plan (4 MB) Landfarm Remediation - 2011 (1 MB) Solid Waste Facility - Closure and Reclamation Plan for Existing Site (3 MB) Surveillance Network Program and 2010 Field Manual (2 MB) Solid Waste Facility - Site Characterization and Preliminary Design (1 MB) Rae Sewage Life Station Contingency Plan and CGB Response to Inspector (1 MB) Wastewater Treatment Facility - O&M Plan (9 MB)
Item For Review Distributed On:	May 7 at 14:42 Distribution List
Reviewer Comments Due By:	June 4, 2014
Proponent Responses Due By:	June 25, 2014
Item Description:	The Tlicho Community Government of Behchoko submitted their Water Licence application on May 5, 2014 and was deemed complete on May 7, 2014. The Tlicho Community Government of Behchoko is requesting a Type A Water Licence to regulate water use and waste disposal prior to the expiry of their current Type B Water Licence by November 30, 2014.

	<p>In this initial phase of the review process, the WLWB suggests that reviewers ask questions of the Proponent, identify any issues or make any recommendations to the Board. The Proponent should attempt to clarify or resolve questions or issues identified by reviewers.</p> <p>Please view the Work Plan on our online registry.</p>
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Comment Summary

Environment Canada: Bradley Summerfield				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	General File	<p>Comment (doc) EC comments cover letter</p> <p>Recommendation</p>		
2	Operations and Maintenance (O&M) Plan for Behchoko Wastewater Treatment Facilities (WWTF)	<p>Comment With respect to Surveillance Network Program (SNP) Stations 0041-E2, 0041-E6, 0041-E7, and 0041-R2, Environment Canada (EC) notes the following discrepancies between the monitoring parameters listed in the December 2010 SNP Plan (Section 5) and those listed in the WWTF O&M Plan (Sections 3.14 and 5): - Carbonaceous biochemical oxygen demand (CBOD) is missing from the WWTF O&M Plan - The WWTF O&M Plan lists Total Phosphate; the December 2010 SNP Plan lists Total Phosphorous.</p>	<p>June 25: CBOD will be added to list of parameters in appropriate sections.</p>	<p>June 18: Board staff note that Total Phosphate is a requirement of the Water Licence SNP, therefore the Plans should reflect this.</p>

		Recommendation EC recommends correcting the WWTF O&M Plan to agree with the SNP Plan.		
3	Operations and Maintenance Plan for Behchoko Wastewater Treatment Facilities	<p>Comment EC notes that both the Rae and Edzo sewage lagoons discharge to wetlands to provide subsequent treatment.</p> <p>Recommendation EC recommends that the wetland component of the treatment systems be characterized to evaluate the capacity of the wetlands (i.e. retention times, hydraulic and organic loading rates) and determine how to optimize treatment.</p>	<p>June 25: Wetland characterization is out of the scope of an O&M plan. The hydraulic conductivity and characterization of the Edzo wetland has been completed by the Center for alternative Wastewater treatment (Annie Chouinard, Cold-climate constructed wetland applications in Canada and Northern China and modeling applications in the Canadian Arctic using SubWet 2.0). The Rae lagoon has been evaluated by the CCME in 2010 and 2011. Monitoring of the wetlands can be incorporated into O&M to confirm optimum treatment.</p>	
4	Operations and Maintenance Plan for Behchoko Wastewater Treatment Facilities	<p>Comment All effluent discharges must meet the Fisheries Act requirement that any deposits to waters frequented by fishes be non-deleterious.</p> <p>Recommendation EC recommends that effluent quality at the end of the treatment system should strive to meet or exceed the Wastewater Systems Effluent Regulations SOR/2012-139 Fisheries Act Registration 2012-06-29. Specifically: - average carbonaceous biochemical oxygen demand (CBOD) due to the quantity of CBOD matter of</p>	<p>June 25: Effluent regulations can be incorporated into the O&M Plan and SNP. Can tabulate parameters and guidelines (see topic 15).</p>	

		<p>less than or equal to 25 mg/L; - average concentration of suspended solids of less than or equal to 25 mg/L; - average concentration of total residual chlorine of less than or equal to 0.02 mg/L ; - maximum concentration of un-ionized ammonia of less than 1.25 mg/L, expressed as nitrogen (N), at 15°C ± 1°C; and - non-acutely lethal effluent. Although the new Wastewater Systems Effluent Regulations do not currently apply to the North, EC recommends monitoring and sampling be aligned with the requirements of the Wastewater Systems Effluent Regulations.</p>		
5	<p>Operations and Maintenance Plan for Behchoko Wastewater Treatment Facilities</p>	<p>Comment In order to optimize treatment of effluent both in the Rae Lagoon and in the downstream wetland area, the timing of effluent release must balance the summer treatment period in the Rae Lagoon along with the active treatment period in the wetland area.</p> <p>Recommendation The Proponent is encouraged to develop an effluent release schedule that will provide optimum treatment.</p>	<p>June 25: Discharge is to be completed as per the O&M plan (late summer).</p>	
6	<p>Operations and Maintenance Plan for Behchoko</p>	<p>Comment The Proponent is encouraged to investigate options to improve the quality of final effluent by</p>	<p>June 25: Agree to signage per O&M plan. Fencing of the entire lagoons is not feasible. A gate can be used at the</p>	

	Wastewater Treatment Facilities	<p>controlling inputs into the wastewater system through diverting hazardous chemicals. EC notes that Section 4.20 Signage and 4.21 Security and Control indicate requirements and recommendations for signage and fencing at the sewage lagoon site.</p> <p>Recommendation EC recommends developing a contingency plan to address situations including, but not limited to: - Effluent does not meet release criteria at annual release period; - Effluent does not meet release criteria and lagoon is full; - Water quality monitoring indicates a leak or uncontrolled release of effluent; - Erosion of lagoon berms and/or effluent decant structure; and - Lagoon has less than the required 1 m of freeboard and the annual release period is months away EC also recommends that the signage and fencing actually be installed as per the O&M plan in order to prevent further dumping of solid waste and deceased animals into the sewage lagoon.</p>	<p>entrance to control access. Emergency situations: It is difficult to determine responses to emergency situations if the effluent is above the discharge parameters. If the effluent does not meet the criteria, simply waiting for another week when the weather is calm could reduce the effluent concentration. If the lagoon capacity is reached and discharge cannot wait, a secondary treatment unit could be brought in to reduce effluent concentrations. Additional capacity in Cell 2 could be utilized to prevent the discharge of untreated sewage, but should be used as a last resort. Cell 1's high effluent concentration would delay the discharge of Cell 2. Again, depending on the scenario of the emergency, each case should be evaluated to determine the best course of action. The above scenarios can be incorporated into the contingency plan.</p>	
7	Operations and Maintenance Plan for Behchoko Wastewater Treatment Facilities	<p>Comment EC notes there are some gaps in the SNP information.</p> <p>Recommendation All monitoring information should be recorded and retained.</p>	<p>June 25: The CGB will provide a better schedule of sample collection dates and seek assistance to ensure monthly samples are collected from Edzo WWTP and in preparing tables to help format historic results and to see trends.</p>	

8	Operations and Maintenance Plan for Behchoko Wastewater Treatment Facilities	<p>Comment EC notes that although the intention is to only release raw sewage into cell 1 there are also 2 discharge tubes set up beside cell 2.</p> <p>Recommendation EC recommends that the discharge tubes entering cell 2 not be used for depositing raw sewage.</p>	<p>June 25: Consider placing sign or constructing a blockage to prevent discharge of raw sewage into Cell 2. Removal of tubes may be an option.</p>	
9	Operations and Maintenance Plan for Behchoko Wastewater Treatment Facilities	<p>Comment EC notes that the O&M Plan indicates that floating debris such as plastic bags, insulation or other garbage should be removed as quickly as possible. It was observed that there is excessive garbage floating around the edge of the lagoon and on the berms. This garbage includes honeybags, plastic containers and deceased animals.</p> <p>Recommendation EC recommends that the garbage be removed and deposited in the SWF as soon as possible as indicated in the O&M Plan.</p>	<p>June 25: Floating debris should be removed as quickly as possible. Once ice break up occurs, a designated boat and with a fishing net or hook should be used to remove floating waste. Honeybags do not belong in the sewage lagoon, and deceased animals will affect the efficiency of the lagoon and could attract other animals.</p>	
10	Solid Waste Facility (SWF) Management Plan	<p>Comment EC notes that there is no mention of secondary containment at the SWF.</p> <p>Recommendation EC recommends the use of secondary containment, such as a lined pad and berms, for storage and transfer of substances and/or products that are potentially deleterious to fish. EC recommends monitoring on a regular basis for: -</p>	<p>June 25: It is not typical for small municipal landfills accepting only domestic waste and serving small communities to be lined. It is generally beyond the resources of the community to implement significant engineering controls. Most small landfills are designed as natural attenuation sites. The environmental monitoring program for the existing site should</p>	

