



Conservation and Water Stewardship

Climate Change and Environmental Protection Division
Environmental Approvals Branch
123 Main Street, Suite 160, Winnipeg, Manitoba R3C 1A5
T 204 945-8321 F 204 945-5229
www.gov.mb.ca/conservation/eal

File: 5628.00

June 11, 2013

David J. Salari, P.Eng.
Chief Operating Officer
BacTech Environmental Corporation
50 Richmond Street East, Suite 300
Toronto, ON M5C 1N7

Dear Mr. Salari:

**Re: BacTech Manitoba Corporation ARS Remediation – Snow Lake, MB –
Environment Act Proposal**

The initial review of the Environment Act Proposal (EAP) regarding the proposed BacTech Manitoba Corporation ARS Remediation – Snow Lake, MB has been completed.

The initial review has generated requests for additional information. Please respond to the comments and requests from the public and the Technical Advisory Committee that have been previously forwarded to BacTech via email and are presented in the attached items being:

1. Email message from Lands Branch – Manitoba Conservation and Water Stewardship, dated March 21, 2013;
2. Email message with attachment from Forestry Branch – Manitoba Conservation and Water Stewardship, dated March 21, 2013;
3. Email message from Fisheries Branch – Manitoba Conservation and Water Stewardship, dated March 18, 2013;
4. Email message from Clair Pilgrim, dated March 14, 2013;
5. Email message from Office of Drinking Water – Manitoba Conservation and Water Stewardship, dated March 13, 2013;
6. Facsimile message (3 pages) from Town of Snow Lake, dated March 11, 2013;
7. Letter from Environmental Services Section – Manitoba Infrastructure and Transportation, dated March 6, 2013;
8. Email message from Environmental Compliance and Enforcement Division – Manitoba Conservation and Water Stewardship, dated February 26, 2013;

9. Letter with attachments from Clair Pilgrim, dated February 22, 2013;
10. Email message from Canadian Environmental Assessment Agency, dated February 14, 2013;
and
11. Memorandum from Water Quality Management Section – Manitoba Conservation and Water Stewardship, dated February 14, 2013.

Please address and respond to the comments and requests for additional information. Resulting responses that are specifically pertinent to the EAP review are to be directed through Manitoba Conservation and Water Stewardship's Environmental Approvals Branch. The EAP review process will continue upon receipt of your response.

If you have any questions or would like to discuss these items, please contact me at 204-945-6030.

Yours truly,

Original Signed By

Robert Boswick, P. Eng.
Environmental Engineer

Attachments

- c: MaryAnn Mihychuk, Director – BacTech (via email)
- Don Labossiere, Director – Environmental Compliance and Enforcement, Manitoba
Conservation and Water Stewardship
- Clair Pilgrim (via email)
- Public Registries

From: Kaita, Adara (CON) on behalf of +WPG1212 - Conservation_Circulars (CON)
Sent: March-21-13 2:18 PM
To: Boswick, Robert (CON)
Subject: FW: EA Proposal - BacTech Manitoba Corporation - ARS Remediation - Snow Lake - File: 5628.00

Hi Robert,

I have received the following comments, please disregard the March 19th email and replace with the following:

The Sustainable Resource and Policy Management Branch have no concerns. The Lands Branch supports the project, conditional upon the following:

- If the proposed activity will require additional stripping or clearing which will impact merchantable timber the contractor is required to contact the Regional Forester; prior to impact activities, to determine if a timber damage appraisal is applicable.
- Work permit is required from local NRO Office for work on Crown Lands
- Route for actual pipeline is still to be confirmed, map should be provided showing actual route. There are no concerns with the proposed route.
- Potential plant noise- should be addressed with support from Town Snow Lake.
- No comments or recommendations in regards to the BACOX process involving a biological reactor leaching process. This has been deferred to Water Science Management for their evaluation and comment.
- No resource concerns with location of Storage compound facility - area is an existing clay pit. For decommissioning storage compound it is recommended area to be covered with a clay cap, (min .5 meters) local till and planted with natural seed mix.
- Storage compound "is expected to be "clay and liner- it is recommend this be implemented unless better alternative is provided.
- Report notes "water sample analysis from monitoring wells will continue to be recorded following the closure of the storage impoundment area." The time frame is to be defined and it is recommended that it be ongoing.
- Recommend ongoing monitoring of surrounding groundwater, soil, and surface water once project is complete to determine long term effect. Important in sampling is the water quality (surface and groundwater) into Snow Lake from Snow Creek and tributary sources.
- Stockpile site (ARS) to be reclaimed and rehabilitated, including soil under and adjacent to stockpile.
- The location of the proposed Bioleach facility, storage impoundment area, and pipelines are contained within QMX Mineral lease. Proposal notes; "a co-operative agreement between QMX and Bac Tech to be negotiated"-requires negotiation prior to development.
- Requires land tenure for Storage Compound Facility. Will the storage compound facility be held under Crown Land Reservation by IEM as a storage facility under the Orphaned and Abandoned Mine site Rehabilitation Program?

The Lands Branch also notes the following:

- No significant Resource or Environmental concerns noted in proposal, with significant potential to reduce or eliminate arsenic leaching into the surrounding environment from the identified arsenopyrite residue stockpile. This would be conditional the project is implemented as proposed, considering the following comments, and ensuring all Federal and Provincial regulations, and Guidelines are met.
- Main priority of the project is to reduce or eliminate leaching of arsenic from stockpile to surrounding soil, groundwater and surface water with proper treating and long term storage.
- Water recovery is important from the storage compound-detailed engineering to identify best option- this would require review. No concern with option presented in Figure 8.
- Snow Lake itself does have high quality fish habitat, and is an important recreational fishery. Canada Creek watershed flows into Snow Lake and is an important source. Within the study area the consultant indicated only small bodied species were located. It was noted sampling was conducted in July-August. Typically larger fish species would be more evident in a creek system during the spring spawning period.

- Adara

From: Kaita, Adara (CON) **On Behalf Of** +WPG1212 - Conservation_Circulars (CON)
Sent: March-19-13 9:12 AM
To: Boswick, Robert (CON)
Cc: Armstrong, Mike (CON)
Subject: EA Proposal - BacTech Manitoba Corporation - ARS Remediation - Snow Lake - File: 5628.00

Hi Robert,

The Sustainable Resource and Policy Management Branch and the Lands Branch have no concerns with the EA.

Adara Kaita

Crown Land Programs and Policy Manager
Conservation and Water Stewardship
Box 25, 200 Saulteaux Crescent
Winnipeg, MB R3J 3W3
Cell: (204) 945-6301
F: (204) 948-2197

From: Armstrong, Mike (CON)
Sent: March-21-13 1:06 PM
To: Boswick, Robert (CON)
Subject: FW: Request for TAC Review/Comments - BacTech Manitoba Corporation - ARS Remediation - Snow Lake - File: 5628.00

Please see attached comments from NW Region in regards to EA Proposal – Bac Tech Manitoba Corporation - ARS Remediation - Snow Lake - File: 5628.00

Review Bac Tech Environmental Assessment Report-File 5628.00

The NW IRMT has reviewed EA Proposal - BacTech Manitoba Corporation - ARS Remediation - Snow Lake - File: 5628.00 to treat and stabilize material from an arsenopyrite residue stockpile (ARS) IN Snow Lake, Manitoba using a bioleach process.

