1. CALL TO ORDER

For those in attendance at District of Hope Open Council Meetings and Public Hearings, please be advised that the District of Hope Ratepayers Association are recording these meetings and hearings. The District, in no way, has custody or control of the recordings.

Therefore, all persons who do not want their presentation or themselves recorded, please approach the Clerk to declare same and the District will relay this to the Association so that you can freely speak.

2. APPROVAL OF AGENDA

THAT the June 13, 2016 Committee of the Whole Meeting Agenda be adopted as presented.

3. ADOPTION OF MINUTES

a) Committee of the Whole Meeting Minutes

THAT the Minutes of the Committee of the Whole Meeting held April 25, 2016 be adopted as presented.

3. OTHER PERTINENT BUSINESS

a) McKay Edwards – Update on Nickel Mine Tailings Storage Facility

Presentation to provide an update on the status of reclamation at the tailings storage facility.

4. CLOSE
1. MAYOR VICKTOR CALLED THE MEETING TO ORDER AT 6:30 PM

2. APPROVAL OF THE AGENDA

   Moved by Councillor Dyble / Seconded by Councillor Medlock
   THAT the April 25, 2016 Committee of the Whole agenda be adopted as presented.

   CARRIED.

3. ADOPTION OF MINUTES

   Moved by Councillor Dyble / Seconded by Councillor Erickson
   THAT the Minutes of the Committee of Whole Meeting held April 7, 2016 be adopted as presented.

   CARRIED.
4. **FINAL ASSET MANAGEMENT INVESTMENT PLAN 2016 REPORT**

Representatives from Urban Systems provided an overview of the Final Asset Management Investment Plan 2016 Report. The purpose of an Asset Management Plan is to ensure long term sustainable service delivery by analyzing the District’s physical infrastructure assets and financial resources. Upon researching the District’s assets, it was determined that the District has $256,000,000 in assets, 30% remaining life, $48,000,000 infrastructure deficit and an average annual life cycle cost investment of $5,300,000. The District’s infrastructure includes 60 km of water pipes, 36 km of storm pipes, 50 km of sanitary pipes, 10 lift stations, 11 water pumping facilities, 4 reservoirs, 82 km of roads and 6 bridges.

Urban Systems indicated that the next key steps include:

- Undertaking condition and risk assessments for assets that have passed their service life to determine the likelihood and consequence of failure for each asset.
- Consider cost, risk and service in the existing budgeting process.
- Consider adjusting levels of service to reduce asset replacement costs (e.g. reducing road widths).
- Update infrastructure master plans and bylaws using asset management principles.
- Review rates, taxes and fees to increase revenue and determine affordability limits.
- Consider seeking alternative revenue sources.
- Develop financial/infrastructure policy.
- Continue lobbying FCM and UBCM for support and demonstrate your capacity.
- Develop a prioritized capital plan that considers all infrastructure and service needs – condition, capacity and compliance.

5. **MAYOR VICKTOR CLOSED THE COMMITTEE OF THE WHOLE MEETING AT 7:06 P.M.**

Certified a true and correct copy of the Minutes of the Committee of the Whole meeting of Council held on April 25, 2016, in the Council Chambers of the District of Hope, British Columbia.

______________________________  ______________________________________
MAYOR  CORPORATE OFFICER
Wilfried Vicktor  Donna Bellingham
Giant Nickel Tailings Storage Facility – Community Meetings
Week of June 13th, 2016
Greetings and Introductions
Agenda

- **Purpose of this Meeting**
  - Tailings – Brief Overview
  - Giant Nickel Tailings Storage Facilities
  - 2015 – Year in Review
  - Giant Nickel Work Plan, 2016
  - Questions and Comments
Purpose of the Meeting

- Provide important information on:
  - Barrick’s work since the 2015 Meeting
  - Barrick’s 2016 work plan at Giant Nickel
  - Authorizations for which Barrick intends to apply
- Solicit feedback on Barrick’s proposed plans from communities of interest
- Describe the work Barrick is doing to further reduce the likelihood and consequence of a tailings dam failure
- Purpose of this Meeting
- **Tailings – Brief Overview**
- Giant Nickel Tailings Storage Facilities
- 2015 – Year in Review
- Giant Nickel Work Plan, 2016
- Questions and Comments
What are Mine Tailings?

