JC- this will be covered off the general discussion from earlier

18. **Section 4.5.8 (S6)** – The NWB understands that MHBL has not provided analytical data for the blended tailings slurry following the milling process revision. Has this analysis been completed? Given the change in the blended tailings slurry, how does this impact the management plan to discharge waters?

JC- we can have a statement to the effect that we are doing the design and refer to where it is stated the report

19. **Section 4.5.8 (S6)** – Does MHBL believe that in **Table 4.17,** the flow for the Float Tails Solution is 46.5 instead of 2.8 m^3/h and the flow for the Cyanide Detoxified Solution be 2.8 instead of 46.5 m^3/h?

JC- this was a transposition error in the table and we will fix

20. A site specific risk-based criterion for copper was provided in **S11** which states that a copper concentration of 4 ppb should be acceptable compared to the CCME limit of 2 ppb. There was no reference to report **S11** within the **Water Quality Model (S6)** or **Tailings Management Plan (S10i);** however the **Main Application Document** states that the site specific copper concentration of 4 ppm will be used. Clarification is requested on the intent of use of a site specific copper concentration of 4 ppb. If 4 ppb is intended for use as a discharge criterion, what is the impact for not including and incorporating this value into the water quality model or tailings management plan to manage Tail Lake waters?

JC- this will be dropped from the text to be consistent with the discussions with NIRB; will take the site specific out

21. The NWB understands that the water quality model may assume complete mixing of all input solutes instantaneously in Tail Lake. Does MHBL agree that the discharge of the tailings slurry is spatial and a point source at the various discharge pipe location within Tail Lake?The NWB understands that there has been no details provided to demonstrate that a completely and instantaneous mix reactor is appropriate for Tail Lake. Is it conservative to assume a completely mix reactor? What is the basis for assuming an instantaneous mix reactor in Tail Lake? What contingency measures are in place if short circuiting of discharge waters to Tail Lake to the decant location occur?

JC- we agree that the discharge will be a point source, but Tail is a shallow lake and shallow lakes tend to be mixed and don't stratify; the energy of the wave action will help mix the water, but is not enough to suspend the solids; because the discharge strategy measures water quality at the intake it already inherently compensates for short circuiting; We will put this opinion in writing

22. The NWB understands that solute loadings to Tail Lake from non-mill sumps (e.g., fuel farm, landfill, landfarm, etc) may not be considered in the model. What are these expected loadings and concentrations? A table that summarizes all model input source water quality and quantity would alleviate any uncertainty regarding these model inputs. The NWB requests MHBL to provide summary table that summarizes all model inputs.

LC- we do not anticipate that any of the water from these non-mill sumps will have to go to Tail Lake; we already have a system in place to treat this water for direct release to the tundra and there would have to be a failure of that system; So we will have to add info to the doc on the systems and its specifications; and then we will calculate the water balance and say that the amounts will be insignificant; this will have to be in the main doc and then cross referenced in WQ doc

23. MHBL states that cyanide treatment needs to be 95% efficient for base case modeling to ensure free cyanide concentration at or below CCME guidelines in Doris Creek. Was this value of 95% efficient derived for the original or changed milling process? If the former, what is the required efficiency for the current milling process?

JC- yes this is based on the original milling circuit; the same number would apply to a revised milling circuit; we will put that in the section JC will add on these issues

24. The Hydroclimatic Parameter Re-evaluation **(S5)** report supports the use of the *"dry case"* scenario for water balance modeling at Doris North, but believes that *"it would still be prudent to model the 'wet case' scenario to continue to account for existing uncertainty"* **(Page 31 of S5).** Does MHBL agree that it is reasonable to use *"wet case"* for water balance modeling to assess maximum dam elevation? Does MHBL also agree that the *"wet case"* may not be a conservative assumption for water quality modeling due to dilution? Does MHBL agree that hydroclimatic parameters under a *"dry case"* may result in lower flow conditions in lakes and creeks and therefore lower dilution function of natural water bodies? Does MHBL

agree that the assumptions of water quality modeling are critical for the discharge scenario evaluations? Does MHBL believe the *"wet case"* assumption in water quality modeling is conservative from a water quality perspective compared to the *"dry case"*? If not, does MHBL believe that additional model runs based on the *"dry case"* should be completed to characterize the discharge strategy?

JC- both the wet case and dry case have been modeled and the only difference is the amount of discharge annually from Tail Lake; This is well spelled out in the report; The dry case yields a poorer water quality than the wet case, however from a design perspective the wet case has to be considered as your base case b/c you have to size your pipeline for the upper flow case so that you can discharge what you need to. It does not matter if the discharge is less than calculated since it is possible to close a valve to reduce the flow but you need to add a pipe to increase the flow capacity. The low flow case indicated that MMER criteria will still be met so that it will still be possible to discharge water albeit at a lower rate. Therefore the dry case was run to demonstrate that the same system is applicable and the only thing that changes is the amount (volume) of water you can discharge.

MR- the WQ model is directly attached to the WB model, it is a single integrated model.

JM- we have to be able to list the confidence we have in the model and the limitations;

JC- In none of the modeled circumstances would we not meet MMER; so the only question is what happens with the volume discharge and how we manage it. The main effect is how much we can discharge each year and that effects what our concentration will come up to and the level it will be at within the TCA and then when we can lower the elevation to where we can breach the dam. So yes the low flow would give higher concentration but it will not significantly affect the operation of the TCA. We also designed it this way so that it is better for us to have a dam that can hold the water for a longer period of time. We have shown that under both scenarios we can operate. 1st question is: will concentrations exceed MMER and under both conditions we can discharge b/c we can meet MMER criteria, 2nd question then is what do you design for and since the pipeline has to be sized to meet the maximum discharge rate you have to design for the wet case to ensure capacity

JM- (NWB) will not give us (MHBL) any direction on what dry or wet case to run; it would come out in the tech meetings;

JC- we have to state that we don't need to run the dry case as a base case and why.

JC- they are saying that using the wet case as a base case is a concern and we disagree

S7- Geochemical Characterization of Quarry Materials

1. **Report (S7)** was not signed for authorship and professional approval. The NWB requests that this design report be signed and sealed by the responsible professional.

LC- our error in printing, will fix

2. On **Page 51** on the **Main Application Document,** it was stated that the quarry rock is non-acid generating and that a program of ARD characterization will be conducted during construction to verify this conclusion. The NWB requests sufficient detail of this program?

LC- will make sure this language is clear b/c this is not the NIRB condition program but it is a follow up program

3. **Section 2.0 (S7) -** It was stated that *"shake flask leachate indicated that aluminum and copper leached at concentrations exceeding CCME guidelines for the protection of aquatic life".* Further, it was stated that *"shake flask leachate indicate only potential elements of concern, and are not indicative of potential impacts to the receiving environment".* With respect to the shake flask test results, further clarification and detailed discussion is requested on how the measured results are *"not indicative of potential impacts to the receiving environment".*

JV- just include details as to the technical program and how that compares to actual situations

4. **Section 4.1.4 (S7)-** A correlation was provided to relate $NPC_{a,Mg}$ to NPI_C, the NWB requests details on how this relationship was determined.