		liner integrity, if applicable; - leachate containment; and - any contact water / drainage / seepage that is (or potentially could be) released to the receiving environment.	serve to determine the effectiveness of natural attenuation for the proposed addition. Surface water management and management of leachate seeps are considered to be the most important water management issue for the site, therefore proper cell development, cover placement, grading and runoff management are considered to be the primary water management protection strategies for the site.	
11	Solid Waste Facility Management Plan	<p>Comment EC notes that there is no contingency plan currently in place if SNP results indicate that the quality of water being released to the environment fails to meet the standards set out in the SNP.</p> <p>Recommendation EC recommends developing a contingency plan (including treatment measures) to be implemented if the quality of water (including contact water, leachate, and drainage/seepage water) released to the receiving environment fails to meet the standards set out in the SNP.</p>	June 25: A contingency plan can be added to the SNP.	
12	Hazardous Waste Management Plan	<p>Comment EC notes that this document does not mention the use of secondary containment.</p> <p>Recommendation EC recommends that the proponent consider the use of secondary containment for particular waste items (lined pads, berms),</p>	June 25: See response to comment 10 above.	

		including waste-streams that are prone to potentially leaking and contaminating soil and water. In addition, monitoring of the secondary containment for evidence of spills/leaks (including checking fluid levels and integrity of secondary containment as well as visually inspecting for stained soil) is very important.		
13	Surveillance Network Program (SNP)	<p>Comment Historically, decant of the sewage lagoon usually occurs over approximately a 1-2 week period between September to October.</p> <p>Recommendation EC recommends that the SNP stations are sampled as per the SNP during this (and any other) decant period.</p>	June 25: SNP will be updated to incorporate the recommendations.	
14	Surveillance Network Program	<p>Comment SNP stations at the Edzo and Rae raw water facilities are scheduled to be sampled once every 5 years. Ideally, an initial sample would have been collected from each of these sites upon initiating the SNP monitoring program. It appears that no samples have been collected from these stations to date.</p> <p>Recommendation If this is the case, EC recommends collecting a sample from these stations this year and that the results be submitted to the Mackenzie Valley Land and Water</p>	June 25: Water sampling will be completed as requested.	

		Board (MVLWB) for posting to the Public Registry and be included in the Annual Report.		
15	Surveillance Network Program	<p>Comment The SNP Plan needs to be updated.</p> <p>Recommendation EC recommends updating the SNP Plan as per the following: 1. Add table(s) that identify: - Name, description and location of each SNP station; - Parameters and detection limits; - Licence limits for each parameter; and - Planned sampling frequency. 2. Include all additions/changes to SNP station locations 3. Revise maps to include: - Additions/changes to SNP stations, descriptions of SNP stations, and Figure titles; - Identify locations of relevant infrastructure, including water / wastewater / solid waste management/treatment facilities; and - Site drainage patterns, particularly with respect to water/wastewater/solid waste facilities and surface waterbodies.</p>	June 25: SNP will be updated to incorporate the recommendations.	
16	SNP Annual Reporting	<p>Comment Annual data could be better presented.</p> <p>Recommendation EC recommends that the proponent compile annual data into summary table(s), rather than attaching laboratory reports (as has been done in past annual reports). 1.</p>	June 25: Assistance will be sought to develop a template for reporting to address all of the recommendations.	

		<p>Information in summary table(s) should include, but is not limited to: - Name, description and location of each SNP station; - Sample collection date(s); - Parameters and detection limits; - Licence limits for each parameter; - Planned sampling frequency; - Sampling results and units; and - Use of bolded text and/or other device to prominently identify any exceedances. 2. In the case of non-reporting (ie. no sample data) for a SNP site, EC recommends including the following additional information in the annual report: - Date when site was last sampled; - Planned date for future site sampling; and - Reason for non-reporting. 3. Recommend including site map(s) that clearly identify: - SNP station locations; - SNP station names and descriptions; - Relevant infrastructure, including water / wastewater / solid waste management/treatment facilities; - Surface waterbodies; - Effluent drainage path; - Site drainage patterns; and - Roads.</p>		
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GNWT - Environment and Natural Resources: Central Email GNWT

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
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20	General File	Comment (doc) ENR Comments and Recommendations Recommendation		
21	General File	Comment (doc) (Submitted after Due Date) ENR GNWT Letter to the WLWB. ENR not Intervening in Water Licence Process. Recommendation		
1	Topic 1: Site Characterization and Preliminary Landfill Design (Proposed Facility)	Comment (Submitted after Due Date) Comment(s): . The proponent has identified the physical hydrogeology of the region to be primarily permafrost however, no site specific testing has been conducted to identify the ice content at site. In addition, as the landfill will generate heat during the decomposition of waste, this may further degrade any surficial permafrost and result in the movement of contaminants through the active layer. Earlier in the report (page 8), it states that "the area is within a zone of extensive discontinuous permafrost and that potential bedrock fracture systems under the proposed SWF area is unknown." . ENR notes that the proponent has not included climate adaptation scenarios in its design as is considered best practice in arctic environments. . ENR notes that the preliminary design does not appear to be designed by an engineer that is	June 25: Climate change will likely affect the thickness of the active layer in the future. This could be a positive thing from an attenuation point of view and with respect to reducing potential future impacts to surface water. The presence of an impermeable layer beneath the waste (such as permafrost or a liner) forces water that has infiltrated into and beneath the waste to mound on the permafrost (or liner) and then to migrate beyond the waste footprint potentially discharging as seeps and into surface water features. A thicker active layer should have more attenuative capacity. The 1.5 Kg/person/day waste generation rate was referenced from Dillon (2006) as noted in Section 3.6 of the SWF report. Waste generation rates (residential and non residential) in Canada have been increasing through the years and are now approximately 1000 kg/person/year (2.7 kg/person/day),	

		<p>registered to practice in the NWT. . Page 9 - A waste generation rate of 1.5 kg/person/day is much lower than the national average. The average Canadian waste generation rate is approximately 2.7 kg/person/day.</p> <p>Recommendation Recommendation(s): 1) That the proponent will not rely on permafrost as an impermeable structure. In the absence of field data this does not provide sufficient conservatism in the design to limit contaminant movement. 2) That the proponent includes an impermeable structure and leachate collection system to allow for future adaptive management scenarios. 3) That the proponent provide forecasts for regional climate conditions and demonstrate how the landfill design will mitigate the movement of contaminants into the future as is consistent with engineering best practices. 4) That the proponent conducts a geotechnical investigation of the potential site and ensure that the facility is designed accordingly. 5) ENR requests that the proponent provide evidence that the landfill design has been deemed acceptable and stamped by a NAPEG registered professional engineer. 6) The 1.5 kg/person/day waste generation rate</p>	<p>however the residential component of waste is less than half this total (Statistics Canada, 2006). Waste coming to this landfill from the community should only be residential waste. A rate of 1.5 kg/person/day for this component of waste is considered to be appropriate. In addition, design capacity of the landfill is 9,100 m³ above the estimate based on 1.5 kg/person /day and therefore allows for a factor of safety in estimated landfilling rates.</p>	
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		should be confirmed as this will significantly change the design specification for the new landfill.		
2	Topic 2: Design Specification Community of Behchoko New Solid Waste Landfill	<p>Comment (Submitted after Due Date) Comment(s): ENR notes that the preliminary design does not appear to be designed by an engineer that is registered to practice in the NWT.</p> <p>Recommendation Recommendation(s): 1) ENR requests that the proponent provide evidence that the landfill design has been deemed acceptable and stamped by a NAPEG registered professional engineer.</p>	<p>June 25: Byron O'Connor is licenced under NAPEG (#L1670) and was involved in the preparation of the reports.</p>	
3	Topic 3: Spill Contingency Plan	<p>Comment (Submitted after Due Date) Comment(s): ENR commends the proponent for its Spill Contingency Plan (SCP). The following areas should be addressed to encompass best management practices and provided for board approval for continued operations: . ENR notes that the proponent has not provided standard operating procedures for the transfer of hazardous materials; specifically fuel and fuel distillates. . The proponents spill response is specific to fuel and fuel distillates. Remedial actions should be provided for all hazardous materials encountered in Schedule B (Appendix C) as this plan is to be used</p>	<p>June 25: SNP will be updated to incorporate the recommendations.</p>	