Tailings are the finely-ground rock particles, usually the size of fine sand and silt, which remain after the crushed and slurried ore has been processed to remove the desired metals.

Fine sand and silt relative sizes
(1 micron = 1,000 mm)

Typical human hair diameter
(80 microns)

425 microns
75 microns
2 microns

Fine sand
Silt
### Tailings Treatment and Storage Options

<table>
<thead>
<tr>
<th>Storage Type</th>
<th>Treatment Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional (Slurry)</td>
<td>In-Pit</td>
</tr>
<tr>
<td>Thickened (Paste)</td>
<td>Underground Backfill (often with binder)</td>
</tr>
<tr>
<td>Filtered (Cake)</td>
<td>–</td>
</tr>
<tr>
<td>Below Ground</td>
<td></td>
</tr>
<tr>
<td>In-Pit</td>
<td>Underground Backfill (often with binder)</td>
</tr>
<tr>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Surface Impoundment</td>
<td>Raised Embankments:</td>
</tr>
<tr>
<td></td>
<td>• Upstream</td>
</tr>
<tr>
<td></td>
<td>• Centreline</td>
</tr>
<tr>
<td></td>
<td>• Downstream</td>
</tr>
<tr>
<td></td>
<td>Central Discharge (Paste Cells)</td>
</tr>
<tr>
<td></td>
<td>Dry Stack</td>
</tr>
<tr>
<td>Water Retention Dams</td>
<td></td>
</tr>
<tr>
<td>Water Body</td>
<td>Riverine</td>
</tr>
<tr>
<td></td>
<td>Lacustrine Submarine</td>
</tr>
<tr>
<td></td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>–</td>
</tr>
</tbody>
</table>

– indicates not common / practicable

Most below ground and above ground storage methods are adoptable to tailings / waste rock co-disposal. Water-retention type dams (defined as being built to full height prior to receiving tailings) for storing large volumes of runoff water as well as tailings solution are less common than raised embankments.
Mount Polley Tailings Dam Failure

Photo credit: Jonathan Hayward/The Canadian Press
Independent Expert Review Mandate

Investigate and report on the cause of failure
- Mechanisms
- Contributing technical, management or other practices

Recommend actions to ensure no similar failures at other BC mine sites

Identify potential practices for implementation in BC to prevent such failures
August 18, 2014

Notification of Chief Inspector’s Orders
Tailings Dams – Independent Review of Dam Safety and Consequence Classification

As Chief Inspector of Mines, it is my responsibility to ensure that tailings dams in British Columbia are being designed, constructed, and operated in a safe manner. In light of the recent tailings dam failure at the Mount Polley mine on August 4, 2014, I am issuing the following orders for the purpose of reviewing the safety of tailings impoundment structures at mines throughout the province to establish where improvements may be required.

Owners, agents or managers responsible for tailings dams are being issued these orders pursuant to Section 18 of the Mines Act.

Orders:

Dam Safety Inspection and Independent Third Party Review of Dam Safety Inspection

1. You are required to conduct a Dam Safety Inspection (DSI) by December 1, 2014. The DSI must cover all dam structures for all tailings storage facilities on your mine site. The DSI must be conducted by a qualified professional engineer consistent with the BC Ministry of Energy and Mines Guidelines for Dam Safety Inspections.

2. The mine manager must have the DSI reviewed by an independent qualified third-party professional engineer from a firm that has not been associated with the tailings dam. The Independent Third Party Review of the DSI must also include a review of the dam consequence classifications.

3. Both the DSI and the Independent Third Party Review of the DSI must be signed by the qualified licensed professional engineers who conducted the work.

4. Any recommendations made in the DSI or the Independent Third Party Review of the DSI must be summarized in an accompanying letter from the Mine Manager to the Chief Inspector outlining the commitments for completing the recommended work along with a schedule for implementing the recommended work.