Background

- This site was identified as a designated site in the Province of Manitoba's Orphaned and Abandoned Mine site Rehabilitation Program. Proposal was determined to be a Class II Development under Manitoba's Classes of Development Regulation. The stockpile (ARS) is approximately 185 meters x 85 meters in size composed of approximately 300,000 tonnes of cyanide-treated concentrate, with an estimated 9.7 grams /tonne of gold. The study area is composed of an area approximately 5.1 sq kilometres including an arsenopyrite residue stockpile, bioleach plant, storage impoundment, and surrounding area. Depending on additional feed source potentially identified the life of the plant is estimated at approximately 7 years. Process includes naturally occurring bacteria (harmless to environment or humans) to liberate precious and base metals from ore residues. Bac Tech met with public and town council on (3) three occasions. Reclamation of the stockpile site will also provide economic opportunity to the Town of Snow Lake employing approximately 31 employees.

The project is composed of five major components:

- Arsenopyrite residue stockpile (ARS)
- Hauling arsenopyrite residue (AR) to the Bioleach plant
- Bioleach plant
- Pipelines to transport stabilized waste to storage impoundment
- Storage Impoundment

Comments/ Recommendations:

- No significant Resource or Environmental concerns noted in proposal, with significant potential to reduce or eliminate arsenic leaching into the surrounding environment from the identified arsenopyrite residue stockpile. This would be conditional the project is implemented as proposed, considering the following comments, and ensuring all Federal and Provincial regulations, and Guidelines are met.
- Main priority of the project is to reduce or eliminate leaching of arsenic from stockpile to surrounding soil, groundwater and surface water with proper treating and long term storage.
- If the proposed activity will require additional stripping or clearing which will impact merchantable timber the contractor is required to contact the Regional Forester; prior to impact activities, to determine if a timber damage appraisal is applicable.
- Work permit is required from local NRO Office for work on Crown Land.
- No comments or recommendations in regards to the BACOX process involving a biological reactor leaching process. This has been deferred to Water Science Management for their evaluation and comment.
- Route for actual pipeline is still to be confirmed, map should be provided showing actual route. No concerns following proposed route.
- Potential plant noise- should be addressed with support from Town Snow Lake.
- No resource concerns with location of **Storage compound facility** - area is an existing clay pit. For decommissioning storage compound it is recommended area to be covered with a clay cap, (min .5 meters) local till and planted with natural seed mix.
- Storage compound "is **expected to be** "clay and liner- it is recommend this be implemented unless better alternative is provided.
- Water recovery is important from the storage compound-detailed engineering to identify best option- would require review. No concern with option presented in Figure 8.
- Report notes "water sample analysis from monitoring wells will continue to be recorded following the closure of the storage impoundment area" -time frame to be defined- recommend ongoing.
- Agree majority of area for construction has been heavily disturbed, and does not provide for good quality wildlife habitat. In the Town limits of Snow Lake.
- Snow Lake itself does have high quality fish habitat, and is an important recreational fishery. Canada Creek watershed flows into Snow Lake and is an important source. Within the study area the consultant indicated only small bodied species were located. It was noted sampling was conducted in July-August. Typically larger fish species would be more evident in a creek system during the spring spawning period.

- Recommend ongoing monitoring of surrounding groundwater, soil, and surface water once project is complete to determine long term effect. Important in sampling is the water quality (surface and groundwater) into Snow Lake from Snow Creek and tributary sources.
- Stockpile site (ARS) to be reclaimed and rehabilitated, including soil under and adjacent to stockpile.
- The location of the proposed Bioleach facility, storage impoundment area, and pipelines are contained within QMX Mineral lease. Proposal notes; "a co-operative agreement between QMX and Bac Tech to be negotiated"-requires negotiation prior to development.
- Requires land tenure for Storage Compound Facility. Will the storage compound facility be held under Crown Land Reservation by IEM- as a storage facility under the Orphaned and Abandoned Mine site Rehabilitation Program?

Boswick, Robert (CWS)

From: Janusz, Laureen R (MWS)
Sent: March-18-13 3:34 PM
To: Boswick, Robert (CON)
Cc: Kitch, Ian (MWS); Long, Jeff (MWS)
Subject: EAP 5628.00 BacTech Manitoba Corporation - ARS Remediation - Snow Lake due March 15

Hi Robert,

Sorry I didn't make the early afternoon deadline.

Fisheries Branch has reviewed this request treat and stabilize material from an arsenopyrite residue stockpile (ARS) comprised of approximately 300,000 tonnes of cyanide-treated concentrate residue located in Snow Lake using a bioleach process.

Background:

This site was identified as a designated site in the Province of Manitoba's Orphaned/Abandoned Mine Site Rehabilitation Program. It is a source of contaminate loading based on metal concentrations measured in pore water of the ARS and in groundwater adjacent to the ARS. Elevated concentrations of metals in the soil proximate to and north of the pile, lie within a natural drainage channel draining into a wetland that discharges into Snow Lake. Concentrations of metals in groundwater at the site are sufficiently elevated that they pose an unacceptable risk to human health, aquatic life and terrestrial life should they come into contact with this water. The proposed development is to be situated within an Industrial zone of the Town of Snow Lake.

The project is comprised of five components: the arsenopyrite residue stockpile; hauling the residue to the Bioleach Plant site; the bioleach plant facility; pipelines to transport stabilised waste to and recover water from the storage impoundment facility and the storage impoundment facility. The proposed bioleach process uses naturally occurring bacteria, harmless to humans and the environment, to free precious and base metals from sulphide ore residues and results in a stable iron arsenic precipitate which is an environmentally benign product.

While much of the area is disturbed there are also extensive wetlands, several small ponds and a drainage channel. The drainage channel passes from east to west towards a small water body located between the ARS and the storage impoundment area, passes under the roads via culverts to the northwest and connects to Canada Creek and Snow Lake.

The consultant's have indicated that overall the environmental effects of the project (remediation of ARS and implementation of water management system expected to decrease the loading and concentration of metals to groundwater, soil and surface water; infilling of portion of wetland for road; spills from transporting ARS, breach of pipeline and from storage impoundment system) were likely to be minimal. Bach Tech has indicated using control technology as well as regular pipeline inspections, monitoring the process and the pipeline with a Programmable Logic Controller capable of detecting slight changes in the process including a pressure drop in the pipeline. Environmental monitoring programs will be developed to track conditions or issues during the lifespan and adaptive management implemented as necessary.