		<p>in an emergency event. For example, glycol will sink to the bottom of water bodies, thus requiring a separate contingency and response in the event of a spill. . Training- ENR notes that the proponent has outlined training of municipal staff through ENR hosted spill training courses. ENR does not formally offer spill response training as a program to community governments. For additional information on developing a robust training program, the community should reference the section 2.5 of the AANDC Guideline for Spill Contingency Planning. . Section 3.4 Spill Reporting Procedures- ENR notes that while the SAO and Band Manager will determine if the spill should be reported to the 24-hour spill line, ENR notes that there is no reference to when the thresholds outlined in Schedule B (Appendix C) will be referenced. . ENR notes that under off-site Resources ENRs Hazardous Substances Specialist should be added as the primary contact (867-873-7562).</p> <p>Recommendation Recommendation(s): 1) That the proponent update its SCP to be consistent with the AANDC Guideline for Spill Contingency Planning in</p>		
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		addition to GNWT Spill Contingency Planning and Reporting Regulation.		
4	Topic 4: Hazardous Waste Management Plan (HWMP)	<p>Comment (Submitted after Due Date) Comment(s): The Hazardous Waste Management Plan (HWMP) clearly states the capacity of the Community to manage hazardous waste and has identified its priorities. (See recommendation 1) ENR notes that the HWMP states that Asbestos will be accepted on condition of notice to the Senior Administrative Officer. Small amounts of Asbestos may be suitable for disposal if done in accordance with direction given by the Worker Safety and Compensation Commission (WSCC) and ENR's Guideline for the Management of Waste Asbestos (GNWT 2004). Even small amounts of Asbestos can present unacceptable levels of risks to the public, but especially to public works staff who ultimately need to bury it. (See recommendation 2) The HWMP states that vehicles buried once fluids are collected. Vehicles contain numerous pollutants in them addition to fluids such as: . Lead acid batteries; . Mercury switches; and . Refrigerants. (See recommendation 3)</p> <p>Recommendation Recommendation(s): 1) The community concentrates on fully</p>	June 25: HWMP will be updated to incorporate the recommendations.	

		<p>implementing the plan by communicating to staff as well as the Industrial, Commercial, and Institutional sector, and work towards refining the current plan as it is implemented. 2) The proponent state in the HWMP that the Senior Administrative Officer will ensure safe work procedures are in place and consistent with the guidance developed by WSCC and ENR. 3) The Community Government ensure that all vehicles are thoroughly depolluted prior to recycling or disposal.</p>		
5	Topic 5: Solid Waste Facility Management Plan	<p>Comment (Submitted after Due Date) Comment(s): . The proponent has identified the physical hydrogeology of the region to be primarily permafrost; however, no borehole logs have been presented identifying the ice content verifying regional trends. In addition, as the landfill will generate heat during the decomposition of waste, this may further degrade any surficial permafrost and result in the movement of contaminants through the active layer. . ENR notes that the proponent has not considered dust mitigation in its design. Dust has been noted in several regulatory processes (EKATI, Fortune etc.) as being a potential concern of the community. It is best practice to mitigate fugitive dust</p>	<p>June 25: Please see the response to Environment Canada comment 10 and GNWT comment 1 above. The technical merits of a groundwater monitoring program, established as part of any proposed sub-surface investigation, should be discussed during the technical review meeting. No dust impacts are anticipated due to the low volume of traffic however if dust becomes an issue an appropriate Mitigation Plan (water truck) will be put in place.</p>	

		<p>created during operation and maintenance of the facility.</p> <p>Recommendation</p> <p>Recommendation(s): 1) ENR recommends that the proponent not rely on permafrost as an impermeable structure, in the absence of field data this does not provide sufficient conservatism in the design to limit contaminant movement. 2) ENR recommends that groundwater monitoring wells be installed to monitor the groundwater regime. This will ensure that any movement of contaminants of the landfill are monitored and will allow for adaptive management to minimize impacts to the surrounding environment (if any). 3) ENR recommends that the proponent develop an Air Quality Management and Mitigation Plan to reduce fugitive dust at the site. This may be as simple as using the community water truck during periods of significant dust generation.</p>		
6	Topic 6: Closure and Reclamation Plan for Existing Site (C&R)	<p>Comment (Submitted after Due Date)</p> <p>Comment(s): There is no implementation schedule in the C&R Plan. (See recommendation 1) ENR notes that the report is not signed or stamped by a NAPEG registered professional engineer. (See recommendation 2) ENR commends</p>	<p>June 25: Closure of small landfills typically involves grading, placement of final cover and the implementation of a care and maintenance and monitoring program. The most critical element is generally the placement of suitable final cover, and closure planning should keep this in mind, ie a</p>	

		<p>the community of Behchoko for its C&R Plan. ENR notes that in future iterations of the C&R Plan that the proponent should provide greater emphasis on the following: .</p> <p>Quantifiable remedial targets or how the proponent intends on developing a remedial target, for each objective on a feature specific basis for approval by the Board. This is to identify to what level the site will be restored/reclaimed when activities are completed. ENR notes that by identifying these remedial targets early prior to the development of a final closure and reclamation plan this may allow the proponent to perform progressive reclamation earlier in the life cycle of the project and for revegetation have test programs to determine the optimal conditions. . A detailed description of the proposed closure option(s), and if required, designs, or a detailed description of any proposed study to meet the closure requirements into the future; . Details on the manner in which the closure option satisfies the global objectives stated in Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (AANDC et. al 2013), including all other relevant Federal and Territorial</p>	<p>source of suitable final cover should be identified and earmarked for use at the site sooner than later. An implementation schedule can be developed for the closure plan. A NAPEG registered engineer was involved in the development and review of the landfill closure plan and will stamp the plan. Discussions are required regarding the merits of establishing a groundwater monitoring program for the site.</p>	
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		<p>guidelines and regulations; and . Robust post closure (long term) monitoring program. Section 5 is only a brief high level conceptual program, monitoring requirements should be established early and SOPs developed to ensure consistency over time.</p> <p>Recommendation</p> <p>Recommendation(s): 1) The C&R Plan should include an implementation schedule. 2) ENR requests that the proponent provide evidence that the closure plan design has been deemed acceptable and stamped by a NAPEG registered professional engineer. 3) The proponent update future iterations of the C&R plan to have remedial targets that are quantifiable, be site feature (erosion and sedimentation protection, disturbed vegetation, road scarification, contaminated soil removal etc.) specific and provide closure option(s) on how the proponent will reclaim/restore the areas to be physically stable, chemically inert and meet the future land use objectives for the site. 4) The community should develop a robust monitoring post-closure monitoring program as described above. 5) The proponent ensure that all future versions of the C&R PLAN follow the land and water boards Guidelines for the Closure and</p>		
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		<p>Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (AANDC et. al 2013). 6) ENR notes that the community has proposed to have berms and fencing around the site to limit access; this may require additional long term maintenance. Consideration should be given to walk away solutions to reduce long term monitoring costs post closure. 7) ENR notes that the proponent has not considered a groundwater monitoring program. In light of climatic considerations and a reliance on permafrost with no site specific data the proponent should establish a groundwater monitoring program to ensure that there is not vertical movement of contaminants. ENR recommends that this be added to the SNP network.</p>		
7	Topic 7: Closure and Reclamation (Landfarm)	<p>Comment (Submitted after Due Date) Comment(s): The Behchoko landfarm has been the subject of numerous assessments and proposals since it was developed. The Closure and Reclamation Plan provides statements about the landfarm that are not consistent with the statements made in the Behchoko Landfarm Assessment provided in the same application. A few excerpts from the Closure and</p>	<p>June 25: Agreed</p>	