5. The DSI, Independent Review of the DSI, and the mine manager’s letter to the Chief Inspector must be submitted to the Chief Inspector by December 1, 2014.

Emergency Preparedness and Response Plan and Dam Break Inundation Study

6. All tailings dams that have a failure consequence classification of high, very high or extreme (and taking into account any change in dam classification resulting from the Independent Third Party Review of the DSI under Orders 1 through 5), must have an Emergency Preparedness and Response Plan (EPRP) and a Dam Break Inundation Study.

7. The EPRP and Dam Break Inundation Study must be completed and tested consistent with the Canadian Dam Association, Dam Safety Guidelines (CDA Guidelines). If the tailings facility already has an existing EPRP, it must be reviewed and updated for consistency with the CDA Guidelines and with current standards of engineering practice.

8. The Dam Break Inundation Study must be prepared by a qualified licensed professional engineer.

9. The Dam Break Inundation Study, the EPRP, and a summary of the EPRP test including any identified gaps and lessons learned from the EPRP test, must be submitted to the Chief Inspector by December 1, 2014.

The Ministry of Energy and Mines will be placing reliance on the seal of the qualified professionals undertaking the above work. In addition, all submitted reports and reviews that are submitted to satisfy these orders will be subject to additional review by Ministry of Energy and Mines geotechnical engineers and/or their consultants. As well, in the interest of transparency and the public interest, all submitted documents related to these orders will be made available to the public.

Sincerely,

Al Hoffman, P. Eng.
Chief Inspector of Mines
27 January 2015 Memorandum

Ministry of Energy and Mines

MEMORANDUM

Date: January 27, 2015

To: Robbie Harmeit, Mine Manager
    [Sent by Email: RHarmeit@barrick.com]

CC: Diane Howe, Deputy Chief Inspector, Reclamation and Permitting, MEM
    George Warnick, Manager, Geotechnical Engineering, MEM
    Heather Narynski, Sr. Geotechnical Inspector, MEM

Re: Review of Submission in response to Chief Inspector’s Orders issued on August 18, 2014

The Ministry of Energy and Mines has engaged a consulting firm to evaluate the consistency and
compliance of your submission in response to the Chief Inspector’s orders issued on August 18, 2014.
This high-level review has determined that your submission satisfies the requirements of the Order;
however, the following items shall be addressed:

Dam Safety Inspection (DSI) Report:  
• For consistency with MBM’s Dam Safety Inspection Guidelines and good engineering practice,
  the next DSI submission shall include:
  o Review of climate data
  o Review of instrumentation data inclusive of most current record

In addition to the requirements listed above, all recommendations made by your consultants within
each document submitted, shall be addressed in the timeframe specified. MEM will be following-up
in the fall of 2015 to obtain a status update with respect to all recommendations and commitments, as
well as any submission deficiencies noted above.

This review is specific to the orders issued on August 18, 2014, which does not encompass all aspects
of dam safety in relation to the tailings dam(s). Please ensure that you are meeting your ongoing
requirements with respect to the following:

• Satisfying any outstanding orders from previous Ministry Inspection reports.
• Satisfying any outstanding recommendations from previous Dam Safety Inspections (DSI) or Dam
  Safety Reviews (DSR).
• Submission of annual Dam Safety Inspection (DSI) reports as per Section 10.5.3 of the Health,
  Safety and Reclamation Code for Mines in BC (Code). These reports are to be submitted by
  March 31st in the year following the inspection. The next DSI (for 2013) will be due March 31,
  2016.

Thank you for your submission to the orders of August 18, 2014.

Sincerely,

Al Hoffman, P. Eng.
Chief Inspector of Mines
Ministry of Energy and Mines
03 February 2015 Memorandum

MEMORANDUM

February 3, 2015

To: Robin Harnatt, Mine Manager - Snip-Barrick

As you are aware, the Expert Panel that was convened to examine the Mount Polley tailings dam breach has issued a report on their findings. This report has been made public and you may already be familiar with the conclusions of this report. Chief among these was the determination that the failure at Mount Polley was related to the presence of weak glacio-lacustrine soil in the dam foundation. The Panel also indicated that the severity of the consequence of failure was in large part owing to the quantity of stored water and the proximity of this water to the dam embankment (i.e. lack of beach). The Ministry of Energy and Mines (MEM) requires confirmation that the conditions that lead to the incident at Mount Polley are not present at other mines in B.C.