*The water that falls or accumulates in the ARS site during the excavation of the material as well as during dust suppression will be pumped to a sedimentation tank, then a storage tank and then either piped or trucked to the BacTech facility for consumption into the process. The storage impoundment area where the neutralized precipitate will be discharged to is **expected to be clay and HDPE lined to prevent seepage into our out of the impoundment.** They are currently also looking at the best option to reclaim water from the storage cell which, until the project is complete, would be returned for re-use in the process. Upon closure the plan for the storage impoundment area is to place a clay cap over the precipitate, top with local till and perhaps planting of wild grasses. Monitoring wells will be strategically drilled around the SIA to monitor ground water quality before and after neutralized precipitate is capped to assure there is no effect to surrounding water quality.*

Branch comments:

Snow Lake provides year round habitat for a number of small body species which support large bodied recreationally important fish species. Within the study area, however the consultant's indicate that only small bodied species were found: brook stickleback, lake chub and fathead minnows. From the report however it does appear that the wetlands provide nursery areas for these species which then migrate out to Canada Creek. I do not have the expertise to comment specifically on the end product or chemical components involved in the processes so for this aspect defer to Water Science Management for their evaluation. Generally it would seem, from a fisheries perspective, that what they are proposing should actual result in an improvement in metal concentrations currently found in the sediment and water (surface and ground) which leads to or contributes to primary fish bearing waters.

There are some elements of this project which still need to be determined (for example the actual pipeline route, whether the pipeline carrying the precipitate will be placed on a bed of material or within a larger pipe; how the accumulated water from the storage impoundment area will be removed and the lining of the storage impoundment area). It would be beneficial to have some of those aspects finalized as part of the review. However, from our perspective, perhaps some of these as well as other project areas could be covered off in general licence conditions as follows:

- given the proximity of the pipeline, in some locations, to the drainage channel, our preference would likely be for the pipeline to be placed within a larger pipe. I'm not sure if this could be a licence requirement.
- Also not sure what the uncertainty is regarding the lining for the storage impoundment area as they noted "is expected to be" clay and liner. We would certainly prefer that both be implemented as suggested.
- They have indicated that with the culvert installation they will ensure unimpeded flow under expected flow conditions. Could this be a licence condition as well as the requirement to generally work when "dry" and/or ensure the implementation of appropriate erosion and sediment control measures during and after until all the sites have stabilized.
- Regarding the water withdrawal from Snow Lake the proponent does not indicate that they will be adhering to DFO's Freshwater Intake End-of-Pipe Fish Screen Guidelines. Given Snow Lake is fish bearing we would really appreciate a clause that requires them to adhere to these guidelines and in particular the need to screen, the placement and approach velocities. The guidelines are only effective at preventing the entrainment or impingement of fish larger than 25 mm and for many Manitoba fish species the larval stages are much smaller than this which is why placement is also important.
- Regarding monitoring, given they are predicting a decrease in loading and concentration of metals to groundwater, soil and surface water, it would be good to have post project monitoring to verify this prediction (noted for groundwater but not the other components).
- They indicate that the mixed/liquefied reagents will be stored in tanks that will be housed within a bounded area that can contain the total volume of the particular tank or tanks. Can this be a licence requirement to ensure that and also they indicate that each containment will have an individual sump pump to transfer all spills but it isn't identified where the spill material will be transferred to? Maybe this will be identified in the emergency response plan but should it should be clear on where, how and when (testing requirements, etc) this material can be discharged.

Robert, I may have missed it but it seems unclear in the proposal whether the soil below the stockpile that has been contaminated will be remediated through this process and then how the ARS site itself will be remediated once the material is removed. Could this information be provided?

Laureen Janusz
Fisheries Science and Fish Culture Section
Fisheries Branch,
Manitoba Conservation and Water Stewardship
Box 20, 200 Saulteaux Crescent
Winnipeg, MB R3J 3W3

Phone: 204.945.7789

Cell: 204.793.1154

Fax: 204.948-2308

Email: Laureen.Janusz@gov.mb.ca

From: clair pilgrim

Sent: March-14-13 4:14 PM

To: David J. Salari; Gerald J. Thornton; Snow Lake, Town; Armitt, Ernest (IEM); Boswick, Robert (CON)

Subject: Request for Mtg with Stakeholders - Snow Lake

Hello Robert Boswick, David Salari, Gerald Thornton, Ernest Armitt, and Clarence Fisher

I have send this to Robert Boswick (Conservation), and copies it to Gerald Thornton (QMX), David Salari (BacTech), Ernest Armitt (Dept of Mines), and Clarence Fisher (Mayor of Snow Lake). Time is of essence, and I think by copying everyone, the meeting might take placed sooner than never.

I have met recently with Jeff Precourt (Town CAO) and I've realized that he and Council may not be fully updated as decisions are made on the BacTech Project. One recent decision had the transfer of contaminated material to a "local landfill". If that meant the garbage dump, this would put contaminated material outside of the Canada Creek Basin. I would want our Council to make that decision.

I have also met with Gerald Thornton, VP QMX Gold Corp. this week to discuss my concerns and potential alternatives given to Conservation, because I believe if all the alternatives are reviewed, there are potential impacts that could be further mitigated to reduce any liability and ultimately protect future drinking water quality for the citizen's of Snow Lake. Liabilities are quite obvious, and all parties should agree on their responsibilities before this necessary remediation of the ARS begins. Gerald has indicated he is open to such a meeting, and he will also separately discuss his corporate responsibilities with BacTech.

I am seldom brief, but I will list things that I would propose to be on the agenda for such a meeting.

1. Construction details such as water services, and other plans on how the ARS would be mined. The removal and disposal site for the ARS cap material is unknown at this point. Collection of the drainage water during mining will be pumped to the process tanks. Some of these smaller questions will probably need to be discussed between the two mining entities since both companies will be mining in the same water basin and how that may or may not impact each of the respective companies.

Plant location is still a concern given haulage distances and I believe a discussion should take place as to the plant being in closer proximity to ARS pile. QMX is open to understanding potential alternatives such as the removal of the "bush" next to the ARS, and if necessary some additional area to the North for the **Plant Site to be relocated**. I believe much of this discussion must come from BacTech to explain their mining approach for the pile with proposed equipment. "Although the pile rises to only 5m above the ground surface, the total depth of residue extracted in the drill cores measured between 10.0 and 14.6 m". It is shallow on the north side, and the contact dips to the south (Fig 3 June 2005 U of M paper). Under the bush area is bedrock, which would be suitable with fill for the plant foundation. As the ARS is mined, locating the plant next to the pile would contain any further contamination.

QMX regularly samples the waters of the Canada Creek Basin for arsenic, and reports to Conservation. The liability of a potential increase in arsenic reaching Snow Lake obviously is a QMX and BacTech concern. There is an opportunity through a stakeholder meeting for QMX to know how this project will play out. That is why such a meeting is necessary.