		<p>Reclamation Plan are outlined below.</p> <p>3.1 WASTE COLLECTION AND PLACEMENT (pg.2) Access to the site during the post-closure period will be from the east access road (as seen on Drawing 02). This will allow continued access to the Community's landfarm.</p> <p>4.4 SITE END USE (pg. 8) Following landfill closure, the majority of the site will become available as passive greenspace for wildlife habitat. The existing landfarm will remain operational, with the Community following the requirements set forth in the water license. The existing access road on the west side of the SWF will be closed and no longer used. The existing access road on the east side of the SWF will be maintained up to the landfarm to allow access to it as well as for use in site inspections. A gate will be placed at the entrance to the closed SWF and will remain locked at all times. Access to the landfarm will require the accompaniment of the Public Works Supervisor. Contact details for the Public Works Supervisor will be posted on a sign on the gate. The landfarm assessment makes several recommendations such as reconstructing the liner and further delineation of soil contamination beneath the remediation facility. ENR</p>		
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		<p>understands that these actions require a remedial action plan (RAP) for the entire landfarm. The closure and reclamation plan makes several statements with respect to the continued operation of the landfarm. It is not understood how the current landfarm can remain operational. In addition, the hazardous waste management plan states that contaminated soil will not be accepted into the facility.</p> <p>Recommendation Recommendation(s): 1) The community government develop a remedial action plan that follows the recommendations put forth in the document titled Behchoko Landfarm Assessment (WESA, September 2013) in the current application. 2) The community government develop the remedial action plan according to the guidance provided in the Environmental Guideline for Contaminated Site Remediation (GNWT 2003)</p>		
8	Topic 8: Closure and Reclamation (Landfarm Soil as Intermediate Cover)	<p>Comment (Submitted after Due Date) Comment(s): The Closure and Reclamation Plan outlines the use of soil from the landfarm that meets industrial land use criteria. 3.2 INTERIM COVER PLACEMENT AND MAINTENANCE (pg.3)</p>		

		<p>Covering the waste at regular intervals with interim cover will be necessary to maintain proper cell development and to minimize odours, litter, and vermin. It is proposed to utilize an on-site stockpile of soil as interim cover over the wastes deposited at the landfill as a part of closure operations. The Community may also elect to use soil from the landfarm that is determined to be "non-hazardous contaminated soil" for interim cover. Interim cover will have a minimum thickness of 200 mm. Currently the landfarm contains both soil that does, and does not, meet industrial land use criteria. In order to utilize soil for intermediate cover that is intermingled with contaminated soil it needs to be segregated based on most recent analytical results from test pitting (Behchoko Landfarm Assessment, WESA, Sept 2013) and re-analyzed prior to use as intermediate cover material to ensure that segregated soils are not contaminated.</p> <p>Recommendation Recommendation(s): 1) The Community Government outline how the soil will be reused as intermediate cover in a remedial action plan for the landfarm.</p>		
9	Topic 9: Landfarm Management Plan	Comment (Submitted after Due Date) Comment(s): ENR notes that the	June 25: The community is committed to rectifying the issues with the	

		<p>proponent has proposed an operational landfarm for the community. However, the current landfarm is not authorized in the licence to accept contaminated soils. The landfarm is considered a feature of the community and needs to be included in the Water Licence.</p> <p>Recommendation Recommendation(s): 1) ENR recommends that if the proponent intends to operate an active landfarm that they apply for an amendment to the Water Licence. 2) ENR recommends that in the amendment (if required) the community include further information such as: a) As-built Drawings of the facility, stamped by an engineer currently authorized in the NWT; b) Operation and Maintenance Plan for the treatment facility; and, c) Proposed monitoring locations, to ensure no off site migration of contaminants.</p>	<p>existing landfarm. The community is considering future operation of the landfarm, and agree that these recommendations should be followed if continued operation is desired.</p>	
10	Topic 10: Water Licence Conditions	<p>Comment (Submitted after Due Date) Comment(s): The WLWB may consider insertion of the following conditions within the corresponding sections of Behchoko Water Licence W2014L3-0002.</p> <p>Recommendation Recommendation(s): 1) The WLWB should consider including the following Terms and Conditions in the</p>	<p>June 25: Agreed, additional conditions and descriptions can be added to each subsection of the water license.</p>	

		<p>appropriate sections of the Water Licence for greater clarity: “Part A - Scope and Definitions: A definition for “Engineer” and “Surveillance Network Program”</p> <p>Part B - General Conditions: ? Results of any inspections of all dams, berms, dykes and control structures; ? Results of any inspections of the old landfill cell once closed and any corrective actions, as necessary; ? Summary of sludge management activities, if any ? Comparison of SNP data to Water Licence regulated limits and sampling and analysis requirements; ? The inclusion of all correspondence between the inspector and the Licensee;</p> <p>Part D “Conditions Applying to Waste Disposal ? A condition requesting the Licensee to monitor the Waste discharged from each Sewage Disposal Facilities (Rae and Edzo) for carbonaceous biological oxygen demand (CBOD). The results of this study, including a trend analysis between CBOD and BOD for each Rae and Edzo Sewage Disposal Facility should be submitted to the Board. This trend analysis will help establish trends to prepare for the future transition to</p>		
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		<p>the federal Wastewater System Effluent Regulations where CBOD is to replace BOD. “ Part H “ Conditions Applying to Contingency Planning ? A condition requesting the Licensee to review the Spill Contingency Plan and modify the plan as necessary to reflect changes in operation, technology and staffing. This condition would be coupled with the one that specifies revisions are to be submitted to the WLWB for approval.</p>		
11	Topic 11: Rae Sewage Disposal Facility Discharge	<p>Comment (Submitted after Due Date) Comment(s): Concerns were expressed from various agencies in recent meetings about Faecal Coliforms in sewage being discharged from Rae Sewage Disposal Facility. It was noted that Water Licence EQC for this parameter differed between Rae (2 X 10⁴ CFU/100 ml) and Edzo (1 X 10³ CFU/100 ml), and it was questioned if the EQC selected for Rae reflected the CCME recreational guidelines. Recommendation Recommendation(s): 1) ENR recommends the WLWB to take this opportunity to ensure the selected Water Licence EQC limits for treated effluent are still appropriate and remain protective for the recreational</p>	<p>June 25: Discharge locations are different. The Rae lagoons has additional wetland treatment from the road crossing to the Frank channel. The Rae Sewage lagoon should meet CCME requirements.</p>	

		component of the receiving water body (i.e. Frank Channel).		
12	Topic 12: Behchoko Sampling Results “ Oil & Grease	<p>Comment (Submitted after Due Date) Comment(s): The Community of Behchoko submitted sampling results with their 2011, 2012 and 2013 annual report. It was noted that although sampling for oil & grease is a requirement of the Water Licence (Part D:2 & D:3 - limit of 5 mg/L), no results were provided for this parameter. Sampling for oil & grease should be added as part of future sampling events at SNP 0041-E2 (Sewage Disposal Facilities serving Edzo) and SNP 0041-R2 (Sewage Disposal Facilities serving Rae).</p> <p>Recommendation Recommendation(s): 1) ENR recommends for future monitoring include oil & grease and that the SNP reports should include the sampling results.</p>	June 25: Agreed	
13	Topic 13: Behchoko Wastewater Treatment Facility O&M Plan “ Rae Cell 2 Berm	<p>Comment (Submitted after Due Date) Comment(s): The O&M Plan states the following: section 4.4, that "Cell 2 berms consists of engineered constructed berms, natural bedrock (to the west and the east) and natural topography (to the north)." During the construction, all organic material directly underneath the berms was</p>	June 25: Agreed, but how much detail is required? Is a simple visual inspection deemed necessary or would an annual survey of the berms be required? The annual report should have a section on the settlement of all cells for the sewage treatment of CGB.	

