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via Email

January 8, 2010

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0E-1J0

Dear Ms. Beaulieu:

Re: Abandonment and Reclamation Plan, Fuel Tank Farm, Former Nanisivik Mine Site

As requested in your letter of December 3, 2010 we have reviewed the comments provided by all parties on the October 15, 2009 submission of the above captioned proposal, and have incorporated these in the accompanying report, and/or responded in the attached documentation.

We trust this additional information will address the requests for clarification on the original report. As always, if the NWB or any of the participating parties have any questions regarding the project, I would be pleased to respond to these directly and can be reached at 416-363-4798 (ext 271) or at bcarreau@breakwater.ca.

Yours sincerely,



Robert Carreau
Vice President, CanZinco Ltd.

The following table summarizes comments made by the various reviewers and the response to same.

Regulator	Comment or Concern	Response/Change Made in Document
GN	<i>"..., the DOE recommends that the proponent should demonstrate that no contamination has migrated within or outside the tank Farm area.</i>	The following statement has been added to the report: <i>"Previous assessment and remediation programs in the tank farm area will be reviewed. Any potentially impacted area of concern not yet addressed by the previous assessments will be included within the proposed decommissioning assessment program".</i>
GN	<i>"The proponent is referred to the use of the attached DOE's Environmental Guideline for Contaminated Site Remediation (updated March 2009)"</i>	The document has been reviewed and will be referred to in the assessment and remediation of the site.
EC	<i>Background soil quality samples are proposed to be collected from the area occupied by the soil remediation facility. EC recommends that a different area be sampled in addition to the proposed area, since the proposed treatment area is located just off of the access road and may potentially have some level of contamination from previous vehicle use.</i>	It is proposed that the lay down area southeast of the existing tank farm be used for the treatment pad and that sampling be done prior to its development to confirm no impacts above the criteria exist. Minor impacts due to vehicle traffic do not present a significant concern to the development of operation of the treatment facility.
EC	<i>The proposed landfarm is going to be approximately 130 m from the Twin Lakes Creek and 320 m from Strathcona Sound. However, the Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils (2006) recommends for landfarm facilities to be a minimum of 500 m from permanent surface water bodies.</i>	The following statement was added to Section 6.1 of the report: <i>"It is our opinion that this location represents the most practical location for the treatment pad. Engineering controls (i.e., drainage ditches, an underflow dam, retention/collection pond, LLPDE liners and effluent treatment system) will protect adjacent water bodies from impacts. The tank farm has been in place for over 30 years and through monitoring carried out by SRK Consulting and AECOM, no impacts arising from fuel handling or minor spills have ever migrated to Twin Lakes Creek or Strathcona Sound. This indicates that migration times for these fuel products between the tank farm and the nearby aquatic receptors are long; greater than 30 years. It is therefore unlikely that handling contaminated soil in engineered containment cells at the proposed location could, over the short term of the treatment process, result in impacts to these aquatic receptors."</i>

EC	<i>Stantec describes a biotreatability study of the soil that will be conducted to determine microorganism and nutrient levels in order to develop optimal nutrient and moisture conditions for the soil, but the desired nutrient content is not mentioned. The typical and recommended optimal nutrient ratio of carbon: nitrogen: phosphorus ranges between 100:10:1 to 100:10:0.5. While moisture content should be between 40 and 85% of field capacity. Additional guidance on optimal soil conditions for biopiles and land farms can be found in the Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils (2006).</i>	<p>Stantec has obtained a copy of the referenced guideline; it has been reviewed and will be referenced when carrying out this work.</p> <p>Typically, we will use a ratio of 100 kg TPH:10 kg Nitrogen:1 kg Phosphorus :1 kg Potassium. (100:10:1:1) when building a Biopile. A sample of the soil to be treated will be taken and analyzed prior to the construction of the Biopiles, to determine the biologic loading, the recommended nutrient loading and the desired moisture content to be at in the field.</p>
DFO	<i>Although it is indicated that the recommended option of biopiles has been used effectively under similar circumstances in the high Arctic, land farming has also been outlined as a viable option. We are seeking some clarification on the differences between the 2 approaches and the associated time lines relative to the subject site and why biopiles have been put forth as the recommended option.</i>	The term "land farm" was used incorrectly in the draft report. We proposed to construct biopiles to treat the petroleum impacted soil from the tank farm. Land farming requires up to 6 times the land area and associated liner. The ability to control precipitation falling on that large an area could prove to be problematic. Biopiles occupy a much smaller area and can be covered to control moisture conditions in the pile and mitigate the formation of effluent from precipitation leaching through the contaminated soil. The term land farm has been removed from the report.
DFO	<i>Given the nature of the site conditions and the remoteness of the location, the schedule put forth seems very ambitious. Have the timelines related to compliance requirements with the Nunavut Land Claims Agreement been taken into account in the schedule? (MPC, NWB, NIRB, EA. Can a more detailed Gantt Chart be provided for the proposed project which outlines key activities and related timeframes in further detail?</i>	The time lines have been taken into account. The NWB has forwarded the report to the appropriate regulatory agencies and the comments received from the draft document are relatively minor. A more detailed Gantt chart has been prepared for review. Later in the planning stage of the project, once a contractor has been retained, a more detailed timeline will be produced for the project.
DFO	<i>The site plan only indicates 4 biopiles. Depending on the volume of the material to be treated, up to 20 or more piles could be required and the proposed location offers no contingency for unexpected increased volumes. Multiple entrances to the biopiles should be considered to facilitate access for maintenance should volumes be extensive.</i>	A detailed design of the area will be produced during the field work planning phase early this year and will be submitted for review. The design will account for the possibility of extensive volumes of impacted soil being encountered. Drawing 1056201-1 now indicates the location of the facility and treatment system location. The facility is shown containing 16 treatment cells.
DFO	<i>Canadian Coast guard (CCG) will have some ongoing program requirements for use of the docking facilities and laydown area adjacent to the docking facilities during the time period proposed for site remediation. Activities being completed in parallel will need to be coordinated between CCG and Breakwater .</i>	Historically, the dock area was sufficient to accommodate both the Canadian Coast Guard (CCG) and the mining operations. Therefore, Breakwater expects that there is adequate space for any foreseeable use by the CCG while the biopiles are in operation. However, Breakwater remains committed, as always, to full cooperation with any other