SD- not a lot of point into going into it, since updating the report, we will put in more explanation

5. **Section 4.2.3 (S7)** – The NWB understands that shake flask extraction tests indicate the potential for leachate with alkaline pH and elevated concentrations of aluminum. Shake flask extraction test results presented in the AMEC 2005 reported alkaline pH with elevated concentrations of aluminum and copper. The samples of rock tested in **Report S7** and in AMEC 2005 were from near surface.

a. Why was copper identified as being elevated in the AMEC 2005 testing and not in the **S7 Report?**

b. It was stated that the *"elevated pH is thought to be an artifact of the test procedure...*[and that these] *conditions will not be present under rock fill placement scenarios where pH is buffered at lower levels by interaction with atmospheric CO2. Significant leachate of aluminum is not expected to occur from placed quarry rock".* The statement above suggests that the test methods may not be representative. The following information is to be clarified:

i. What field testing will be completed to assess if there is an acceptable leachate composition from the quarry rock?
LC- we can add the details to the follow up monitoring program for seeps

ii. If an unacceptable leachate composition is measured in field application, what mitigating measures are in place to control release of potentially contaminated waters and impact freshwaters (as defined by NWANSRTA)?
LC- we will commit to removing any bad rock b/c it is to our benefit and that would go back to the quarry or back underground

6. Kinetic humidity cell testing prediction results for sulphide depletion and ARD onset were presented in the **Main Application Document** and used in the **Water Quality Model [S6].** The NWB understands that these results were not presented or discussed within report **S7.**

a. Why was this data not presented in report **S7?**

b. What are the results of this testing?

c. Kinetic humidity cell testing of quarry samples were completed using the siderite correction method for NP (AMEC). Subsequent rock characterization did not measure any siderite in the rock. What impact does the siderite correction method for NP have on the results if no siderite is present in the rock? Are these results valid?
LC- the neutralization potential was calculated using two methods, the standard Sobek method and then went back and did the siderite testing to address a Perry Mehling concern
LC- we have to reference where this is in the AMEC 2005 doc for the FEIS b/c the prob was that they didn't have that doc

7. Report **S10m** indicates that ongoing monitoring to verify ABA characterization work on quarried rock materials at a frequency of *"approximately 100 samples spread over construction quarrying".* Cross-referencing between Report **S10m** was not provided in report **S7.** Appropriate crossreferencing is requested where applicable. Additionally, the NWB requests clarification if the approximately 100 samples will be taken from each of the four quarries or from the total amount of rock quarried? From this sampling,

a. What is the expected turn around time (from sample collection to obtaining results) for ABA characterization? And how has this turn around time been considered in the schedule of quarry development and rock placement?

b. If ABA results show a change in rock geochemistry that would be susceptible to metal leaching / acid rock drainage compared to originally expected, what is the resulting action plan for future construction and already placed materials?
LC- will fix the referencing and then will clarify the method in the monitoring plan

S8- Geochemical Characterization of Portal Development

1. Report **(S8)** was not signed for authorship and professional approval. The NWB requests that this design report be signed and sealed by the responsible professional.
LC- our error in printing

2. Within report **S8,** the NWB understands that results from four boreholes that were drilled along the portal alignment to obtain samples for geochemical characterization were provided. With this in mind,
LC- brief statement that it is clear this is not representative and reference where the other material is located

a. How confident is the applicant that the four boreholes drilled provides good representation of the total amount of material that will be stockpiled? The NWB requests detailed discussion on MHBL's level of

confidence on this issue.
LC- refer them to the FEIS document and this will cover this off

b. What practices will be completed during mining to validate the geochemical characterization completed within report **S8?**
Same as above

c. Within report **S10d,** results of acid generating potential of the waste rock from the underground mine were provided. It appears as if the samples tested are different that that reported in **S8.** The NWB requests MHBL to comment on the following:
LC- we have to disconnect S8 from S10; make the into in S8 so that it is clear that it just gives a piece of new info and can't be taken as a stand alone and so refer all to the FEIS

i. Clarification, detail, and comparison (if applicable) to address the interconnectivity between these two documents with respect to geochemical characterization of the portal development rock.

ii. Why are the geochemical results provided in report **S10d** not provided in report **S8?**

iii. The geochemical results from report **S8** are the basis for interim waste rock stockpiling. Why is report **S8** not cross-referenced in **S10d?**

3. Section 4.2.1 (S8) - As illustrated in **Figure 4,** the majority of the samples tested appear to have NP-TIC:AP ratios to be greater than 3. In report **S8** MHBL states the ratios to be less than 3. Clarification is requested to address this inconsistency.
SD- this is a typo and will be corrected

4. Section 4.2.2 (S8) - It was stated that other than copper and zinc, *"median trace element concentrations ranged from <0.1 to 1.6 times crustal average concentrations".* The comparison of median trace elements to crustal average concentrations was not provided to substantiate this claim. A table or reference to appropriate document to validate this comparison is requested.
SD- we will direct the reader to the appropriate doc

5. Section 5 (S8) - It was stated that *"basalt appears to be strongly net acid consuming. However, the lower 6 m of MHBL06-12 had generally lower NP:AP ratios, and this material could be net acid generating".* For purposes of the application record the NWB requests clarity on the following:

a. What is the estimated mass of potential *"net acid generating"* materials that would be stockpiled and percentage of this material to the total mass stockpiled?

b. Given this uncertainty, are there specific mitigating measures or contingencies for the potentially net acid generating material compared to net acid consuming materials to ensure containment of waste and its by-products? If so, what are the mitigating/contingency details (e.g., blending) and implementation? If not, why not?
LC- we just need to reference the summaries of this in B4 in the FEIS

S10- Environmental Protection Plan

The NWB understands that the **Environmental Protection Plan (S10)** includes operations and maintenance; however much of the document is not referenced in the conformity table within the **Main Application Document.** The NWB will only consider **Section 2.7** and **Section 2.13** of the document to gain an understanding for practices in close proximity to waters since only **Section 2.7** and **Section 2.13** were referenced in the conformity table. If additional information contained within **S10** is to be considered by the NWB, appropriate referencing (e.g., sub-document number, page, section title) to subdocuments should be outlined in **S10** and/or within the entire submission. Is MHBL committing to following the mitigating measures and operations outlined in each of the **S10** sub-documents?
LC- in hindsight we should have just put in a one page cover letter as a clarity statement as to what the purpose and intent of the document and remove the covering S10 doc b/c it is confusing
LC- will revise the conformity table to refer to the actual plans instead of S10 alone

S10a- Emergency Response and Contingency Plans

1. **General-** Given the layout, organization, and communication of this plan, the NWB would like to reconfirm that the document is intended for *"each member of management and all employees"*. Does MHBL believe that the document is clear and concise enough that *"site personnel"* will be able to respond effectively and in a timely manner to an emergency situation with guidance from the plans?

LC- this is meant to be the existing plan at the site and is meant to be revised annually; we will give a clarity statement to that effect

2. **Section 4.6 (S10a)** – This section lists procedures to follow in the event that equipment or people have fallen through ice. Due to ambiguity in the document, additional detail and discussion are requested to address each of the following:

LC- talking about an event of a fall through ice and you have pointed out errors that we have made in explaining this

a. The opening paragraph of this section states that *"if accidents happen the following procedure will be the guide to response."* Who is responsible for following this procedure?

b. In the second last bullet point listed in this section, the response to equipment falling through ice is to: *"Ensure that leaks of fuel or engine oils are minimized wherever possible by pumping the fuel from tanks into other containers where this can be safely done without danger of a spill"*. How will this be accomplished?

c. In the last bullet of this section it is stated that *"Where a vehicle has gone completely through the ice and is submerged, contact the appropriate government spills hot line and ask for advice."* What is the appropriate government spills hotline? Should the contact information for this hotline be also included here, or referenced so a situation of this manner, if were ever to occur, could be handled promptly?