		<p>excavated to the native silty clay. The berms were constructed from silty clay that was excavated from the interior of cell 2. The berms should be monitored for settlement."</p> <p>Recommendation Recommendation(s): 1) ENR recommends that the annual report should include the results of settlement monitoring for Cell 2.</p>		
14	<p>Topic 14: Solid Waste Facility (SWF) – Berm Specifications at Proposed New Site</p>	<p>Comment (Submitted after Due Date) Comment(s): The proposed Management Plan for the new SWF specifies in Section 3.7 "berms will be placed around the exterior of the waste footprint of a height of 2 m." However, the "Site Design Specifications" for the new SWF states in Section 3.1.4 that the berm height will be of 1 m. The berm heights should be clearly identified and described. Further, Section 3.7 of the first document further specifies that the design of the landfill utilizes a 1 m separation between the groundwater table and the base of the waste. This could indicate that the local groundwater is susceptible to contamination due to its close proximity to waste from the new SWF cell should the bottom layer of the SWF be compromised over the years.</p> <p>Recommendation</p>	<p>June 25: The berm height will be 2 metres. The establishment of a groundwater characterization and monitoring program should be discussed during the upcoming technical session.</p>	

		<p>Recommendation(s): 1) To monitor the performance of the low permeability (i.e. clay or silt layer) constructed at the base of the new SWF, ENR recommends the establishment of groundwater monitoring wells around the new SWF cell. The wells should be included as part of the SNP program.</p>		
15	<p>Topic 15: SWF “ Alteration and Trenching at Proposed New Site</p>	<p>Comment (Submitted after Due Date) Comment(s): Section 3 of Behchoko Landfarm Remediation 2011 describes that the landfarm site was altered by third parties during the course of the landfarm's operations and that the landfarm effectiveness was also negatively affected by non-appropriate maintenance of the facility. This section specifies that it was observed in 2009 that the enclosed area inside the berms was filled with various unknown contaminated materials; that standing water in this same area was almost cresting over the berms and that the landfarm was unable to contain all of the new material. The Proposed Management Plan for the new SWF also specifies (Section 3.7), that the height of the groundwater table as well as permafrost/bedrock will prevent any excavation of trenches for disposal of waste at the new SWF. Recommendation Recommendation(s): 1) ENR</p>	<p>June 25: Any modifications to design would be an amendment to the Water License.</p>	

		recommends that the Water Licence should include a provision to prohibit unauthorized maintenance and or the excavation of trenches at all waste disposal sites.		
16	Topic 16: SWF “ Proposed and Existing SNP Monitoring Stations	<p>Comment (Submitted after Due Date) Comment(s): Documents provided with this application specify the intention of adding 3 new SNP stations to monitor runoff from the new SWF (see figure "Proposed New SNP Locations" attached to the Water Licence application). It would appear that the 2 SNP locations are located in or near streams that are exiting a pond/lake which is in proximity of the new SWF site. ENR does not believe that these sites would provide an appropriate representation of potential seepage quality from the new SWF. The appropriate location would be upstream of the pond/lake itself as SWF runoff would first report to the pond/ lake. ENR recommends these locations to be further assessed and determined in consultation with the Water Inspector. Furthermore, the SWF C&R plan submitted specifies (Section 5.2), that the existing SNP station (0041-R8) is described as collecting runoff from the existing SWF, and that "this SNP location is considered to be carried forward in the</p>	June 25: SNP will be updated to incorporate the recommendations.	

		<p>monitoring program for the proposed new SWF." ENR is concerned with the use of that SNP site to monitor both existing runoff from the old SWF and runoff from the new SWF. If exceedances were detected, it would be difficult to identify which SWF is the cause. As such, if both SWF runoff are indeed feeding into SNP 0041-R8, ENR recommends that 0041-R8 be replaced, if possible, by a location where only runoff from the old SWF is being monitored.</p> <p>Recommendation Recommendation(s): 1) ENR recommends that the SNP stations should be appropriately located to monitor runoff from the new SWF prior to reaching any waters outside the facility. 2) ENR recommends, if runoff from both SWFs are feeding into SNP 0041-R8, that 0041-R8 be replaced by a location where only runoff from the old SWF is being monitored.</p>		
17	Topic 17: Landfarm - Water Licence Conditions	<p>Comment (Submitted after Due Date) Comment(s): The "Behchoko Land farm Remediation 2011" document was provided as part of this application. Section 2 specifies that AEL was contracted to build a landfarm at the Behchoko landfill in the fall of 2004. The landfarm was</p>	June 25: Agreed	

		<p>then said to have reached the end of its life-cycle and capacity and as a result, had been closed down and barriers had been erected for a no entry zone. The new landfill site was then proposed and approved at a lot adjacent to the old landfill site. In a September 2013 report, WESA (contracted to assess the waste facilities) stated that the landfarm was not used as intended between 2004 and 2009. Large quantities of PHC impacted material, soils and water, waste oil and other petroleum products, drums and bulk tanks were disposed to the landfarm by third parties. As such, berms were modified during that period to increase the landfarm capacity. In a site visit conducted by WESA, in August 2013, they observed crushed 205 liters drums and a pile of plastic barrels within the landfarm. Additionally, old bulk tanks were piled in an area south of the landfarm. Soil samples taken during this visit (see pits location figure 1) confirmed levels that exceeded guidelines at test pits LFTP4, LFTP5 and LFTP6 for one or more of the following: PCH F1, F2, F3. Further, the landfarm specific information only describes remediation of hydrocarbons. No documents or sampling results appear to have been provided on the</p>		
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		<p>potential metal-impact of the soil that are currently within the landfarm. While bioremediation is successful with hydrocarbon-impacted soils, the metal content of the soils remain unknown and would be important to determine prior to the ultimate reuse of the soils. Finally, ENR notes an amendment to this Water Licence was initiated in 2011 by the WLWB to help ensure that effluent discharged and soil removed from the landfarm during the remediation of the site did not negatively impact the surrounding environment.</p> <p>Recommendation Recommendation(s): 1) ENR recommends the renewed Water Licence maintain specific conditions related to the landfarm and its remediation, as well as specific treatment criteria for soils and seepage water from the facility. 2) ENR recommends that the renewed Water Licence include a requirement for a revised closure plan for the landfarm which is to be for Board approval.</p>		
18	Topic 18: Landfarm “Effluent Quality Criteria for Effluent Discharge	<p>Comment (Submitted after Due Date) Comment(s): Following the amendment review process initiated by the WLWB in 2011, effluent quality criteria and association conditions were inserted in the Water Licence.</p>	June 25: Agreed	

		<p>Recommendation Recommendation(s): 1) ENR recommends that the EQC for landfarm seepage should be reviewed to ensure they are consistent with other EQCs at landfarms authorized by the MVLWB 2) ENR recommends that effluent sampling results and GPS coordinates of disposal location(s) for treated landfarm effluent as per no 19 b) and c) be reported in Behchoko Annual Report.</p>		
19	Topic 19: Spill Contingency Plan	<p>Comment (Submitted after Due Date) Comment(s): The new SWF and the problems identified with the landfarm would indicate that an update to the Spill Contingency Plan is required. Recommendation Recommendation(s): 1) ENR recommends that an updated Spill Contingency Plan be required to address the new SWF and any other waste management Facilities. This update should include any new contact persons/agencies.</p>	<p>June 25: Spill Contingency Plan can be up-dated for the SWF.</p>	
GNWT - Environment and Natural Resources: Nahum Lee				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	Spill Contingency Plan	<p>Comment Contact for GNWT ENR North Slave Regional Inspector is absent. Contacts page makes reference to AANDC. Contacts page</p>	<p>June 25: Changes can be made.</p>	

		<p>makes reference to GNWT South Mackenzie District.</p> <p>Recommendation Proper contact information is 867-873-7443. References to AANDC can be removed. Reference to GNWT South Mackenzie District can be removed.</p>		
2	Licence Conditions	<p>Comment Traditionally, Municipal Licences require SNP results to be reported annually regardless of whether or not there are exceedences identified through sampling making it difficult to mitigate potential issues with treatment as they occur.</p> <p>Recommendation The Inspector respectfully recommends that, moving forward, licences contain a condition that requires any exceedence of licence parameters to be reported to the Inspector immediately. This will make responding to the exceedence and potential problem with treatment systems more effective.</p>	<p>June 25: Agreed. Reporting procedures to be implemented.</p>	



Environmental Protection Operations Directorate (EPOD)
Prairie & Northern Region (PNR)
5019 52nd Street, 4th Floor
P.O. Box 2310
Yellowknife, NT X1A 2P7

June 4, 2014

EC File: 5200 000 006/003
WLWB File: W2014L3-0002

Ryan Fequet
Regulatory Manager
Wek'èezhii Land and Water Board
#1-4905 48th St.
Yellowknife, NT
X1A 3S3

Via online submission

Attention: Ryan Fequet

RE: W2014L3-0002 (Type A Water Licence Application – Behchoko Municipal Water Licence – Tlicho Community Government of Behchoko)

Environment Canada (EC) has reviewed the information submitted to the Wek'èezhii Land and Water Board (WLWB) regarding the above-mentioned project proposal and is submitting comments on mitigation measures as well as other matters of importance to the project proposal via the online review system as requested by the WLWB. EC's specialist advice is provided pursuant to the *Canadian Environmental Protection Act 1999*, the pollution prevention provisions of the *Fisheries Act*, the *Migratory Birds Convention Act*, and the *Species at Risk Act*.