		interested parties. A statement to this effect has been added to Section 6.1.
DFO	<i>It is unclear as to whether the area to be excavated will be immediately backfilled with clean fill or it is proposed to leave the excavation open until all remediation is complete. We recommend.....</i>	The following text has been added to Section 6.6 of the report: <i>"Immediately following the remedial excavation and collection of acceptable boundary soil samples the excavated area will be re-contoured. Both the excavation and re-contouring may need to be carried out in zones and stages such that a large area is not left exposed at any one time".</i>
DFO	<i>The Spill Contingency Planning and Reporting Regulations under the Nunavut Environmental Protection Act indicates that the person or entity storing the contaminants has the overall responsibility to provide the plan. Therefore the contractor's plan should be closely reviewed by DFO prior to acceptance and not simply provided to the NWB.</i>	The following text was added to Section 3.0 of the report: <i>"All plans prepared for this project will be submitted for review by the appropriate parties prior to commencing the work."</i>
DFO	<i>Some additional guidance should be provided with respect to how impacted water will be treated. There is a detailed discussion on the treatment of impacted soils, but not water. Section 6.4.1 need to elaborate on water not directly from the biopiles. Criteria for the treatment of the impacted water needs to be included (similar to what has been provided for the soil).</i>	Refer to Section 6.4.2, which was added to the report to further explain the plan for treating the impacted water in the lay down area, inside of the LLDPE liners and in the remedial excavation.
DFO	<i>The preliminary schedule includes a provision that the demobilization of equipment may not occur until 2011..." If the bioremediation (biopiles) is scheduled to run until 2013, how will this be accomplished with no equipment? It is suggested that demobilization will not occur until 2013 or later.</i>	The demobilization in the schedule refers to the tank decommissioning contractor. Equipment from Arctic Bay or other source will be required to excavate, turn/aerate and maintain the soil in the biopiles until their completion, estimated to be by end of year 2013, at which point they will be decommissioned. Equipment will be necessary throughout the remedial program.
DFO	<i>Although we are satisfied with the BTEX/TPH criteria we would like to see PAHs added to the analytical suite of parameters to be tested based on the historical use of Jet Fuel A1.</i>	PAH analysis has been added to the analytical suite of chemicals of concern for the site assessment portion of the work.
DFO	<i>What is proposed for the absorbent materials that have been placed in the tanks? The current proposal only mentions the water and the fuel generated from the cleaning process</i>	Section 5.1.2 of the report now reads: <i>"All water, fuel and absorbent material generated from the cleaning process will be placed in barrels and shipped south for disposal at an approved southern treatment facility or treated using an on-site treatment system, which will include the use of oil/water separators and granular activated carbon, clay/carbon and silica sand filters."</i>
DFO	<i>Will the hazardous waste from the cleaning</i>	Section 5.3 of the report has been changed

	<i>of the tank liner be shipped off-site and treated like that from a decontamination of the tanks?</i>	to reflect the following statement: "Effluent from the tank liner cleaning will be collected and treated with the on-site water treatment system. If it is not possible to treat the effluent from the cleaning effort, the liquid will be drummed and shipped south for disposal and treatment".
DFO	<i>The plan should include provisions for the removal and treatment of impacted groundwater. Section 6.4.1 should be augmented to address all contaminated water.</i>	Refer to section 6.4.2, which was added to the report to further explain the plan for treating the impacted water in the lay down area, inside of the LLDPE liners and in the remedial excavation.
DFO	<i>The excavation should extend to, at least, the bottom of the depth of contamination encountered in the test pit.</i>	The following paragraph was added to Section 5.5 of the report: "The remedial excavation will extend to the depth at which clean soil or soil meeting the established remedial criteria is encountered. This elevation will be identified in the test pit site assessment program".
DFO	<i>Is the lay down area for the biopiles or tank system solid waste?</i>	The liner is made of high density polyethylene and is constructed in pieces and welded together in the field. It is considered non-hazardous waste and the proposed plan is to cut the liner into manageable pieces and once cleaned, buried in an onsite rubble pit and covered with fill.
DFO	<i>More explanation on the methods for treating this water needs to be included. Does overland runoff include runoff from between the biopiles as well as runoff from the biopiles from the biopiles? There is a possibility that runoff from between the biopiles could be contaminated by the biopiles. Would this runoff be monitored for contamination?</i>	Refer to section 6.4.2 which was added to the report to further explain the plan for treating the impacted water in the lay down area, inside of the LLDPE liners and in the remedial excavation.