Conservation must understand the procedures that will mine 306,000 tonnes of ARS, which by simple averaging of the layers has 16.8% by weight Arsenic.

I still believe the plant location should be relocated. Call the meeting, review and let science prevail.

2. The final disposal site for the ferric arsenate needs to be reconsidered for the same reason. The risk (no matter how small) of the ferric arsenate getting into the Canada Creek Basin would be criminal for Snow Lake drinking water. The risk is not worth it. The ARS pile is 63 years old now, and although it was created during another environmental era, what will be the status of the ferric arsenate pile in 63 years?

The meeting would also discuss the moving of the final disposal site to the east end of the QMX Birch Lake tailings. By relocating disposal site it further mitigates any potential for contamination to Canada Creek. I believe this benefits both companies. The site has bedrock on 3 sides. Engineers could design the site to have the bottom clay seal at or above the water table. Together with the liner the entire disposal would eventually be sealed above the water table, with a "horseshoe" ditch to divert snow melt and rain into the QMX tailings. The sand-silt-clay at the proposed site could be used to fill to the standing water elevation at the new site. A source of good clay needs to be found for the seal at the new disposal site (not impossible).

3. No Closure plan is available now, defining the end game.

Will there be a secondary cleanup of the remaining low grade contaminated material, and even the contaminated clay underneath the ARS?

"The patented BACOX process developed by BacTech involves a biological reactor leaching process that can be applied to the remediation of the ARS in and **"economically beneficial manner"**.

Does this mean BacTech stops treating contaminated material when the gold/silver grades drop to uneconomical limits?

It may seem premature, but the Town, BacTech and QMX should know the latest thinking about the end game.

BacTech now has a letter of intent to sample the HudBay Minerals - Anderson Lake tailings. There are 35 years of milling history from 10 mines at Anderson..

Assume the tailings are economical to treat, does the plant move to Anderson Lake shoreline? The long term operation of a plant at Anderson would also satisfy the proposed connection to a branch of the University College of the North, which would teach mine remediation.

4. Conservation needs to get this meeting organized soon with all 5 stakeholders.

BacTech will see advantages and cost savings.

The Risks will be defined and understood for each mining company.

Department of Mines will be assured that the "necessity factor" to treat the ARS will be done with the full knowledge of all five stakeholders.

The Mayor can report to Council and the people that all options and questions have been discussed..

Only then can Conservation say, that all has been down to complete the review of all environmental concerns.

5. Please don't think that I want to put a "stick in the spokes" of BacTech plans.

Remediation of the ARS is necessary, due to the enormous amount of Arsenic in the pile – the need is accepted.

Chemistry of material dumped into the environment can always change – time often bites – that is the risk.

This project is impossible to discuss in brief, my apologies.

Clair Pilgrim

From: Wiens, Jonathan (CON)
Sent: March-14-13 11:02 AM
To: Boswick, Robert (CON)
Subject: FW: Request for TAC Review/Comments - BacTech Manitoba Corporation
- ARS Remediation - Snow Lake - File: 5628.00

Wildlife Branch has no wildlife related concerns with Client File 5628.00

Jonathan Wiens, MSc
Habitat Specialist
Manitoba Conservation
Box 24 - 200 Saulteaux Crescent
Winnipeg, Manitoba, R3J 3W3
Phone: (204) 945-7764
Mobile: (204) 918-3420
Fax: (204) 945-3077
Email: jonathan.wiens@gov.mb.ca

Boswick, Robert (CWS)

From: Stibbard, James (MWS)
Sent: March-13-13 11:26 AM
To: Boswick, Robert (CON)
Subject: Re: 5628.00 BacTech Snow Lake Tailings Remediation EAP

Robert,

I reviewed the above noted EAP for bioremediation of an abandoned mine tailings pile at Snow Lake. I noted two points:

- The EAP notes that potable water from the Town of Snow Lake public water system will be supplied to the processing plant. Protection of the public water system from cross contamination and backflow, in accordance with applicable provisions of *The Manitoba Plumbing Code*, should be installed.
- The EAP notes that emergency response plans will be in place in the amount of spillage etc. While the chance of spilled materials getting into Snow Lake may be remote, the lake is the source of drinking water for the Town. As such, contact information for the Town water Treatment plant operators should be included in the emergency response plans.

Beyond these points, I did not see any other cause for concern with this EAP or the proposed development.

If you have any questions, please call.

Regards,

James Stibbard P. Eng.

Approvals Engineer

Office of Drinking Water

1007 Century Street

Winnipeg MB R3H 0W4

phone: (204) 945-5949

fax: (204) 945-1365

email: James.Stibbard@gov.mb.ca

website: www.manitoba.ca/drinkingwater

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TOWN OF SNOW LAKE

P.O. Box 40
Snow Lake MB R0B 1M0

Phone: (204) 358-2551
Fax: (204) 358-2112

DATE: March 11, 2013

TO: Environmental Approvals Branch
Manitoba Conservation

FAX NUMBER: 204-945-5229

NUMBER OF PAGES: 3 (Includes cover page)

MESSAGE: Snow Lake Town Council Resolution 95/13
RE: Baetech Manitoba Corp - ARS Remediation
project File 5628.

THE TOWN OF SNOW LAKE



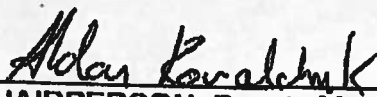
RESOLUTION NO. 95/13

DATE: March 5, 2013

MOVED BY COUNCILLOR B. Forsyth-Flamand

SECONDED BY COUNCILLOR C. Samborski

BE IT RESOLVED THAT the Town of Snow Lake, in the best interest of all its citizens current and future, ask that the Province of Manitoba, Department of Conservation and Water Stewardship, reply to us in writing that the Environmental Assessment and Licensing Branch has taken into consideration the safe drinking water of our residents in their deliberations when discussing the issuing of permits for the ARS Remediation Project for BacTech Manitoba Corporation.



CHAIRPERSON, Deputy Mayor A. Kowalchuk

Notice of Environment Act Proposal

Conservation and Water Stewardship has received a proposal pursuant to *The Environment Act* regarding the following operation and invites public participation in the review process:

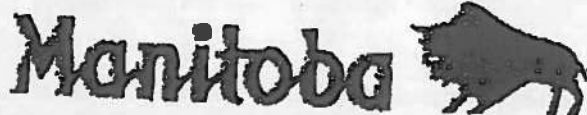
BACTECH MANITOBA CORPORATION - BACTECH ARS REMEDIATION PROJECT - FILE: 5628.00

A proposal was filed by BacTech Manitoba Corporation for the remediation of a stockpile of arsenopyrite residue at the Snow Lake Mine site (formerly the New Britannia Mine and the Nor-Aome Mine) in the Town of Snow Lake, Manitoba. The site has been identified as a designated site in the Province of Manitoba's Orphaned/Abandoned Mine Site Remediation Program. The Province of Manitoba has entered into an agreement for BacTech to complete the project whereby the stockpile of arsenopyrite residue will be treated and stabilized utilizing the REBGold patented bioleach process (BACOX). The major components of the project include the arsenopyrite residue stockpile; a bioleach plant facility where the arsenopyrite will be remediated; hauling of arsenopyrite residue to the bioleach plant site; a storage impoundment facility; and pipelines to transport stabilized waste to, and recover water from, the storage impoundment facility. The plant is proposed to be located on property within SW 17-68-17 WPM, on the east side of Cedar Avenue including Parcels A and B of Certificate of Title 1709674/3. The storage impoundment facility is proposed to be located on Crown Land located approximately 1.4 kilometers northeast of the bioleach plant facility. Operation of the plant is estimated to continue until mid-2020.