MH- if it is an ops doc for site personnel, they need to be pointed to equipment and how

LC- we don't have that level of detail yet but we will grow to that; we will make some generic statements

LC- will put in the hotline number

MH- we also reference govt regs but don't direct the reader and we should do that

3. **Section 6.2 (S10a)** – In this Section MHBL states that hazards at the Doris North Mine site include *"the release of toxic vapours, fire, spills, and explorations."* Are explorations a hazard?

LC- yes a typo

4. **Section 6.3 (S10a)** – In the second bullet point of this section one of the principal objectives of the **Spill Response Plan** is to *"promote the safe and effective recovery or disposal of spilled materials"*. Is MHBL committing to the safe and effective recovery or disposal of spilled materials?

LC- this should be worded better to point out the principle that we are trying to prevent

5. **Section 6.4 (S10a)** – Additional detail and discussion are requested to address each of the following:

a. In **Section 6.4** MHBL provides a list of petroleum products and other chemical substances that may be stored at the Doris North Mine site. Is there a site plan that identifies the location of these substances at the Doris North Mine site? If this plan does exist, MHBL is invited to appropriately reference where this plan may be found. Given that this is an emergency response document, should this site plan be included within this report?

LC- yes we will add that

b. The types of petroleum derived materials included in the **Spill Response Plan** are listed in **Section 6.4** in bullet form as *"flammable immiscible liquids"* and *"flammable compressed gasses"*. This is followed by **Section 6.4.1** which begins with a general description of *"flammable immiscible liquids"* and then closes with a list of examples of these substances in bullet form. In **Section 6.4.2,** the structure is entirely different, with the characteristics of *"flammable compressed gasses"* listed in bullet form, followed by a list of these gases that are likely to be present on site (in a single bullet). Does MHBL believe that the structure and organization of this section is sufficiently clear to allow easy understanding of the material by

management and employees at the Doris North Mine site in an emergency situation?
MH- an organizational item
LC- we will revisit and improve

c. As noted above, a list of types of *"petroleum derived materials"* is provided in **Section 6.4,** followed by more detailed descriptions and examples of each type in **Section 6.4.1** and **Section 6.4.2. Section 6.4.3,** however is headed *"Other Products"* which are not *"petroleum derived"*. Why was the heading *"Other Products"* not listed in **Section 6.4?**
same as above

d. **Section 6.4.3** states in the first paragraph that *"there are chemicals and reagents that are needed for use in the gold abstraction process"* and then goes on to list these *"chemicals and reagents"* in bullet form. The last two bullets listed are *"Domestic sewage"* and *"Tailings"*. Aren't these waste products and not *"chemicals and reagents needed for use in the gold abstraction process"?*
same as above

e. The final paragraph in **Section 6.4.3** states that the MSDS's will be available on site. Will the MSDS's be made available with this document? Should MSDS's be annexed in order to provide a quick reference in the event of an emergency situation?
LC- were provided as part of FEIS and will reference that and cross ref those in the hazardous materials mngmnt plan

6. Section 6.5 (S10a) –Sections 6.5.1.1 through **6.5.1.5** list the responsibilities of various mine staff in the event of a spill. However, both **Section 6.5.1.2** and **Section 6.5.1.5** are labeled "Mine General Manager". Clarification is requested regarding this apparent duplication.
LC- yes we have to get consistent in labeling of staff on site

7. Section 6.5.1.3 (S10a) – One of the responsibilities of the *"Spill Clean Up Supervisors"* is to *"Assess whether burning is a viable clean up measure"*. Under what circumstances does MHBL believe that this would be a viable clean up measure?
LC- we would make the decision to bum off ice only after consultation with appropriate agencies and that should be stated

8. Section 6.7 (S10a) – Additional detail and discussion are requested to address each of the following:

a. The first bullet point of **Section 6.7** identifies a *"Spill Response Coordinator"*. However, this title is not listed in **Section 6.5.1,** along with the various other mine personnel involved with the spill response. What are the responsibilities of the *"Spill Response Coordinator"?*
LC- this could change individuals depending on the nature of the spill; and so we'll have to add a paragraph of definition of Spill Res Coord and a bullet point of who that would be under these conditions

b. The last bullet point in **Section 6.7.1** states that in the event of a spill the *"Mine General Manager will liaise with…Regulatory Agencies and the KIA to keep them informed as to the status of the ongoing operations."* Who are these *"Regulatory Agencies"?* Will the contact information for these agencies as well as the KIA be referenced here?
MH- we should reference the agencies here
LC- key point is there should only be one contact

9. Section 9.1.5 (S10a) – This section describes *"three levels of warning signs or emergency conditions"* for the Doris North tailings dams. What are examples of observations which would indicate an *"obvious emergency"*, a *"potential emergency"*, or that are *"noted as being unusual"?* Does MHBL agree that a description of typical scenarios or cases for each of these three levels would be beneficial to the Reader and Regulators in providing an understanding to the three levels of warning or emergency conditions?
MH- thinks it would be useful to have examples of that
LC- this comes from Matt Kaweii and we have to revisit how appropriate it is; does not come from SRK

10. Section 9.3 (S10a) – This section describes the **EAP** (Emergency Action Plan) for dams at the Doris North Project site. The NWB requests additional detail and discussion to address each of the following:

a. This section identifies *"dam failure"* as the case for which an EAP for the Doris North Mine site will be

developed. Does MHBL believe that it is appropriate to develop an EAP or a response plan for a break in the tailings delivery line?
LC- yes it should be added

b. In the final paragraph of this section MHBL states that *"the EAP will be developed for potential failure of south and north dams"*. The NWB requests clarification in if MBHL considers this document to be the EAP or rather a commitment for MHBL to develop the EAP for this instance. Does MHBL intend to develop EAP's for fuel spills, explosives spills, or chemical spills?
LC- we will be developing these prior to construction and will clarify this

c. **Section 9.3.1** identifies potential causes of dam failure in bullet form. The third last and second last bullets are listed as *"Upstream dam failure"* and *"Downstream dam failure"*. Does MHBL believe that this appears to be a circular statement in that dam failure will cause dam failure or should these statements be built upon?
LC- we will have to revisit the context b/c it seems like a moot point

d. **Section 9.3.2** states that *"regulatory authorities"* will be notified *"If or when there is a need to reduce the level of water in the dam"*. Who are these *"regulatory authorities"?* Does MHBL believe the contact information for the *"regulatory authorities"* should be included or referenced in this section? If not, why not?
LC- yes will reference in the list

e. **Section 9.3.4** states that *"access to the North and South Dams…will be maintained properly at all times."* The NWB requires additional clarification (to add to the application record) into what are MHBL's standards to which the access routes will be maintained and what measures have been set in place to ensure these standards?
LC- we will just clarify the intent that those roads are to be kept accessible

f. **Section 9.3.6** is headed *"Equipment that may be needed for Emergency Operation and Repair"* and lists in bullet form said equipment. However, the final bullet in the list is *"Machine operators"*. What other personnel may be required for emergency operation and repair?
LC- intent was to be a list of equipment and we will take out that final bullet

g. **Section 9.3.7** illustrates the **Notification Process** in the event of an emergency condition with either of the dams at the Doris North site. Do the mine personnel identified in the **Notification Process** also make up the emergency response team? If not, who are the mine personnel that constitute the emergency response team? What are their responsibilities during each of the three levels of emergency conditions noted in **Section 9.1.5?**