Should you require further information, please do not hesitate to contact me at (867) 669-4707 or Bradley.Summerfield@ec.gc.ca.

Sincerely,

Bradley Summerfield
Environmental Assessment Coordinator

Attachment(s) – (EC comments Excel Sheet)

cc: Loretta Ransom, Senior Environmental Assessment Coordinator, PNR-EPOD
Carey Ogilvie, Head, Environmental Assessment North (NT and NU), PNR-EPOD

June 5, 2014

Ryan Fequet
Regulatory Specialist
Wekeezhii Land and Water Board
#1-4905 48th Street
Yellowknife, NT
X1A 3S3

Dear Mr. Fequet,

Re: **Community of Behchoko
Type A Water Licence Application – W2014L3-0002
Municipal Water Licence Application
Request for Review and Comments**

The Department of Environment and Natural Resources, Government of the Northwest Territories (GNWT), has reviewed the application at reference based on its mandated responsibilities under the *Environmental Protection Act*, the *Forest Management Act*, the *Waters Act*, the *Forest Protection Act* and the *Wildlife Act* and has the following comments and recommendations for the consideration of the Board.

Topic 1: Site Characterization and Preliminary Landfill Design (Proposed Facility)

Comment(s):

- The proponent has identified the physical hydrogeology of the region to be primarily permafrost however, no site specific testing has been conducted to identify the ice content at site. In addition, as the landfill will generate heat during the decomposition of waste, this may further degrade any surficial permafrost and result in the movement of contaminants through the active layer. Earlier in the report (page 8), it states that “the area is within a zone of extensive discontinuous permafrost and that potential bedrock fracture systems under the proposed SWF area is unknown.”
- ENR notes that the proponent has not included climate adaptation scenarios in its design as is considered best practice in arctic environments.
- ENR notes that the preliminary design does not appear to be designed by an engineer that is registered to practice in the NWT.

- Page 9 – A waste generation rate of 1.5 kg/person/day is much lower than the national average. The average Canadian waste generation rate is approximately 2.7 kg/person/day.

Recommendation(s):

- 1) That the proponent will not rely on permafrost as an impermeable structure. In the absence of field data this does not provide sufficient conservatism in the design to limit contaminant movement.
- 2) That the proponent includes an impermeable structure and leachate collection system to allow for future adaptive management scenarios.
- 3) That the proponent provide forecasts for regional climate conditions and demonstrate how the landfill design will mitigate the movement of contaminants into the future as is consistent with engineering best practices.
- 4) That the proponent conducts a geotechnical investigation of the potential site and ensure that the facility is designed accordingly.
- 5) ENR requests that the proponent provide evidence that the landfill design has been deemed acceptable and stamped by a NAPEG registered professional engineer.
- 6) The 1.5 kg/person/day waste generation rate should be confirmed as this will significantly change the design specification for the new landfill.

Topic 2: Design Specification Community of Behchoko New Solid Waste Landfill

Comment(s):

ENR notes that the preliminary design does not appear to be designed by an engineer that is registered to practice in the NWT.

Recommendation(s):

- 1) ENR requests that the proponent provide evidence that the landfill design has been deemed acceptable and stamped by a NAPEG registered professional engineer.

Topic 3: Spill Contingency Plan

Comment(s):

ENR commends the proponent for its Spill Contingency Plan (SCP). The following areas should be addressed to encompass best management practices and provided for board approval for continued operations:

- ENR notes that the proponent has not provided standard operating procedures for the transfer of hazardous materials; specifically fuel and fuel distillates.
- The proponents spill response is specific to fuel and fuel distillates. Remedial actions should be provided for all hazardous materials encountered in Schedule B (Appendix C) as this plan is to be used in an emergency event. For example, glycol will sink to the bottom of water bodies, thus requiring a separate contingency and response in the event of a spill.
- Training- ENR notes that the proponent has outlined training of municipal staff through ENR hosted spill training courses. ENR does not formally offer spill response training as a program to community governments. For additional information on developing a robust training program, the community should reference the section 2.5 of the [AANDC Guideline for Spill Contingency Planning](#).
- Section 3.4 Spill Reporting Procedures- ENR notes that while the SAO and Band Manager will determine if the spill should be reported to the 24-hour spill line, ENR notes that there is no reference to when the thresholds outlined in Schedule B (Appendix C) will be referenced.

ENR notes that under off-site Resources ENRs Hazardous Substances Specialist should be added as the primary contact (867-873-7562). **Recommendation(s):**

- 1) That the proponent update its SCP to be consistent with the *AANDC Guideline for Spill Contingency Planning* in addition to *GNWT Spill Contingency Planning and Reporting Regulation*.

Topic 4: Hazardous Waste Management Plan (HWMP)

Comment(s):

The Hazardous Waste Management Plan (HWMP) clearly states the capacity of the Community to manage hazardous waste and has identified its priorities. (See recommendation 1)

ENR notes that the HWMP states that Asbestos will be accepted on condition of notice to the Senior Administrative Officer. Small amounts of Asbestos may be suitable for disposal if done in accordance with direction given by the Worker Safety and Compensation Commission (WSCC) and ENR's [Guideline for the Management of Waste Asbestos](#) (GNWT 2004). Even small amounts of Asbestos can present unacceptable levels of risks to the public, but especially to public works staff who ultimately need to bury it. (See recommendation 2)

The HWMP states that vehicles buried once fluids are collected. Vehicles contain numerous pollutants in them addition to fluids such as:

- Lead acid batteries;
- Mercury switches; and
- Refrigerants. (See recommendation 3)

Recommendation(s):

- 1) The community concentrates on fully implementing the plan by communicating to staff as well as the Industrial, Commercial, and Institutional sector, and work towards refining the current plan as it is implemented.
- 2) The proponent state in the HWMP that the Senior Administrative Officer will ensure safe work procedures are in place and consistent with the guidance developed by WSCC and ENR.
- 3) The Community Government ensure that all vehicles are thoroughly depolluted prior to recycling or disposal.

Topic 5: Solid Waste Facility Management Plan

Comment(s):

- The proponent has identified the physical hydrogeology of the region to be primarily permafrost; however, no borehole logs have been presented identifying the ice content verifying regional trends. In addition, as the landfill will generate heat during the decomposition of waste, this may further degrade any surficial permafrost and result in the movement of contaminants through the active layer.
- ENR notes that the proponent has not considered dust mitigation in its design. Dust has been noted in several regulatory processes (EKATI, Fortune etc.) as being a potential concern of the community. It is best practice to mitigate fugitive dust created during operation and maintenance of the facility.

Recommendation(s):

- 1) ENR recommends that the proponent not rely on permafrost as an impermeable structure, in the absence of field data this does not provide sufficient conservatism in the design to limit contaminant movement.
- 2) ENR recommends that groundwater monitoring wells be installed to monitor the groundwater regime. This will ensure that any movement of contaminants of the landfill are monitored and will allow for adaptive management to minimize impacts to the surrounding environment (if any).
- 3) ENR recommends that the proponent develop an Air Quality Management and Mitigation Plan to reduce fugitive dust at the site. This may be as simple as using the community water truck during periods of significant dust generation.

Topic 6: Closure and Reclamation Plan for Existing Site (C&R)**Comment(s):**

There is no implementation schedule in the C&R Plan. (See recommendation 1)

ENR notes that the report is not signed or stamped by a NAPEG registered professional engineer. (See recommendation 2)

ENR commends the community of Behchoko for its C&R Plan. ENR notes that in future iterations of the C&R Plan that the proponent should provide greater emphasis on the following:

- Quantifiable remedial targets or how the proponent intends on developing a remedial target, for each objective on a feature specific basis for approval by the Board. This is to identify to what level the site will be restored/reclaimed when activities are completed. ENR notes that by identifying these remedial targets early prior to the development of a final closure and reclamation plan this may allow the proponent to perform progressive reclamation earlier in the life cycle of the project and for revegetation have test programs to determine the optimal conditions.
- A detailed description of the proposed closure option(s), and if required, designs, or a detailed description of any proposed study to meet the closure requirements into the future;
- Details on the manner in which the closure option satisfies the global objectives stated in *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories* (AANDC et. al 2013), including all other relevant Federal and Territorial guidelines and regulations; and

- Robust post closure (long term) monitoring program. Section 5 is only a brief high level conceptual program, monitoring requirements should be established early and SOPs developed to ensure consistency over time.