More specifically, you are required to undertake an assessment to determine if the dam(s) associated with your tailings storage facility/facilities may be at risk due to:

1. Undrained shear failure of silt and clay foundations;
   a. Including a determination with respect to whether or not similar foundation conditions exist below the dams on your site,
   b. Whether or not sufficient site investigation (SII) holes, etc. has been completed to have confidence in this determination,
   c. If present, whether or not the dam design properly accounts for these materials,
   d. If any gaps have been identified, a plan and schedule for additional sub-surface investigation.

2. Water balance adequacy;
   a. Including the total volume of surplus mine site water (if any) stored in the tailings storage facility,
   b. The volume of surplus mine water that has been added to the facility over each of the past five years,
   c. Any plans that are in place or that are under development to release surplus mine water to the environment,
   d. Recommended beach width(s), and the ability of the mine to maintain these widths,
   e. The ability of the TSF embankments to undergo deformation without the release of water (i.e. the adequacy of the recommended beach width),
   f. Provisions and contingencies that are in place to account for wet years, and
   g. If any gaps have been identified, a plan and schedule for addressing these issues.

The Ministry is cognizant of the demands that were placed on your company by the Chief Inspector’s Orders of August 18, 2014, and does not wish to place any additional undue burdens on your company. However, the previous Orders were issued before the mechanism of failure was known. Consequently, you are asked to provide a letter of assurance to respond to the items listed above. The letter is to be prepared and sealed by a qualified professional engineer, and is to be submitted to the Chief Inspector of Mines by June 30, 2015. To facilitate MEM’s review, you are asked to maintain the above numbering system in your response to each item.

It is envisioned that the above items would best be addressed through a fulsome review of existing information. Where this information has not been compiled, it will be necessary to conduct a review of historical information to determine if any gaps remain in the understanding of the relevant conditions for the tailings storage facility dams on your site. Where appropriate, follow-up actions shall be identified that will be taken to address any opportunities for improvement.

Documents supporting the letter of assurance shall be maintained on-site and shall be made available to any Inspector of Mines upon request.

It should be noted that the Panel made a number of additional recommendations in Chapters 9 and 11 of their January 30, 2015 Report on Mount Polley Tailings Storage Facility breach. MEM is in general agreement with all of the recommendations, and will be examining each of them to determine how they can be implemented over the coming weeks and months. You are asked to do the same.

Thank you for your prompt attention to these matters,

Regards,

[Signature]

Ali Hoffman, P.Eng
Chief Inspector of Mines
Ministry of Energy and Mines

CC: Diane Howe, Deputy Chief Inspector, Reclamation and Permitting, MEM
George Warnock, Manager, Geotechnical Engineering, MEM
Heather Narynski, Sr. Geotechnical Inspector, MEM
- Purpose of this Meeting
- Tailings – Brief Overview
- **Giant Nickel Tailings Storage Facilities**
- 2015 – Year in Review
- Giant Nickel Work Plan, 2016
- Questions and Comments
Giant Nickel (Pride of Emory)
Mine History

Underground nickel/copper mine and mill

Located 10 km north of Hope, on Trans-Canada Highway

Long history of mining under various owners:

- Operated intermittently from 1920’s through 1950’s
- Sustained operation from 1959 through 1974
  - 4.7 million tons ore mined
  - 59 million pounds nickel
  - 28 million pounds copper

Over forty years in closure status

- Initial reclamation by Homestake Canada in mid-1990’s
- Barrick acquired Homestake (and Giant Nickel) in 2003
Site Location and Layout

- Historic Tailings Area
- Lower TSF
- Upper TSF

[Map of site location and layout]
Series of 3 tailings impoundments (Upper, Lower and Historic) created during operations (1959 to 1974)