LC- we will clarify

11. **Appendix A (S10a)** – The *"Emergency Procedures"* contained in this appendix do not appear to be referenced anywhere in the rest of the document. The NWB requests clarification in where these procedures apply and appropriate referencing where applicable.
LC- will check this to see why we have that

12. **Appendix B (S10a)** – This appendix contains *"Spill Procedures for Products on site"* in tabular format. The NWB understands that these tables do not appear to be referenced in the text. Each table indicates spill responses according to whether the spill occurred on land/tundra, snow, ice, or water. The storage, transfer, and disposal methods for petroleum products, explosive substances, and process chemicals present at the Doris North Mine site were also included. What restoration measures may be required in each potential spill event noted? Has this information been provided in the Closure and Reclamation Plan (if so a reference should be included)? Who are the mine personnel involved with the spill responses?
LC- this should be cross refd to the Haz Mat Mngmt plan and so we will improve the reference on that
LC- restoration measures are that the spill remains open until INAC inspector gives written approval of closure; we will add that into the closure plan as a statement
LC- typically mill guys will be involved in response and we can add that by defining what the response team is and then names will be added when they come on site

S10d- Interim Waste Rock Storage Plan

LC- this was not intended to be an end all / be all characterization of waste rock,. It was not intended to be a design

document. It was intended to provide mine operating staff with a statement of how MHBL committed to handle and manage all underground waste rock brought to surface during the mine life just to discuss the initial initial what???

1. Report **(S10d)** was not signed for authorship and professional approval. The NWB requests that this design report be signed and sealed by the responsible professional.

LJC-Okay will do

2. A significant portion of the storage plan involves description of the type of rock to be stored and acid generating potential. The importance of this topic can't be understated; however, report **S8** was solely devoted to describing acid generating potential for the portal rock. As was discussed in the review of report **S8,** and should be addressed in response of **S8** review, was the differences in the geochemistry rock analysis presented between the report **S8** and **S10d.**

a. It is requested that there be consistency between documents and appropriate crossreferencing. Since the portal rock discussed in report **S8** is temporarily stockpiled and this stockpile is discussed in report **S10d,** how come report **S8** was not referenced?

LC- we should try and unlink S8 from this; won't change S8 but put in an explanation at the front of S8 to explain what it is for

b. **Section 1.2 (S10d) –** The results of the ABA analysis were provided in a summary table format in **Appendix 1.** The report states that this material is presented graphically in **Appendix 1;** however, the graphs were not provided. The NWB requests clarification and the inclusion of graphs required to support information presented.

LC- the word graphically was inappropriately used

3. Minimal details were provided on the construction, design, and layout of the interim waste rock pile within report **S10d.** In fact, there was no reference to the design drawings **S-07** and **S-08** that depict pile layout plan and critical cross-sections within report **S10d.** Does MHBL agree that appropriate cross-referencing should be provided to include drawing details within report **S10d?** With regards to construction, design, and layout of the interim waste rock pile, additional detail and clarity are requested to address each of the following:

LC- We will correct this by providing referencing and provide the same intro that it is meant to be plan and not design doc

a. **Executive Summary (S10d) -** It was stated that the *"pile will be constructed within a 0.5 m high perimeter berm designed to contain and direct all runoff from the pile into a dedicated runoff collection pond. The berm will also direct clean runoff away from the waste rock pile".*

i. **Section F-F'** in engineered drawing **S-08** provides a cross-section of a typical containment berm with a minimum of 1.0 m in height. Technical specification document **(S3) Section 10.2.14,** the berm is referenced to be 1.0 m high. The **Main Application Document (Section 3.3)** stated that a 0.5 m high berm will be designed. Clarification is requested to address this inconsistency. What is the minimum berm height?

ii. Will the construction of the berm be completed according to the technical specifications outlined in **Section 7.0** and **9.0** of report **S3?** Clarification and cross-referencing is requested.

iii. The construction material type was not referenced in report **S10d. Section F-F'** in engineered drawing **S-08** depicts the berm to be constructed of run of quarry materials. Technical specifications **S3 (Section 10.2.14)** stated that the *"berm will be constructed from select subgrade material".* Clarification and crossreferencing is requested to address this inconsistency into what the material type will be used to construct the berm.

iv. Engineered drawing **S-07** depicts the waste pile and berm layout, surrounding infrastructure, and topographic elevations. Does MHBL believe that this drawing should be cross-referenced in report S10d where applicable? A berm has been proposed along the west and east sides of the waste rock pile. The NWB understands that the south end of the pile allows waters to drain into a pollution control pond. The NWB also understands that the north end of the pile is open to receive any waters draining from the mill, crusher, and ore stockpile areas. What is MHBL's rational for not constructing the berm along the north end

of the waste rock pile? Does MHBL intend for waters to drain from the north and enter into the pile location? If reliance is on surface grading of the mill stockpile area to divert waters from entering the temporary waste rock pad, will there be engineering oversight during construction to ensure that waters drain on surface as depicted in **S-08?** If so what is in place?

v. The NWB understands that the function of the berm is to contain and direct water from within the waste rock pile to the pollution control pond and to divert clean runoff away from the waste rock pile. Further the berms appear to be generally positioned perpendicular to surface contours to facilitate diversion of waters. The NWB understands that the berm will be constructed of materials (either select Subgrade or run of mine; see **Bullet iii** above) that have high gravel with some sand contents. With consideration given to, as understood by the NWB, the high hydraulic conductivity of this material, discussion and detail are requested on how berms comprised of this material will contains waters and not permit seepage.

MR- we have discussed a number of times; the additional detail with be provided in the design doc

LC- will reference rather than repeat the same info

b. The **Executive Summary** in report **S10d** stated that *"only runoff that meets acceptable criteria for discharge will be released onto the tundra"* from the runoff collection pond (pollution control pond). In **Main Application Document Section 2.4.7** it is stated that *"all water contained in this pond is considered contaminated and will be pumped to Tail Lake via the mill circuit".*

i. Clarification is requested on the method of disposal of waters from this collection pond to address this inconsistency.

ii. If waters are pumped to Tail Lake, how will the pollution control pond waters be directed to the mill circuit?

Is there a plan to monitor water quality from the pollution control pond? Appropriate cross-referencing between reports **S10d** and **S10m** is requested where applicable?

LC- appropriate cross referencing

c. The NWB understands that engineer drawing **S-07** does not provide access road details into the waste rock pile location for rock placement or removal. No details were provided regarding location of tailings slurry and reclaim water pipelines in the vicinity of the camp location. Does MHBL agree that this detail should be included on the engineered drawing? If not, why not?