Recommendation(s):

- 1) The C&R Plan should include an implementation schedule.
- 2) ENR requests that the proponent provide evidence that the closure plan design has been deemed acceptable and stamped by a NAPEG registered professional engineer.
- 3) The proponent update future iterations of the C&R plan to have remedial targets that are quantifiable, be site feature (erosion and sedimentation protection, disturbed vegetation, road scarification, contaminated soil removal etc.) specific and provide closure option(s) on how the proponent will reclaim/restore the areas to be physically stable, chemically inert and meet the future land use objectives for the site.
- 4) The community should develop a robust monitoring post-closure monitoring program as described above.
- 5) The proponent ensure that all future versions of the C&R PLAN follow the land and water boards Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (AANDC et. al 2013).
- 6) ENR notes that the community has proposed to have berms and fencing around the site to limit access; this may require additional long term maintenance. Consideration should be given to walk away solutions to reduce long term monitoring costs post closure.
- 7) ENR notes that the proponent has not considered a groundwater monitoring program. In light of climatic considerations and a reliance on permafrost with no site specific data the proponent should establish a groundwater monitoring program to ensure that there is not vertical movement of contaminants. ENR recommends that this be added to the SNP network.

Topic 7: Closure and Reclamation (Landfarm)

Comment(s):

The Behchoko landfarm has been the subject of numerous assessments and proposals since it was developed. The *Closure and Reclamation Plan* provides statements about the landfarm that are not consistent with the statements made in the *Behchoko Landfarm Assessment* provided in the same application. A few excerpts from the *Closure and Reclamation Plan* are outlined below.

3.1 WASTE COLLECTION AND PLACEMENT (pg.2)

Access to the site during the post-closure period will be from the east access road (as seen on Drawing 02). This will allow continued access to the Community's landfarm.

4.4 SITE END USE (pg. 8)

Following landfill closure, the majority of the site will become available as passive greenspace for wildlife habitat. The existing landfarm will remain operational, with the Community following the requirements set forth in the water license. The existing access road on the west side of the SWF will be closed and no longer used. The existing access road on the east side of the SWF will be maintained up to the landfarm to allow access to it as well as for use in site inspections. A gate will be placed at the entrance to the closed SWF and will remain locked at all times. Access to the landfarm will require the accompaniment of the Public Works Supervisor. Contact details for the Public Works Supervisor will be posted on a sign on the gate.

The landfarm assessment makes several recommendations such as reconstructing the liner and further delineation of soil contamination beneath the remediation facility. ENR understands that these actions require a remedial action plan (RAP) for the entire landfarm. The closure and reclamation plan makes several statements with respect to the continued operation of the landfarm. It is not understood how the current landfarm can remain operational. In addition, the hazardous waste management plan states that contaminated soil will not be accepted into the facility.

Recommendation(s):

- 1) The community government develop a remedial action plan that follows the recommendations put forth in the document titled Behchoko Landfarm Assessment (WESA, September 2013) in the current application.
- 2) The community government develop the remedial action plan according to the guidance provided in the [Environmental Guideline for Contaminated Site Remediation](#) (GNWT 2003)

Topic 8: Closure and Reclamation (Landfarm Soil as Intermediate Cover)

Comment(s):

The Closure and Reclamation Plan outlines the use of soil from the landfarm that meets industrial land use criteria.

3.2 INTERIM COVER PLACEMENT AND MAINTENANCE (pg.3)

Covering the waste at regular intervals with interim cover will be necessary to maintain proper cell development and to minimize odours, litter, and vermin. It is proposed to utilize an on-site stockpile of soil as interim cover over the wastes deposited at the landfill as a part of closure operations. The Community may also elect to use soil from the landfarm that is determined to be “non-hazardous contaminated soil” for interim cover. Interim cover will have a minimum thickness of 200 mm.

Currently the landfarm contains both soil that does, and does not, meet industrial land use criteria. In order to utilize soil for intermediate cover that is intermingled with contaminated soil it needs to be segregated based on most recent analytical results from test pitting (Behchoko Landfarm Assessment, WESA, Sept 2013) and re-analyzed prior to use as intermediate cover material to ensure that segregated soils are not contaminated.

Recommendation(s):

- 1) The Community Government outline how the soil will be reused as intermediate cover in a remedial action plan for the landfarm.

Topic 9: Landfarm Management Plan

Comment(s):

ENR notes that the proponent has proposed an operational landfarm for the community. However, the current landfarm is not authorized in the licence to accept contaminated soils. The landfarm is considered a feature of the community and needs to be included in the Water Licence.

Recommendation(s):

- 1) ENR recommends that if the proponent intends to operate an active landfarm that they apply for an amendment to the Water Licence.
- 2) ENR recommends that in the amendment (if required) the community include further information such as:
 - a) As-built Drawings of the facility, stamped by an engineer currently authorized in the NWT;
 - b) Operation and Maintenance Plan for the treatment facility; and,
 - c) Proposed monitoring locations, to ensure no off site migration of contaminants.

Topic 10: Water Licence Conditions

Comment(s):

The WLWB may consider insertion of the following conditions within the corresponding sections of Behchoko Water Licence W2014L3-0002.

Recommendation(s):

1) The WLWB should consider including the following Terms and Conditions in the appropriate sections of the Water Licence for greater clarity:

- Part A - Scope and Definitions: A definition for “Engineer” and “Surveillance Network Program”
- Part B - General Conditions:
 - Results of any inspections of all dams, berms, dykes and control structures;
 - Results of any inspections of the old landfill cell once closed and any corrective actions, as necessary;
 - Summary of sludge management activities, if any
 - Comparison of SNP data to Water Licence regulated limits and sampling and analysis requirements;
 - The inclusion of all correspondence between the inspector and the Licensee;
- Part D – Conditions Applying to Waste Disposal
 - A condition requesting the Licensee to monitor the Waste discharged from each Sewage Disposal Facilities (Rae and Edzo) for carbonaceous biological oxygen demand (CBOD). The results of this study, including a trend analysis between CBOD and BOD for each Rae and Edzo Sewage Disposal Facility should be submitted to the Board. This trend analysis will help establish trends to prepare for the future transition to the federal Wastewater System Effluent Regulations where CBOD is to replace BOD.
- Part H – Conditions Applying to Contingency Planning
 - A condition requesting the Licensee to review the Spill Contingency Plan and modify the plan as necessary to reflect changes in operation, technology and staffing. This condition would be coupled with the one that specifies revisions are to be submitted to the WLWB for approval.

Topic 11: Rae Sewage Disposal Facility Discharge

Comment(s):

Concerns were expressed from various agencies in recent meetings about Faecal Coliforms in sewage being discharged from Rae Sewage Disposal Facility. It was noted that Water Licence EQC for this parameter differed between Rae (2×10^4 CFU/100 ml) and Edzo (1×10^3 CFU/100 ml), and it was questioned if the EQC selected for Rae reflected the CCME recreational guidelines.

Recommendation(s):

- 1) ENR recommends the WLWB to take this opportunity to ensure the selected Water Licence EQC limits for treated effluent are still appropriate and remain protective for the recreational component of the receiving water body (i.e. Frank Channel).

Topic 12: Behchoko Sampling Results – Oil & Grease

Comment(s):

The Community of Behchoko submitted sampling results with their 2011, 2012 and 2013 annual report. It was noted that although sampling for oil & grease is a requirement of the Water Licence (Part D:2 & D:3 - limit of 5 mg/L), no results were provided for this parameter. Sampling for oil & grease should be added as part of future sampling events at SNP 0041-E2 (Sewage Disposal Facilities serving Edzo) and SNP 0041-R2 (Sewage Disposal Facilities serving Rae).

Recommendation(s):

- 1) ENR recommends for future monitoring include oil & grease and that the SNP reports should include the sampling results.

Topic 13: Behchoko Wastewater Treatment Facility O&M Plan – Rae Cell 2 Berm

Comment(s):

The O&M Plan states the following: section 4.4, that “Cell 2 berms consists of engineered constructed berms, natural bedrock (to the west and the east) and natural topography (to the north).” During the construction, all organic material directly underneath the berms was excavated to the native silty clay. The berms were constructed from silty clay that was excavated from the interior of cell 2. The berms should be monitored for settlement.”