Anyone likely to be affected by the above operation and who wishes to make a representation either for or against the proposal should contact the Department, in writing or by E-mail (robert.boswick@gov.mb.ca), not later than March 15, 2013. Further information is available from the Public Registries located at 123 Main St. (Union Station) Main Floor, Winnipeg; Millennium Public Library, 4th Floor, 251 Donald St., Winnipeg; Manitoba Eco-Network, 3rd Floor, 303 Portage Ave., Winnipeg; Snow Lake Town Office, 113 Elm St., Snow Lake; Online Registry <http://www.gov.mb.ca/conservation/eal/registries/index.html> or by contacting Robert Boswick, Environmental Engineer at 204-945-6030.

Information submitted in response to this proposal is considered public information and will be made available to the proponent and placed on the public registry established in accordance with Section 17 of *The Environment Act*.

Environmental Approvals Branch
Conservation and Water Stewardship
123 Main Street, Suite 160
Winnipeg MB R3C 1A5
Toll Free: 1-800-282-8069 ask for ext. 6030
Fax: (204) 945-5229
Website: www.gov.mb.ca/conservation/eal



Ad No. EA 228

For publication in:

Snow Lake Underground - Thursday Feb. 14, 2013
Winnipeg Free Press - Sat. Feb. 16, 2013

From: Elliott, Jessica (CON)
Sent: March-11-13 10:18 AM
To: Boswick, Robert (CON)
Subject: RE: Request for TAC Review/Comments - BacTech Manitoba Corporation - ARS Remediation - Snow Lake - File: 5628.00

Parks and Natural Areas Branch has reviewed the proposal filed pursuant to the Environment Act for the BacTech Manitoba Corporation ARS remediation project in Snow Lake (file 5628.00). The Branch has no comments to offer.

Jessica

Jessica Elliott, M.E.Des.
Head, Park System Planning and Ecology
Parks and Natural Areas Branch
Conservation and Water Stewardship
Box 53, 200 Saulteaux Cres
Winnipeg MB R3J 3W3

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fax: 204-945-0012

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Before printing, think about the environment

Avant d'imprimer, pensez à l'environnement



Infrastructure and Transportation

Highway Planning and Design Branch
Environmental Services Section
1420 - 215 Garry St., Winnipeg, MB R3C 3P3
T (204) 819-4369 F (204) 946-0563

March 6, 2013

Tracey Braun, M. Sc.
Director, Environmental Approvals Branch
Manitoba Conservation and Water Stewardship
123 Main St., Suite 160
Winnipeg, MB R3C 1A5

RE: BacTech Manitoba Corporation – ARS Remediation – Snow Lake
Client File No 5628.00

Dear Ms. Braun:

MIT has reviewed The Environment Act Proposal noted above and we do not have concerns with the development as proposed. However, we would like to remind the proponent that any new, modified or relocated access connection onto Provincial Road (PR) 392 may require a permit from MIT. A permit may also be required for any construction, above or below ground, within 38.1 m (125 ft) or for any plantings within 15.2 m (50 ft) from the edge of the PR's right-of-way.

Thank you very much for providing us the opportunity to review the proposal.

Sincerely,

Ryan Coulter, M. Sc., P. Eng.
Manager of Environmental Services

From: Huculak, Cristal (CON)
Sent: February-26-13 10:58 AM
To: Prawdzik, Tim (CON)
Cc: Boswick, Robert (CON)
Subject: RE: Request for TAC Review/Comments - BacTech Manitoba Corporation - ARS Remediation - Snow Lake - File: 5628.00

This is a big project and a major remediation. Very interesting. The outcome of removing valuable metals (gold & silver if present) from the tailings while neutralizing the iron & arsenic to be converted to a non-toxic bi-product is good for the environment and the community. This project is very exciting!

This is new to me and I do have some concerns/question. My questions are:

1. Where are they drawing water from to keep the bio-reactors cool (Snow Lake)? Is it a cycling system where the water is drawn and returned?
2. The Bioreactors will be on the NE side of the town of Snow Lake. If there were to be a mechanical problem with the bio-reactors, could they overheat and cause concern for the general population in the area?
3. Once the tailings are neutralized they will be returned to a tailings site. Will this site be levelled, and returned to a natural state (trees/grass planted)?
4. How many people will it take to run this facility? Will they have a camp to house staff? If so, where is it to be located and what is their intentions for waste removal?
5. When the project is completed in 2020, will the plant and bioleach facility be removed and the site remediated?

Cristal Huculak

Environment Officer
Environmental Compliance and Enforcement Division, Northwest Region
Manitoba Conservation & Water Stewardship
Box 2550, 79 3rd Street W & Ross Ave.
The Pas, Manitoba Canada R9A 1M4
E-mail: Cristal.Huculak@gov.mb.ca
T (204) 627-8248 F (204) 623-1773

**Report environmental spills & emergencies to the Manitoba Environmental
Emergency Hotline toll free at 1-855-944-4888.**

Clair Pilgrim

Snow Lake, Manitoba R0B 1M0

February 22nd, 2013

Robert Boswick, P.Eng.
Environmental Engineer
Manitoba Conservation and Water Stewardship
e-mail: Robert.boswick@gov.mb.ca

As you suggested I am sending my comments and questions to you.

Re: Comments and Questions Regarding the BacTech Environmental Licence Application, For the Snow Lake Arsenic Residue Stockpile Remediation Project

No one should be confused. I support the need to remediate the Arsenic Residue Stockpile. My concerns are all about the arsenic, and how we can ensure that the arsenic values in Snow Lake are reduced now, and remain so in the future. BacTech is welcome to the gold and silver, if their process procedures, and final disposal are adequate to reduce the arsenic forever.

I have highlighted my questions and comments; background data is regular text. There is no particular order.

1 Proposal Executive Summary:

Page v: "All waste generated at the facility outside of the neutralized precipitate will be suitable for recycling or disposal in the local landfill".

Is Conservation giving approval to dump process waste outside of a "final disposal site"?? What kind of waste, and where will it be dumped. Does land fill = town garbage dump?