MR- 1st part is correct, that is an omission that will be corrected; 2nd part is on drawing T11 but will be transferred to S07 as well

d. Report **S2, Section 5.5.6** provides discussion on the stability analysis for the waste rock pile. Details were provided that the pile may be classified as Stability Class 1 according to BCMWRPRC 1991 and therefore the *"design can be based on basic reconnaissance and baseline data"* for the site. The NWB understands that there were no details provided in **S10d,** or elsewhere, regarding the pile stability analysis and design. The NWB requests full details regarding the stability analysis method and results with detailed discussion of assumed input parameters completed for the waste rock pile.

MR- this is not provide b/c you do not have to do this analysis b/c of the condition based on that guideline

LC- will reference back the that statement

4. There were no details pertaining to the construction, stability, erosion control, operation, and containment of waters generated from the ore stockpile within report **S10d.** Does MHBL agree that the ore stockpile may also be considered an "interim" waste rock pile? If not, why not? What plans are in place to manage the ore stockpile? How will waters that come into contact with the ore stockpile be managed?

MR- just a clarification that will be in the Water Management Plan b/c it relates to where the different waters are flowing

S10e- Hazardous Materials Management Plan

LC- again add statement on front end that these are just management plans that need to be revised on an annual basis

DL- how does this get communicated to the NWB

JM- MHBL should propose something

LC- Suggest that updates of all management plans be included in the Water License annual reporting. If a plan does not require an update and thus is not changed then this should also be communicated annually to the NWB through the WL Annual Report

1. **Section 2.2 (S10e)-** It was stated that the hazardous materials management procedures *"will be reviewed by MHBL and revised as required to reflect all implemented and projected changes to the HMMP, to correspond with new information and latest technology".* What is the proposed frequency for review of the procedures and/or what would constituent the review of the procedures? How will any changes be communicated to the Board?

2. **Section 2.4.3 (S10e) -** The plan to dispose of assay lab crucibles includes storage in a drum and on a yearly basis *"disposed of through burial in the tailings solids within Tail Lake"* and *"covered by tailings solids".* What is the rational for disposing of the crucibles in this manner instead of an alternate method? Are these crucibles considered hazardous waste after use?

LC- these will definitely be contaminated and we have to revisit how we will deal with these as. Will revisit this section in the re-submission

3. **Section 2.4.4 (S10e)-** It was stated that *"plywood boxes used to contain sodium cyanide bulk bags will be burned at an approved burn site on the property to prevent this wood being used for other purposes".* How will the ash and any other waste from this burn product be managed to ensure there is no impact on waters while minimizing ash from blowing away from the burn site?

LC- would burn these w/in burn pit within the landfill site and cyanide breaks down on combustion; the ash would have to come out of the site, but don't anticipate it will be hazardous; will clarify with more detail

4. Select sections of the report **(S10e)** discussed emergency response and contingency plans, storage of fuel and disposal of waste and the landfill and landfarm. A brief description of these reports was provided; however, reference to the appropriate report and section number should have been provided for completeness.

LC- will just add a reference to the appropriate section in the ERP

S10f- Explosive Management Plan

1. **General** – In the first paragraph of the **Executive Summary** of the **Explosives Management Plan (S10f)** MHBL states *"The plan is provided in support of a water licence application by Miramar Hope Bay Limited for gold mine operation",* and further, introductory **Section 1.2** states that *"The explosives management plan will be cross referenced in other plans for mine operation including: training manuals (where appropriate); MHBL Hazardous Materials Management Plan: MHBL Emergency Response and Spill Contingency Plan; mine operating procedures (where appropriate)."* These two statements raise the following questions:

LC- we will put something at the beginning stating that this is not intended to be a stand alone document and put in approp referencing

a. Does MHBL believe that the use and fate of the plan is described clearly enough in this document?

LC- the contractor would have their own mngmnt plan; this doc would be only a ref doc for our staff to have on site until the specialist contractor comes in; the specialist contractor actually makes the application for the explosives license

b. MHBL is invited to provide an explanation on how this plan is *"in support of the water licence application"* as stated in the **Executive Summary.**

c. Does MHBL intend to make this document available for cross-referencing or does MHBL believe that a reference alone is sufficient?

LC- yes

2. **Section 1.2 (S10f)** – As noted above MHBL states "T*he explosives management plan will be cross referenced in other plans…including: MHBL Emergency response and Spill Contingency Plan".* However, upon review of the **Emergency Response and Spill Contingency Plan,** no such reference was found. Does MHBL intend to include the reference to the **Explosives Management Plan** in the **Emergency**

Response and Spill Contingency Plan?

3. Section 1.4 (S10f) – Additional detail and discussion are requested to address each of the following:

a. The temporary explosives storage site will be built directly on the frozen tundra, and as such, will be used during one winter season only *"with all explosives transferred to the permanent site by the end of the first winter season."* In the event that the permanent explosives storage facility is not completed by the end of the first winter, what course of action does MHBL suggest to take to prevent or minimize environmental impact to the tundra (through the definition of *'water'* outlined in the *NWANSRTA)* due to the presence of explosives stored on site? In other words, does MHBL believe that a contingency plan for this possibility is unnecessary?

LC- will make it clear there is no contingency required b/c the facility has to be moved and that is given a priority in the construction schedule

b. What contingency is in place in the event that the permanent explosive storage site is not available after the first winter season?

c. Additional details of the temporary storage facility are requested to demonstrate that waters will not be impacted, which includes, but not limited to a brief site layout plan.

MR- we deliberately took that out and will clarify. This temp facility will be moved before the first spring snowmelt consequently potential source of contamination will be gone before first summer season

d. The explosives storage and handling facilities are noted in the text to be shown on **Figures 1** and **2.** However, the drawings provided are numbered **S-04** and **G-02.** Clarification is requested.

LC- yes will clarify

e. In **Table 1-1** reference is made to the fuel laydown area, the temporary and permanent explosives area, the fuel farm, and the explosives mixing building. While the meaning of these areas and facilities are understood by the reviewer, consistency in terminology throughout the text, tables, figures, and drawings would facilitate understanding of the document. Does MHBL agree that a defined nomenclature assists Regulators through the assessment of application materials?

LC- we will check this

4. Section 2.2.2.2 (S10f) – Additional detail and discussion are requested to address each of the following:

a. MHBL states in the first paragraph of this section that *"Although AN '(Ammonium Nitrate)' is classified as a hazardous product, its storage and handling at Doris North is not considered to be a significant risk activity."* The NWB understands that this statement may imply that handling and storage of AN would not constitute a significant risk either to site personnel or to the surrounding environment. However, report **S10e** outlines safety procedures for the handling of this product. Clarification is requested as to why handling and storage of a *"hazardous product"* is not considered a significant risk to the surrounding environment.

LC- use at Doris North is not consider a significant hazard b/c of the amounts used are so small and we are not at high risk

MH- please put in a sentence to that effect

b. In the second paragraph of this section MHBL states that runoff from the AN storage pad will be absorbed by the pad itself or the surrounding tundra. Does MHBL believe that absorption of AN by the tundra does not represent a significant environmental impact? If so, how and why is this so? Also in the event runoff transports sediment MHBL states that *"temporary silt curtains can be placed in the water path to screen sediment".* Are there circumstances where screening sediment from runoff from the AN storage pad would not be required?

LC- same as a, explain why there is no risk; can is too loose of a word here

c. In paragraph four of this section MHBL states that *"empty bags",* of AN, *"will be shaken clean at the point of use".* For purposes of adding to the application record what happens with the AN residue once it is *"shaken"* from the bag?