Recommendation(s):

- 1) ENR recommends that the annual report should include the results of settlement monitoring for Cell 2.

Topic 14: Solid Waste Facility (SWF) – Berm Specifications at Proposed New Site

Comment(s):

The proposed Management Plan for the new SWF specifies in Section 3.7 “berms will be placed around the exterior of the waste footprint of a height of 2 m.” However, the “Site Design Specifications” for the new SWF states in Section 3.1.4 that the berm height will be of 1 m. The berm heights should be clearly identified and described.

Further, Section 3.7 of the first document further specifies that the design of the landfill utilizes a 1 m separation between the groundwater table and the base of the waste. This could indicate that the local groundwater is susceptible to contamination due to its close proximity to waste from the new SWF cell should the bottom layer of the SWF be compromised over the years.

Recommendation(s):

- 1) To monitor the performance of the low permeability (i.e. clay or silt layer) constructed at the base of the new SWF, ENR recommends the establishment of groundwater monitoring wells around the new SWF cell. The wells should be included as part of the SNP program.

Topic 15: SWF – Alteration and Trenching at Proposed New Site

Comment(s):

Section 3 of Behchoko Landfarm Remediation 2011 describes that the landfarm site was altered by third parties during the course of the landfarm’s operations and that the landfarm effectiveness was also negatively affected by non-appropriate maintenance of the facility. This section specifies that it was observed in 2009 that the enclosed area inside the berms was filled with various unknown contaminated materials; that standing water in this same area was almost cresting over the berms and that the landfarm was unable to contain all of the new material.

The Proposed Management Plan for the new SWF also specifies (Section 3.7), that the height of the groundwater table as well as permafrost/bedrock will prevent any excavation of trenches for disposal of waste at the new SWF.

Recommendation(s):

- 1) ENR recommends that the Water Licence should include a provision to prohibit unauthorized maintenance and or the excavation of trenches at all waste disposal sites.

Topic 16: SWF – Proposed and Existing SNP Monitoring Stations

Comment(s):

Documents provided with this application specify the intention of adding 3 new SNP stations to monitor runoff from the new SWF (see figure “Proposed New SNP Locations” attached to the Water Licence application). It would appear that the 2 SNP locations are located in or near streams that are exiting a pond/lake which is in proximity of the new SWF site. ENR does not believe that these sites would provide an appropriate representation of potential seepage quality from the new SWF. The appropriate location would be upstream of the pond/lake itself as SWF runoff would first report to the pond/ lake. ENR recommends these locations to be further assessed and determined in consultation with the Water Inspector.

Furthermore, the SWF C&R plan submitted specifies (Section 5.2), that the existing SNP station (0041-R8) is described as collecting runoff from the existing SWF, and that “this SNP location is considered to be carried forward in the monitoring program for the proposed new SWF.” ENR is concerned with the use of that SNP site to monitor both existing runoff from the old SWF and runoff from the new SWF. If exceedances were detected, it would be difficult to identify which SWF is the cause. As such, if both SWF runoff are indeed feeding into SNP 0041-R8, ENR recommends that 0041-R8 be replaced, if possible, by a location where only runoff from the old SWF is being monitored.

Recommendation(s):

- 1) ENR recommends that the SNP stations should be appropriately located to monitor runoff from the new SWF prior to reaching any waters outside the facility.
- 2) ENR recommends, if runoff from both SWFs are feeding into SNP 0041-R8, that 0041-R8 be replaced by a location where only runoff from the old SWF is being monitored.

Topic 17: Landfarm - Water Licence Conditions

Comment(s):

The “Behchoko Land farm Remediation 2011” document was provided as part of this application. Section 2 specifies that AEL was contracted to build a landfarm at the Behchoko landfill in the fall of 2004. The landfarm was then said to have reached the end of its life-cycle and capacity and as a result, had been closed down and barriers

had been erected for a no entry zone. The new landfill site was then proposed and approved at a lot adjacent to the old landfill site.

In a September 2013 report, WESA (contracted to assess the waste facilities) stated that the landfarm was not used as intended between 2004 and 2009. Large quantities of PHC impacted material, soils and water, waste oil and other petroleum products, drums and bulk tanks were disposed to the landfarm by third parties. As such, berms were modified during that period to increase the landfarm capacity.

In a site visit conducted by WESA, in August 2013, they observed crushed 205 liters drums and a pile of plastic barrels within the landfarm. Additionally, old bulk tanks were piled in an area south of the landfarm. Soil samples taken during this visit (see pits location figure 1) confirmed levels that exceeded guidelines at test pits LFTP4, LFTP5 and LFTP6 for one or more of the following: PCH F1, F2, F3.

Further, the landfarm specific information only describes remediation of hydrocarbons. No documents or sampling results appear to have been provided on the potential metal-impact of the soil that are currently within the landfarm. While bioremediation is successful with hydrocarbon-impacted soils, the metal content of the soils remain unknown and would be important to determine prior to the ultimate reuse of the soils.

Finally, ENR notes an amendment to this Water Licence was initiated in 2011 by the WLWB to help ensure that effluent discharged and soil removed from the landfarm during the remediation of the site did not negatively impact the surrounding environment.

Recommendation(s):

- 1) ENR recommends the renewed Water Licence maintain specific conditions related to the landfarm and its remediation, as well as specific treatment criteria for soils and seepage water from the facility.
- 2) ENR recommends that the renewed Water Licence include a requirement for a revised closure plan for the landfarm which is to be for Board approval.

Topic 18: Landfarm – Effluent Quality Criteria for Effluent Discharge

Comment(s):

Following the amendment review process initiated by the WLWB in 2011, effluent quality criteria and association conditions were inserted in the Water Licence.

Recommendation(s):

- 1) ENR recommends that the EQC for landfarm seepage should be reviewed to ensure they are consistent with other EQCs at landfarms authorized by the MVLWB
- 2) ENR recommends that effluent sampling results and GPS coordinates of disposal location(s) for treated landfarm effluent as per no 19 b) and c) be reported in Behchoko Annual Report.

Topic 19: Spill Contingency Plan

Comment(s):

The new SWF and the problems identified with the landfarm would indicate that an update to the Spill Contingency Plan is required.

Recommendation(s):

- 1) ENR recommends that an updated Spill Contingency Plan be required to address the new SWF and any other waste management Facilities. This update should include any new contact persons/agencies.

Comments and recommendations were provided by ENR technical experts in the Environment Division, Water Resources Section and the North Slave Region and were coordinated and collated by the Environmental Impact Assessment, Conservation, Assessment and Monitoring Division.

If you have any questions or concerns, please do not hesitate to contact me at 920-6118 or patrick_clancy@gov.nt.ca

Sincerely,



Patrick Clancy
Environmental Regulatory Analyst
Environmental Impact Assessment
Conservation, Assessment and Monitoring Division
Department of Environment and Natural Resources
Government of the Northwest Territories

July 31, 2014

Sarah Elsasser
Regulatory Specialist
Wekeezhii Land and Water Board
#1-4905 48th Street
Yellowknife, NT
X1A 3S3

Dear Ms. Elsasser,

**Re: Community of Behchoko,
 Type A Water Licence Application - W2014L3-0002
 ENR Written Intervention**

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories would like to inform the Wekeezhii Land and Water Board that it will not be submitting a written intervention for the Community of Behchoko's Type A Water Licence.

ENR feels that the comments provided during the application review, and the subsequent discussions at the technical sessions were sufficient to address ENRs concerns.

ENR notes that the community did agree to the following items during the technical session that should be incorporated into the licence by the WLWB including:

- A one-time wetland study to determine the efficiency, size and capacity of the wetland discharge area in Behchoko;
- Sludge Characterization generated from the community Water Treatment Plant; and
- An updated SNP network to identify additional surface water SNP locations.

ENR is available to participate in all future milestones for this application which could include the Public Hearing, if it is determined that a hearing is required.

If you have any questions or concerns, please do not hesitate to contact Patrick Clancy at 920-6118 or patrick_clancy@gov.nt.ca

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Clancy', written in a cursive style.

Patrick Clancy
Environmental Regulatory Analyst
Environmental Impact Assessment Section
Conservation, Assessment and Monitoring Division
Department of Environment and Natural Resources
Government of the Northwest Territories