2 Appendix B: Water Balance

Services and Water Circuit Sheet

The water mass flow in tonnes/hour is 25.1 tonnes/hour, or a recycling flow of approximately 25,130 litres/hour.

Is there any Bioleach Process water released to the environment or the sewer system, beyond the 500 litres daily of domestic wastewater?

3 Executive Summary – Monitoring and Reporting Page vi

“During all phases of the project, standardized monitoring, reporting, and auditing will be incorporated into the EMS to confirm that all Federal and Provincial Legislation, regulations and laws are adhered to”.

Will Conservation be doing further testing (multiple locations) for arsenic getting into Snow Lake, each summer during the life of this project?

4. The Canada Creek Basin (CCB) will continue to send Arsenic to Snow Lake?

I am not a chemist, but by reading papers by others on Arsenic issues, I can appreciate that Arsenic is not welcome in the smallest quantity. My concerns are to eliminate arsenic flowing to the Fresh Water Treatment Plant.

What do I mean? The Orphan Tailings are still exposed in the perimeter ditch and, there will always be a water table in the CCB. The Orphan Tailings are considered to be less of a threat than the Arsenic Residue Stockpile (ARS). Both are in the Canada Creek Watershed Basin. The drainage flows towards Canada Creek and hence to Snow Lake, very close to our water treatment plant.

Going forward, the plan should be to treat the ARS, and find a final disposal site outside the CCB. Locate a site to contain the BacTech Residue, so that it is securely contained, and does not get into the CCB wetlands and then Snow Lake.

One Option for the Final Disposal Site

This option requires negotiations between QMX Minerals, BacTech and the Dept of Mines. QMX owns a tailings pond in Birch Lake (a separate basin), but there is an area up-stream of their tailings, that is large enough to create the final disposal area for BacTech. Build it right, and there does not have to be leakage into QMX's tailings. This final disposal area has bedrock close on three sides. This Option is at the headwaters of a basin for the final disposal of all tailings. The design for this Option would be to line with clay and raise the final liner and cap above the water table. A “horseshoe” shallow ditch around the final cap should transfer any rain/snow melt to QMX's tailings channels without transferring any BacTech contamination.

Unfortunately, the road from the garbage dump to the hydro substation is not shown on the Proposal map page 4. The right angle curve helps to illustrate the bedrock in that area. The Birch Lake Basin (QMX) drains to Herblet Lake, and not Snow Lake.

The Snow Lake water supply would have added insurance protection.

Negotiate? Has the Department of Mines approached QMX to discuss a secure final disposal site on the east end of the Birch Lake Tailings Storage? The Option area does not appear to be part of the QMX tailings permit area.

Has anyone looked for a final disposal site outside of the “Canada Creek Basin”? Does Conservation review only, or is it possible that Conservation offers alternatives to BacTech?

Does Conservation put boots on the ground to check the suitability of BacTech's plant location and final disposal site in the proposal?

5. Present Plan for Final Disposal is Poor

The pits already dug in the Canada Creek Basin produced the clay/silt combination for the orphan tailings cover. The proposal is to use one of these pits for the disposal of their ferric arsenate residue. The clay on the slope of the CCB and in the pit does not appear to be the type that would hold water and therefore not leak to the environment. Any leakage over the 7 year period (proposed operation) would flow to the wetlands immediately and head for Snow Lake.

I found no soil test results in the BacTech proposal to prove this questionable clay is resistant to drainage. On Page 8 2.3.1, sediment samples were collected at the plant and waste impoundment site, but no test results reported.

Has anyone inspected and tested the clay in the proposed pit for hydraulic conductivity?

How reliable is the HDPE liner? For how long?

6. University of Manitoba's two articles

Paper #1 (2005): Arsenic mobility in alteration products of sulfide-rich arsenopyrite bearing mine wastes, Snow Lake, Manitoba by Salzsauler, Sidenko and Sherriff, Department of Geological Science Un. Of Manitoba

Paper #2 (2011): Source, attenuation and potential mobility of arsenic at New Britannia Mine, Snow Lake, Manitoba by Simpson, Sherriff, Gulck, Khozhina, Londry and Sidenko, Un. of Manitoba, plus 4 companies involvement.

I know you have read these two excellent papers, but I just have to repeat some of the serious concerns, that should be considered again when the final disposal site is chosen and when the chemical ferric sulphate is used.

Paper #1 page 2305 Conclusions: "Arsenic, released during the previous oxidative phase or now from gradual breakdown of arsenopyrite, continues to seep into the groundwater possibly causing the high values in a monitoring well SE of the ARS". The perimeter of excavation for BacTech's "economically beneficial" pit limit will leave behind low grade contaminated material still releasing arsenic to Canada Creek?

Who removes the low grade arsenic material outside of BacTech's "economical" pit limit?

Paper #1 page 2308: "Water could only be extracted below about 4 m depth because the core was too dry above this level".

A simple average of the ARS is 16.8% by weight Arsenic, and the secondary alteration products are 35% by weight Arsenic. In 306,000 metric tonnes of reserves that is a lot of Arsenic. Any small part would continue to pollute Snow Lake's water further.

Transporting this dry material and expecting a truck with a sprinkler for control may not work.

The Plant should be located next to the ARS Stockpile. There is a sufficient area of scrub bush that has shallow soil, and is close to bedrock. Strip the bush, place fill for the plant, construct, and you ARS material is within front end loader haul distance.

There are advantages of the plant being located next to the ARS:

- 1 No haul road; no dust management on road; reduced spreading of the contamination; cost savings.
- 2 The water management system (WMS) is simpler; all at plant site and now part of fire protection system.
- 3 Shelter for the exposed pile will be necessary only at the ARS stockpile.
- 4 Covering and heating a portion of the ARS stockpile for 4 months each year may not be necessary if the inventory ready for treatment is stored in a heated shelter over the ARS stockpile. Duplication may be eliminated.
- 5 However, pipelines are lengthened if the Optional Final Disposal Site or another is chosen. Increased length is not large, considering 2" diameter pipe.
- 6 Entire plant and process is further away from people.
- 7 The feasibility of this plant staying on this site to treat other tailing such as Anderson tailings long term is remote, and unacceptable. Treated tailings would surely go back into Anderson Lake.

Can Conservation and or the Department of Mines order the Plant Site moved from the Proposed location, if there are environmental benefits to the Town of Snow Lake and the water of Snow Lake?

How involved does Conservation get in considering Options?

When is a closure plan expected for this project?

7 A separate file is attached to this email; namely, **Surface Water Arsenic Concentration.**

The list is all from BacTech's report. Arsenic concentrations or assays; namely, in the Canada Creek Basin, Compositions by Layer in the ARS, one Monitor Well, and several sets of Surface Water Samples with Arsenic assays. Exact locations for these Arsenic Assays are not identified on Figure 17 Surface Water and Groundwater Arsenic Concentrations.