LC- we can make this more clear; objective is that we don't let any out, and we will clarify

5. Section 2.2.6.1(S10f) – In **Table 2-1,** in the column headed *"Response",* the explosive chemicals spill

response is described repeatedly as *"clean up"*. How is the cleanup of potentially *"hazardous"* chemicals, which may cause adverse environmental impacts, achieved? To what level will clean up be completed to? Are different methods used for each of the explosive chemicals noted?

MH- given that it is an operations doc some people don't know what clean up is

LC- we will clarify

6. **Section 2.2.11 (S10f)** – MHBL states in paragraph one of this section that *"the supplier will be consulted on the appropriate handling and disposal"* for explosives identified as deteriorated or damaged. Is there any advantage to discussing appropriate handling and disposal methods with the suppliers of the various explosive materials prior to the arrival of such on-site?

LC- we will cross ref and beef up a bit; we do not want a contractor deciding how to dispose of it, need to consult manufacturers and approp agencies

S10g- Landfill Design and Management Plan

LC- was not intended to be design document; will revise document to have design in S2 and have the Management plan in S10g

1. Report **(S10h)** was not signed for authorship and professional approval. The NWB requests that this design report be signed and sealed by the responsible professional.

JM- not necessarily the stamp itself, but we have to not the authorship of everything

2. **Section 3.0 (S10g)** – The NWB understands that the landfill will be constructed within a rock quarry and the bedrock will undergo preparation to ensure gradation to facilitate surface water drainage. The NWB requests clarity on the following:

MR- we will fix the inconsistencies; and we will provide more detail to understand design concepts and how that applies to function

a. For purposes of adding to the application's record, is the quality of the rock high so that leachate from the waste does not penetrate into the subsurface through fractures?

b. It was stated within the design report that the surface within the landfill will be *"graded at approximately 1% in the down slope direction"*; however, engineered drawing **S-13** (or **Drawing #2** within **S10g)** depicts a graded slope to 0.5%. Clarification is requested to address this inconsistency.

3. **Section 3.0 (S10g)** – The NWB understands that containment berms will be constructed to divert storm and melt water away from the landfill. Does MHBL agree that if the containment berms will divert surface waters from entering the landfill, they will also serve the function to divert surface waters within the landfill to the pollution control sump? Additional detail and discussion are requested to address each of the following:

MR- same intent as above; 3 a and b would be covered in S2, and 3 c will be in the management plan

a. Details of the berm cross-section are not visible in engineered drawing **S-14** Typical Landfill **Section A-A'.** Additionally, **Section A-A'** does not contain a berm on the east edge of the landfill as is depicted in engineered drawing **S-13.** The NWB requests comment from MHBL on this issue.

b. What is the material type(s) used in the berm and dimensions?

c. If MHBL believes containment berm serves the function of diverting waters from entering and leaving the landfill facility then what berm design features (e.g., liner, low permeability material, etc.) will ensure that this design function, and thus, containment of leachate, will be achieved?

d. **Report S2, Section 4.16** stated that *"the landfill will be completely hydrologically isolated via a set of containment and barrier berms"*. The NWB requests additional information such as a topographic map delineating surface water drainage patterns around the landfill cell along with catchment area(s) and discussion to compliment this topographic map and detail the quoted claim above.

e. **Report S3 Section 10.2.22** stated a *"1.0 m diversion berm built from Selected Subgrade material will be constructed around the landfill to ensure external surface runoff does not enter the landfill area"*. The NWB understands that according to **Drawing G-05,** Select Grade material is comprised of a sandy gravel to gravel with some sand. These details were not provided in the design report **S-10g.** With consideration

given to, as the NWB understands, the high hydraulic conductivity of this material, discussion is requested on how berms comprised of this material will hydrologically isolate waters from entering or leaving the landfill cell.

4. Engineered drawing S-13 or drawing #2 within S10g- A *"pollution control sump"* is depicted in the engineered drawing; however, the NWB understands that there is no description of the design of the pollution control sump within report **S10g.** What are the engineering characteristics and design limits of the *"pollution control sump"?* Additional information and detail of sump design are requested that include, but not limited to, the following:

MR- 4 a and b will be in S2 and 4 c and d will be in the management plan

a. The engineered drawing does not provide dimensions of the sump. What are the engineered dimensions of the sump and containment volume?

b. Details of how the design capacity of the sump was determined are requested. With consideration given to all input water and snow sources that may include: specified storm event(s), snow-melt water, and snow drift and accumulation within the facility, etc., how was the volume of water and melted snow that enter the sump determined?

c. What are the operations and management procedures MHBL plans to employ to ensure that the sump capacity is not exceeded?

d. Within the **Monitoring and Follow-up Plan** report **(S10m),** it was stated that the water quality from the landfarm sump will be tested on a monthly basis and prior to any planned discharge during open water season and that *"no water will be discharged onto the tundra until water sampling has demonstrated that water is of sufficient good quality to meet discharge standards as established within the water licence".* Report **S10m** was not referenced in the **S10g.** Clarification and confirmation is requested to address how monitoring and discharge of landfill sump water will occur.

5. The NWB understands that the landfill is to contain non-hazardous wastes. Types of waste were provided in **Section 4.1** of design report **S10g.** Details of an approximate volume balance were not provided and thus details and discussion demonstrating that landfill capacity will contain the estimated amount of waste generated on site are deficient.

a. Additional detail and discussion is requested to confirm and understand containment and that the proposed size of the landfill is of sufficient size that includes, but not limited to, the following:

MR- more detail will be in the S2 doc to give more details on the design

i. Expected mass of waste to be landfilled on a yearly and cumulative basis with discussion on how these values were determined.

ii. Estimated volume of waste and cover material with consideration given to estimated bulk (as-placed) density of waste and cover material.

Calculation of volume capacity of the landfill to contain waste and cover material, with consideration given to ensure stable slopes, placement, construction, winter storage area, access to the landfarm, etc. What are the expected heights for each yearly constructed cell?

iv. Comparison of the expected required volume of waste and cover material to the volume capacity of the landfill.

b. What contingency measures are in place to dispose of waste in excess of estimated volumes?

LC- this will be in the management plan; we have discussed burning with the GN-DOE

6. Additional detail and discussion is requested to address the following items with respect to landfill cover and related operations:

a. **Section 4.0 (S10g) -** A graded cover has been specified to be placed before the winter period of snow accumulation. What material will be used as an annual cover?

MR- more detail will be in the design report

b. **Report S2, Section 5.10.1** states that *"at least once every three months, any open cells will be closed by covering them with a nominal layer of surfacing material, and a new cell will be started".* Details of cover application in the design report **S10g** included only the placement of an annual cover. Clarification is requested to address this inconsistency. If surfacing material is used every three months, what material type will be employed?

MR- will require some duplication between the two documents

c. **Report S2, Section 5.10.1** states that *"winter cells must be kept small such that a minimum amount of snow will be captured when the cell is closed".* Design report **S10g** stated that waste will be temporarily stored in the winter within the landfill area until final placement can proceed in the summer. Clarification is requested to address this inconsistency.