- Tailings have been capped and re-vegetated
- Ponding at the toe of the Upper TSF
- Large pond on the Lower TSF (associated with decant pond location during former operation)
- The TSF areas and the surrounding steep hillslopes drain into Stulkawhitis Creek (commonly referred to as Texas Creek)

Permitting

- Reclamation Permit M-64 issued by MEM
Giant Nickel Mine – Tailings Facility

Historic Tailings

Upper TSF

Lower TSF

Pond

Dam

Nickelmine Road

Dogwood Valley

Stulkawhits

Creek
Dam Breach Study

- Probable maximum flood (PMF) = 838 mm (24-hr rain on snow event)
- Rainy day and sunny day scenarios with/without dam breach
- 179,342 m³ (sunny day) to 242,331 m³ (rainy day) pond volumes
- 836,640 m³ tailings
- 30% breach release (tailings plus water)
Rainy Day: PMF with Dam Breach
Section D
Static Minimum Factor of Safety = 1.6

Cap Material

Approx. El. 472.5m

Sandy Tailings

Approx. El. 469m

Fine Tailings

Embankment Fill

Granular Foundation

Weathered Bedrock

Core (Zone S) - El. 969m
Tailings - El. 967.4m
Rock (Zone C) - El. 969m
Post-Breach Ground Profile (August 5, 2014)
Wahleback
Upper Till
Lower Tills
Bedrock

Distance (m)

Metres

0 10 20 30 40 50 60 70 80 90 100 110 120

0 10 20 30 40 50 60 70 80 90 100 110 120

Giant Nickel Lower TSF Foundation
- Purpose of this Meeting
- Tailings – Brief Overview
- Giant Nickel Tailings Storage Facilities
- 2015 – Year in Review
- Giant Nickel Work Plan, 2016
- Questions and Comments
Giant Nickel TSF Work Plan

Work Plan objective:

- Further reduce already extremely low risk of TSF Dam failure
- Reduce consequence of dam failure from earthquake or flood
- Meet or exceed all MEM orders and requirements
- Ensure passive care conditions for Giant Nickel TSFs and work toward stable landform
# Giant Nickel TSF Work Plan

<table>
<thead>
<tr>
<th></th>
<th>Work Plan Description</th>
<th>Year(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Remove debris and vegetation from North Spillway</td>
<td>2015</td>
</tr>
<tr>
<td>2.</td>
<td>Remove debris and vegetation from inlet of South Spillway decant structure</td>
<td>2015</td>
</tr>
<tr>
<td>3.</td>
<td>Discharge water from and regrade ponded area at toe of Southern portion, Upper TSF</td>
<td>2015</td>
</tr>
<tr>
<td>5.</td>
<td>Complete Dam Safety Inspection and include (a) review of climate data and (b) water discharge system, volumes and quantity</td>
<td>2015</td>
</tr>
<tr>
<td>6.</td>
<td>Assurance Letter re: Foundation Conditions</td>
<td>2015</td>
</tr>
<tr>
<td>7.</td>
<td>Conduct a Dam Safety Review, evaluate climate data and perform water balance study</td>
<td>2016</td>
</tr>
<tr>
<td>8.</td>
<td>Next Dam Breach Inundation Study to include sensitivity analysis for breach parameters</td>
<td>2017</td>
</tr>
<tr>
<td>9.</td>
<td>Discharge water from and regrade ponded area at Lower TSF</td>
<td>2015, 2016</td>
</tr>
</tbody>
</table>
South Spillway – Before and after:
Execution of Work Plan
Spillway Improvement – March 2015

- North Spillway – Before and after:
Execution of Work Plan – Lower TSF Dewatering

- Water measuring and water quality sampling, March 2015
Execution of Work Plan – Lower TSF Dewatering, Summer 2015

Submersible Pump with 6-Inch discharge hose
Lower TSF Pond after completion of dewatering, July 2015.
Execution of Work Plan – Upper TSF Pond Re-Grading, Drainage and Diversion (Summer 2015)

Left: Draining Upper TSF Pond. Right: Re-Grading and drainage.
Revegetation and erosion control.
Execution of Work Plan – Utilization of Local Work Force
### Execution of Work Plan – Scorecard