Read the List. BacTech and five other sampling programs, plus the two papers from the University of Manitoba have the majority of samples showing results with HIGH ARSENIC values. The Canada Creek Basin (CCB) is highly polluted.

The Government is correct in making the clean up of the ARS a priority.
BacTech has a process that will convert the ARS arsenic into ferric arsenate.
Let them have the gold and silver – that is not the issue.

Ferric Arsenate may not be stable forever. Conditions in the environment that affect an element's valence and speciation (evolution) are: pH, oxidation or reduction potential, presence of complexing ions example sulphur, iron or calcium, and finally microbial activity.

**Why is the final Waste Disposal Site in the Canada Creek Basin?
There is an advantage to Snow Lake to have the longterm Final Disposal Site
outside of the Canada Creek Basin?**

8. Paper #3: Solubilities and Stabilities of Ferric Arsenate Compounds by E. Krause and V.A. Ettel (1989)

I am not a chemist; however, this paper is a review of experiments done with Ferric Arsenate and questions the stability of ferric arsenate.

Page 312 mid-page: One chemist Robins did work on this issue and his conclusions are the following. "Robins expanded the above data and constructed stability diagrams for a number of simple metal arsenates. He concluded that the disposal of Arsenic as ferric arsenate is "inappropriate" as the minimum solubility of As from $\text{FeAsO}_4 \cdot 2\text{H}_2\text{O}$ is 75 mg L⁻¹, and above pH=2.2 FeAsO_4 is NOT stable, because of decomposition to goethite. Robins further stated that only one compound, $\text{FeAsO}_4 \cdot 2\text{H}_2\text{O}$, exists and that precipitates with Fe/As ratio >1 will decompose with formation of relatively soluble scorodite and goethite as they are aged over several years and develop a more crystalline form. Some of these statements are contradicted by the presence of many simple and complex basic ferric arsenates in nature and by the fact that crystalline scorodite is much less soluble than amorphous ferric arsenate, $\text{FeAsO}_4 \cdot x\text{H}_2\text{O}$ ".

**Is there other or newer research that describes the long term solubility and stability of Ferric Arsenate in the environment? Was Robins correct in '81, '83, & '88?
Who else has done work on ferric arsenate?**

9. Testing for Arsenic

The testing procedures for arsenic sound complicated and variable.
"The analytical method recommended for arsenic by the CCME is the U.S. EPA Method 6010 (inductively coupled plasma-atomic emission spectroscopy) (CCME 1993a, 1993b). There are other descriptions.

Do I have the following correct? The use of Ferric Sulphate in testing for arsenic makes a precipitate from the soluble Arsenic. The precipitate sinks to the bottom. The remaining water is tested by the method above, or other procedures.
By using ferric sulphate, the arsenic assay results are reduced.

Is this an acceptable procedure to get an accurate arsenic value, on which further decisions may be made?

Ferric sulphate is not mentioned in the Bioleaching Process; however, in a newspaper article BacTech proposes to make a liquid ferric sulphate in their plant.

Where and how is ferric sulphate used in their bioleaching process?

If not in the process, where and how does BacTech plan to use the ferric sulphate?

After water is treated with ferric sulphate in the environment, is the precipitate produced reversible over time, thus releasing the arsenic as soluble arsenic?

10. Health Canada

In Paper #2 Source, attenuation and potential mobility of arsenic at New Britannia Mine, Snow Lake Barbara L. Sherriff, page 1848.

There is one statement about the water in Snow lake: "Water from Snow Lake had consistent values of 0.004 mg/l Arsenic. These values do not exceed the maximum allowable concentration of As in potable water of both Health Canada (0.005 mg/l) and the World Health Organization (0.01 mg/l)".

The small difference is 0.001 mg/l, and considering the possible use of ferric sulphate in testing, I wonder if the water going to our fresh water plant is healthy. The Town has said sampling of drinking water from the treatment plant in Snow Lake is acceptable.

Page 4 of Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health – 1997.

"Ingestion of inorganic arsenic compounds in drinking water or in medicinals has been repeatedly and strongly associated with skin cancer in human studies. In addition to skin cancer various cancers of internal organs (including the bladder, kidneys, and lungs) have also been reported in populations exposed to high levels of arsenic in drinking water".

Would you ask Health Canada to speak to the potential health risks of arsenic?

Ask whether prolonged ingestion of arsenic (at what level) may be considered unhealthy?

Thank you for addressing my concerns.

Clair Pilgrim

Data Lists of Arsenic Concentrations in ARS Stockpile

February 22nd, 2013

and Surface Water Samples with Arsenic Results vs. CCME Guidelines.

The Canadian Council of Ministers of the Environment (CCME) Guidelines for Drinking Water is 0.005 mg/litre

1 BacTech 4.1.2.2 Surface Water Quality (BacTech EAP Oct 2012)

Near ARS Stockpile	- As concentration High	- some exceeding guidelines by 4 to 2000 times.	- Highest @ ARS
Creeks	- As concentration High		
Wetlands	- As concentration High		
Canada Creek 2 km upstream	- still exceeds CCME		
Canada Creek drains into S. L.	- still exceeds CCME		
Snow Lake	-lower but still exceeded CCME Guidelines of 0.005 mg/l		

2 Paper #1: Arsenic mobility etc. June 2005 – Orphan Tailings – University of Manitoba

Monitor Well 17 south of ARS ARS stockpile (306,000 tonnes)	>20 mg/l As -- 40 times greater then Mining Metal Effluent Reg. Of 0.5 mg/l
Primary Zone	Unoxidized sulphide residue contains up to 23 wt% As.
Transition Zone	Mineralogically similar to unoxidized material containing 17.4 wt% As
Lower Alteration Zone	Composition of <15.0 wt% As
Upper Alteration	Composition of <15.9 wt% As
Highly altered material	Composition of <12.9 wt% As

3 Paper #2: June 2011 Source, attenuation and potential mobility of arsenic at NB Mine Snow Lake, Mb (Un. of Mb)

NBM Monitor Well (MW 17)	Concentration up to 20 mg/l from 1995 to 2005
in 1995	Concentration 10 mg/l
2000	Concentration 20 mg/l

4 BacTech Table D2: Surface Water Arsenic

Source: Salzauler 2004 12 samples in total

Only one sample has 0.00 mg/l Arsenic
 Eleven samples exceed CCME Guidelines of 0.005 mg/l
 One sample had a multiple of 4 times the CCME Guidelines.
 The maximum multiple for one sample is 3760 times CCME Guidelines

Source: SENES 2008

One sample is under the CCME Guidelines
 One sample exceeds CCME Guidelines with a multiple of 7.16 times.

Source: Manitoba Conservation 2001

Four samples of surface water, all under CCME Guidelines

Source: DNE Knight Piesold Consulting 1995

Six samples of surface water all exceeding the CCME Guidelines
 Lowest multiple is 3.4 times.
 Highest multiple is 914 times.