MR- will be fixed

7. Section 4.4 (S10g) - It was stated that *"water will be collected within the landfill area"* and *"tested for the presence and absence of oil and grease".* If *"oil and grease are present in the samples, water contained within the landfill will be treated using water/oil filtration system before releasing onto the tundra".* Depending on the characteristics of the oil-water *"filter"* style separator, hydrocarbons may be removed from the waters removed from the landfill. Does MHBL agree that since the source of waste will be derived from a variety of locations, there is potential for the other dissolved contaminants and suspended solids to not be removed to acceptable levels by an oilwater *"filter"* style separator? The NWB requests MHBL discussion on the following:

a. What are the typical characteristics of an acceptable oil-water *"filter"* style separator that would be appropriate for this application?

LC- this will be in the management plan

b. Where will the water removed from the landfill be discharged?

LC-in the management plan

c. What water quality criteria will the proposed method of discharge and fluid treatment ensure in this application? Will there be monitoring of the discharge prior to release be completed?

LC- in the management plan

d. **Report S2 Section 4.16** stated that water from the landfill will be pumped out and clean water directed on to the tundra and contaminated water to a tanker and then on to Tail Lake. There remain some inconsistencies between report **S2** and **S10g** (described above) with regards to water collection and disposal operations. Clarification is requested to address each of the following:

i. Will waters collected in the landfill sump be tested before being pumped out? ii. If so, what are the details of the testing program? If not, why not?

iii. What will be the practice employed to dispose of contaminated waters pumped from the landfill cell? For example, will it pass through an oil-water separator, or will it be collected by a tanker truck and then on to Tail Lake?

LC- will make sure there is more clarity and detail in S2 and the mngmnt plan

8. Section 5.5 (S10g) - It is proposed that clean wood and paper will be burned *"well away from the perimeter of the landfill".* What is a safe location and minimal distance from the landfill and landfarm to ensure damage to the geomembrane in the landfarm is not compromised?

LC- will provide more detail

9. Section 5.7 (S10g)- The NWB understands a final cover of clean rock has been specified to cover the refuse and surface contour the topography to blend into the surrounding terrain and to direct surface drainage away from the site.

a. What are the material specifications/type of the clean rock used for cover?

MR- more detail in S2

b. Has slope stability and surface drainage of the final elevations been considered? If so, what are the

characteristics for construction of the final elevations that will ensure a stable slope? If not, why not?
MR- more detail in S2

c. Is there a minimum amount of final cover that is required to be placed over the waste and what is this amount? If not, why not?
LC- this is in the closure plan and will be referenced

d. What is the engineering design function of the cover material?
MR- yes will provide more detail

10. Section 5.7 (S10g) - It was stated that since *"this landfill does not contain any hazardous waste its closure plan does not require infiltration or thermal control".* Reference to the appropriate location within the Closure and Restoration plan is requested that may address the following issues. Additional detail and description is requested to address each of the following:
LC- we can reference this

a. If waters are required to be collected from the landfill during active operation and the cover material does not control infiltration, how will controlled discharge of waters from the landfill be completed after closure?
b. If waters collected from the landfill during active operation are monitored for potential contaminants (e.g., oil and grease), will monitoring of waters from the landfill be completed after closure? If so, what are the long term monitoring plans? If not, why not?

c. Does MHBL agree that a landfill that does not accept hazardous waste still has the potential to generate a leachate that may not be acceptable for release into the environment? Further discussion on why *"infiltration or thermal control"* are not required for this landfill is requested.
LC- we can explain this better in the mngmnt plan as well as the closure plan to explain the intention

11. Section 2.10 (S10) - It was stated that drill cutting are to be moved from drill location to an *"approved storage area on the property".* Will these cuttings be placed in the landfill? Clarification is requested on where drill cuttings will be stored.
LC- drill cuttings are not landfill rock; would have to store them and use them as rock cover; we will address this in the mngmnt plan
LC- will move design components to S2 and clarify these issues in mngmnt plan

S10h- Landfarm Design and Management Plan

1. Report (S10h) was not signed for authorship and professional approval. The NWB requests that this design report be signed and sealed by the responsible professional.
LC- this will be relabeled as a management plan only and the design criteria will be moved to S2

2. Section 1.0 (S10h) - It is stated that the *"proposed landfarm is relatively small, consistent with the mine size and underground operations mode, but could be expanded if required".* This statement suggests that consideration has been given to expected volume of soil to be landfarmed and appropriate sizing of the facility to accommodate contaminated soil; however details of a volume balance were not described in the design report. Additional information and detail is requested to address each of the following:
LC- we would not have any way of knowing and we just have to guess, and have used Windy as an example

a. Based on past and current experiences at mine sites and exploration camps, details of a volume balance are requested that includes, but not limited to, the following:

i. Expected yearly and cumulative volume of contaminated soil entering the facility with details on how these approximate values and soil properties used in the analysis were determined.
LC- we can put this in the mngmnt plan as long as it is understood to be a guess

ii. Estimated yearly and cumulative volume of soil remediated within the landfarm and removed from the facility with details on how this approximate value was determined.
LC – we can put this in the design criteria

iii. Expected volume of contaminated snow entering the facility with details on how this approximate

volume was determined.

iv. What height of freeboard has been provided in the design of the landfarm to ensure containment?

v. Calculation of the total containment volume of the landfarm with consideration given to freeboard.

vi. Calculation of the volume of soil and volume of snow that could be contained within the landfarm.

vii. What volume of contingency is there in the design capacity of the landfarm to contain soil and contain snow if the estimates of soil and snow volume to be contained are not correct?

viii. If the volume of soil or snow exceeds containment volume, how will these materials be managed to ensure containment of contaminants?

b. The statement aforementioned in **Bullet 2** detailed that the landfarm *"could be expanded if required"*. Adaptive management of this nature requires a complete understanding of the engineered design limits (e.g., containment volume) of the facility with fully defined alternative contingency scenarios defined with appropriate quantifiable triggers on when a change in original design and management. Additional information is requested to address each of the following:

i. With consideration given to construction timelines, anticipated site specific conditions, and anticipated receiving volumes of contaminated soil and snow, what quantifiable marker(s) and value(s) will be used to trigger the requirement to expand the landfarm?

ii. Will expansion of the landfarm remain enclosed within the landfill containment berm area?

iii. Since the landfarm is located within the landfill containment berm area, how has the potential expansion of the landfarm been considered in the design, management, and operation of the landfill? This issue was not addressed in the landfarm or landfill design reports.