<table>
<thead>
<tr>
<th></th>
<th>Task Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Remove debris and vegetation from North Spillway</td>
<td>Complete</td>
</tr>
<tr>
<td>2.</td>
<td>Remove debris and vegetation from inlet of South Spillway decant structure</td>
<td>Complete</td>
</tr>
<tr>
<td>3.</td>
<td>Discharge water from and regrade ponded area at toe of Southern portion, Upper TSF</td>
<td>Complete</td>
</tr>
<tr>
<td>4.</td>
<td>Update Emergency Response Plan</td>
<td>Complete</td>
</tr>
<tr>
<td>5.</td>
<td>Complete Dam Safety Inspection and include (a) review of climate data and (b) water discharge system, volumes and quantity</td>
<td>Complete</td>
</tr>
<tr>
<td>6.</td>
<td>Assurance Letter re: Foundation Conditions</td>
<td>Complete</td>
</tr>
<tr>
<td>7.</td>
<td>Conduct a Dam Safety Review, evaluate climate data and perform water balance study</td>
<td>Scheduled</td>
</tr>
<tr>
<td>8.</td>
<td>Next Dam Breach Inundation Study to include sensitivity analysis for breach parameters</td>
<td>Scheduled</td>
</tr>
<tr>
<td>9.</td>
<td>Discharge water from and regrade ponded area at Lower TSF</td>
<td>Scheduled</td>
</tr>
</tbody>
</table>
Giant Nickel Work Plan 2016

- Purpose of this Meeting
- Tailings – Brief Overview
- Giant Nickel Tailings Storage Facilities
- 2015 – Year in Review
- Giant Nickel Work Plan, 2016
- Questions and Comments
Above: Diesel Pump on Dam Crest
Above Right: Data Logger
Below Right: Intake
Above and Right: Syphon Installation
Above: Piezometers connection to telemetry
Goals of Program:

1. To investigate the geotechnical and hydrogeological conditions of the Lower and Upper TSF Embankments

2. To install Vibrating Wire Piezometers (VWPs) in completed drillholes; eight within the Lower TSF Embankment and eight within the Upper TSF Stage 1 and 2 Dykes (South side)
Site Investigation, Phase I – Feb/March 2016

- **Work Completed**
  - 7 Sonic drill holes (4 at Lower TSF, 3 at Upper TSF) drilled into bedrock
  - Standard Penetration Testing (SPT) and downhole water level measurements
  - Installation of 16 Vibrating Wire Piezometers (VWPs) in drillholes (8 in upper TSF, 8 in lower TSF)
  - Laboratory testing of selected embankment and dyke fill, tailings and overburden material recovered from drilling
  - Telemetry for VWPs

- **Lessons Learned**
  - Lower TSF embankment is strong; water behind dam not impacting dam safety
  - Upper TSF dams (South side) requires buttressing to meet desired factor of safety
Goals:

- locate appropriate rock and other fill material for buttressing upper TSF dams (south side) and lower TSF pond
- test rock and fill material for ARD potential
- determine location, quantity and type of trees requiring removal for License to Cut application
Site Investigation Phase II – May-June 2016
2016 Earthworks Project – Timing and Next Steps

Engineering/Other

- Preliminary design and IFC drawings received June 10
- Formal risk assessment, June 21
- Procurement – earthworks contractor, subs & suppliers
- Pre-Work (July, 2016)
  - De-watering
  - Clearing and site prep
- IFC drawings to be received (July, 2016)
- Earthworks commences (Aug 2016)

Permitting

- Preliminary Field Reconnaissance to assess archaeological potential of borrow areas
- License to Cut application (FLNRO)
- Agreement with BC Hydro re: working under hydro lines
- Agreement with MOE for:
  - Water discharge
  - Water management plan
- Amendment to Mines Act permit
  - Earthworks
  - Borrow pits
  - S&H and erosion control
- Purpose of this Meeting
- Tailings – Brief Overview
- Giant Nickel Tailings Storage Facilities
- 2015 – Year in Review
- Giant Nickel Work Plan, 2016

**Questions and Comments**