Source: Golder Consulting Site Visit 2012

One sample is under CCME Guidelines.
 Five samples exceed CCME Guidelines.
 Lowest Multiple of samples that exceeded CCME Guideline is 22.0 times.
 Highest Multiple of samples that exceeded CCME Guideline is 250.0 times.

Keep in mid that the CCME Guideline for Drinking Water is only 0.005 mg/litre
 There are also tables for Arsenic in Groundwater, and Soil and Sediment,
 both of which have high arsenic levels.

Boswick, Robert (CWS)

From: Flynn, Heather [CEAA] [Heather.Flynn@ceaa-acee.gc.ca]
Sent: February-14-13 9:43 AM
To: Boswick, Robert (CON)
Cc: Farmer, Kristina [CEAA]
Subject: 5452 (MC File 5628.00) BacTech Manitoba Corp. - ARS Remediation Snow Lake

Good morning,

This email is to confirm receipt of the Environment Act Proposal for the ARS Remediation at the Snow Lake Mine site by BacTech Manitoba Corporation (MC File 5628.00).

As you know, the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) came into force in July 2012, focusing federal attention on those project proposals that have a greater potential for significant adverse environmental effects in areas of federal jurisdiction. The *Regulations Designating Physical Activities* identify the activities which, if carried out individually or in combination, would constitute a "designated project" that is subject to the requirements of CEAA 2012.

The proponent is responsible for confirming its federal regulatory responsibilities associated with its project. In your response to the proponent, please advise it to review the noted regulations (<http://laws-lois.justice.gc.ca/eng/regulations/SOR-2012-147/index.html>) and contact the Canadian Environmental Assessment Agency if its proposal includes any activity described.

Thank you for your effort to ensure coordination and close communication between provincial and federal levels of government. If you require any further clarification on the requirements of CEAA 2012, please feel free to contact me.

Regards,
Heather

Memorandum

Date: February 14, 2013

To: Robert Boswick
Climate Change and Environmental
Protection Division
Environmental Approvals Branch
123 Main Street, Suite 160
Winnipeg MB R3C 1A5

From: Kevin Jacobs
Water Quality Management Section
Manitoba Conservation and Water
Stewardship
123 Main Street, Suite 160
Winnipeg MB R3C 1A5

<http://www.gov.mb.ca>

Subject: EAP 5628.00 REQUEST FOR
TAC REVIEW/COMMENTS -
BACTECH MANITOBA
CORPORATION - ARS
REMEDIATION - SNOW LAKE

Telephone: 204-945-4304

Facsimile: 204-948-2357

E-Mail: Kevin.Jacobs@gov.mb.ca

Hello Rob, please find below comments regarding the EAP file number 5628.00 BacTech Manitoba Corporation - ARS Remediation - Snow Lake.

The proposal is for a processing plant to extract remaining gold content from an arsenopyrite stockpile from the orphaned and abandoned Nor-Acme mine. It is noted that this mine closed in 1959 and the stockpile was not covered until 2000 resulting in significant impacts from acid mine drainage to the surrounding area. This uncontrolled drainage has in turn led to significantly elevated metal concentrations in the surrounding environment.

The proposal notes that gold from the arsenopyrite stock pile will be extracted using a patented bioleaching technology which in turn will fully oxidize and neutralize the remaining arsenopyrite such that acid mine drainage will no longer occur. Waste materials are proposed to be deposited in specially constructed containment facility on Crown Land off the site. Water is proposed to be reclaimed from the containment facility for use in the processing plant thus it appears no discharge to surface water is planned.

Overall should the project be successful it will help eliminate a long standing source of contaminants to the surrounding terrestrial and aquatic environment.

It is noted the storage impoundment facility will be lined with clay and/or an HDPE liner. It is requested that a license require a maximum hydraulic conductivity of 1×10^{-7} cm/s or less

The proposal notes that approximately 0.85 hectares of wetlands will have to be filled in to accommodate required infrastructure. It is recommended that the proponent consult with the Manitoba Habitat Heritage Corporation regarding potential mitigation or compensation measures relating to the loss of this wetland area.

The proposal notes that a number of materials will be needed during the operations phase including various reagents and large quantities of limestone. It is not noted where the source of

these materials is. It is recommended that the facility ensure sufficient stockpiles of material exist in the event of a supply shortage due to for example a natural disaster such as a forest fire.

It is noted the existing arsenopyrite stockpile is currently capped with waste rock. The proposal notes that during excavation drainage will be designed to collect and runoff and direct it to the processing plant for consumption. It is unclear how excess moisture may be handled for example if precipitation greatly exceeds what can be used in the bioleaching process.

It is noted that process water may need to be obtained from Snow Lake. We recommend pumping and piping apparatus is equipped with redundant backflow devices.

A closure plan should be submitted for the project. We would recommend progressive rehabilitation at the site to the extent possible.

The proposed use of pressure sensitive electronic leak detecting equipment is to be commended. The proponent should develop prior to operation a comprehensive spill response plan in the event of a pipeline rupture, or spill of petroleum hydrocarbon, or process reagents.

Should the opportunity present itself, water quality staff may be interested in attending on site during construction and or operation of the facility.

Thank you for the opportunity to provide comments. Should you have any questions, please do not hesitate to contact me at the above telephone number.

Kevin Jacobs
Water Quality Management Section

Boswick, Robert (CWS)

From: Town of Snow Lake [snowlake@mymts.net]
Sent: February-14-13 4:54 PM
To: tracy.braun@gov.mb.ca
Cc: Boswick, Robert (CON)
Subject: Bac-Tech Enviromental Plant Site

Manitoba Conservation

Environmental Approvals

123 Main Street Suite 160

Winnipeg MB, R3C 1A5

VIA EMAIL

Attention: Ms. Tracey Braun, M. Sc., Director

Re: BacTech's request for Approval to Proceed on BacTech plant site – Remediation Project – Snow Lake, MB.

Dear Ms. Braun,

The Town of Snow Lake supports BacTech's request to proceed with preliminary civil construction tasks at the BacTech plant site location in Snow Lake this spring.

From the Town's point of view we need to begin an early working relationship with their technical teams to be able to provide municipal services in a timely manner.

If you have any questions, feel free to contact myself.

With Regards,

Jeff Precourt

Jeff Precourt, CMMA
Chief Administrative Officer
Town of Snow Lake
Box 40, Snow Lake, MB R0B 1M0
204-358-2551 (T)
204-358-2112 (F)

From: Matthews, Rob (MWS)
Sent: February-12-13 11:49 AM
To: Boswick, Robert (CON)
Cc: Dey, Asit (MWS)
Subject: RE: Request for TAC Review/Comments - BacTech Manitoba Corporation - ARS Remediation - Snow Lake - File: 5628.00

Robert,

“The proponent has applied for a water rights licence for this project and a Development Authorization will be issued for the project by the Water Use Licensing Section prior to the construction of the pumping works.”

Rob Matthews,
Manager,
Water Use Licensing Section
204-945-6118