LC – we have clouded the issue by saying it could be expanded and so we will remove that bullet; we will have to apply to the Water Board as a separate issue if that is required

3. Section 3.0 (S10h) - The NWB understands that there may be inconsistency between the submitted documents and engineered drawing **(S-14** or **Drawing #3** within **S10h).** Clarification is requested to address each of the following inconsistencies:

MR- we had an unfortunate mix-up; this is an inconsistency that will be corrected and we will keep the design in one spot in S2

a. There is no mention of the use of geotextiles to be place on each side of the HDPE liner within report **S10h** as is depicted in the engineered drawing. Will geotextiles be used in design as depicted in the engineered drawing **S-14?**

b. The terms used to define the soil types, such as *"crushed quarry rock"* and *"fine crushed rock"* used in report **S10h** are not consistent with the terms used in engineered drawing **S-14** or as-specified in report **S3 Section 7.0 Fill Material Specifications.** The NWB requests clarification to clear any potential confusion and ambiguity between documents.

c. Report **S10h** states *"A pad of crushed quarry rock will be laid down to provide a bermed area for the landfarm. Finer crushed quarry rock will then be placed on the pad to provide a suitable bedding layer for the HDPE impervious liner".* Engineered drawing **S14 Detail 1** depicts a nominal surfacing layer of ~0.1 m below the geomembrane and overlying the bedrock. What are correct details for material placement below the geomembrane?

d. Report **S10h** states *"A ramp will be constructed of crushed rock to allow vehicles to enter and exit the landfarm without damaging the containment berm. More fine crushed rock will be placed on top of the liner to protect it from damage from vehicles delivering contaminated soils to the landfarm will be placed by hand so as not to damage the liner. An additional approximate 30 cm of fine crushed rock will be placed with a small crawler or wheeled dozer".*

i. From above, the NWB understands that total cover thickness over the geomembrane would be 0.45 m. Engineered drawing **S-14 Detail 1** depicts a material thickness above the geomembrane to be 0.2 m. Clarification is requested to address the inconsistencies between the document text and the engineered drawing.

ii. Reference is given to placement methods for materials above the liner, such as *"by-hand"* and use of a *"small crawler or wheeled dozer"*. Are these specifications specific to construction of this facility and in addition to that provided in report **S3 Section 8.3** and **Section 9.0?** Is MHBL committed to placement of this material by hand?

e. Report **S10h** stated *"Should heavier equipment be required to service the landfarm, additional fine crushed rock or soil will be placed over the HDPE liner prior to use of the area for soil decontamination"*. This statement is an adaptive management strategy that requires further clarification of the technical specifications required for additional HDPE protection (e.g., thickness for each material type used), or reference to applicable specification if provide in a separate document.

f. The access ramp is potentially an area with heavy traffic, clarification is required if Technical Specification **8.3.1(7f)** in report **S3** is applicable for this design? If not why not?

4. Engineered drawing S-13 or drawing #2 within S10h- A *"pollution sump"* and *"temporary storage area"* are depicted in the engineered drawing; however, there is no description of the design of the pollution sump or the purpose/design of the temporary storage area within report **S10h.** Clarification is requested to address each of the following:

LC- same as above, will remove the design detail and just deal with the operation in the management plan
MR- there will be items dealt with in the management plan

a. What are the engineering characteristics and design limits of the *"pollution sump"?* Additional information and detail of sump design are requested that include, but not limited to, the following:

i. The engineered drawing depicts a dimension of 1 m by 1 m area for the sump, but the sump depth is not provided. What are the approximate engineered dimensions of the sump and containment volume?

ii. How is the sump integrated into the construction of the liner? Additional detail, potentially with an engineered drawing, is requested.

Details of how the design capacity of the sump was determined are requested as insufficient description and discussion was not included. With consideration given to all input water and snow sources that may include: specified storm event(s), moisture conditioning of the landfarm soils, contaminated snow-melt water, and snow drift and accumulation within the facility, how was the volume of water and melted snow that enter the sump determined?

iv. How will non-contaminated snow and drifted snow that accumulates within the landfarm be managed?

v. What are the operations and management procedures to ensure that the sump capacity is not exceeded and saturate the landfarmed soil and alter the design moisture content of the contaminated soils?

b. All details with regards to the purpose, design intent, operations, and management of the temporary storage area are requested.

c. The temporary storage area does not include a sump to remove any accumulated liquid.

i. The NWB understands that it may be assumed that any water that may accumulate within the temporary storage area will drain through the unlined berm inside the landfarm and enter the pollution sump. The NWB requests MHBL clarification.

ii. If no to above, how will accumulated fluid be removed from the temporary storage area?

5. Throughout the landfarm design, landfarming experiences brought forward from the Boston (Water Licence **NWB1BOS0106)** and Windy (Water Licence **NWB2HOP0207/B1)** camps have been used to assist in detailing how the Doris North landfill is designed and operated. This is shown through the following:

LC- we only pointed this out to show that the physical action of remediation of soil has been demonstrated, but are not comparing the designs

- **Executive Summary** and **Section 1.1-** *"The design and proposed management are based on successful landfarms operated at the Boston and Windy exploration camps operated by MHBL"*
- **Section 3.0 -** *"A mixture of ammonium nitrate and corn cobs will be used as a bacterial medium and mixed with contaminated soil as it is placed within the landfarm. This medium has proven to have worked successfully at the nearby Boston and Windy exploration camps over the 2005 and 2006 summer seasons".*
- **Section 3.0 -** *"Any standing water in the landfarm will be passed through an oil-water "filter" style separator prior to release to the environment (a similar unit is in operation than the Boston and Windy Camp landfarm facilities). Normally, water should be adsorbed by landfarm soil".*

Additionally, within **Section 6.8** of report **S10a** it is stated *"Two approved Land Treatment Area (LTA) are currently in operation on the Belt. One is located at Boston Camp and the other is located at Windy Lake camp. Petroleum contaminated top soil will be removed and placed in these LTA for treatment"*

It is the NWB's understanding that the landfarms at the Windy and Boston exploration camps are unlicensed facilities. The following correspondence has been issued communicating the need to license these facilities:

JM- we should take out all reference to those sites b/c it puts interveners in an awkward position

LC- we will put in the collection of papers on landfarm performance under cold weather conditions that we gave to NIRB and will put in that backup

- Oct 27, 2005 NWB to MHBL **(RE: Acknowledgement Annual Report 2004)-** *"The NWB generally requires that Landfarm facilities be operated under a water licence….the Licensee incorporate the Land Treatment Area (Landfarm) into the current Licence through application for amendment to be submitted as a stand alone amendment or in conjunction with other foreseeable changes required. This application should be submitted at least four (4) months prior to active monitoring in 2006."*
- July 12, 2006 INAC to NWB **(RE: 2BE-HOP –Miramar Hope Bay Ltd. – Hope Bay Project – 2005 Annual Report)-** *"The 2005 Annual Report states that exploratory drilling activities have commenced in the project area and that the Windy Lake Camp has a land treatment area for the remediation of soils contaminated with petroleum hydrocarbons. The project's licence permits water use for domestic purposes only. In light of these water use activities, INAC recommends that the project's licence be revised to incorporate the terms and conditions necessary for the water use and waste disposal activities practiced by the proponent".*

Currently the NWB has yet to receive a licence application for the above listed landfarms. Through this letter document the NWB is notifying Regulators on references to the Boston and Windy landfarms in the Doris North application and the correspondence provided by the NWB and Regulators to MHBL in the recent past for Regulator advisement and action on the issue.

6. Section 3.0 (S10h)- It is stated that a *"mixture of ammonium nitrate and corn cobs will be used as a bacterial medium and mixed with contaminated soil as it is placed within the landfarm".* With regards to this operation, additional detail and discussion are requested for each of the following:

LC- we will specify and make clear what this corn cob commercial product is

a. What are the specifications for ammonium nitrate concentration, application rate, method of application, operator requirements, etc. associated with operation with details on their selection?

b. What is the required or target mass/volume of corn cobs to be mixed with contaminated soil (i.e., density of corn cobs per unit volume of soil) with details on how this was determined?

c. Will the required amount of corn cobs always be available for use in this application? If not, what contingency measures are in place and what are the details of this contingency measure?

d. Drawing upon experience in design and operation from past projects is advantageous. However, without