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September 21, 2007

*Your file - Votre référence*

MVEIRB File Number: EA 0607-002

*Our file - Notre référence*

Mr. Alistair MacDonald
Environmental Assessment Officer
Mackenzie Valley Environmental Impact Review Board
P.O. Box 938
YELLOWKNIFE NT, X1A 2N7

By FAX: 766-7074

**Re: Technical Review of the Developer Assessment Report and subsequent information submitted by Tamerlane Ventures on the proposed Pine Point Pilot Project.**

Indian and Northern Affairs Canada (INAC) is pleased to submit the attached report as our response in preparation to the pre-hearing Conference called by the Mackenzie Valley Environmental Impact Review Board, on the proposed Tamerlane Ventures Pine Point Pilot Project.

The attached technical report represents our review of the information received between May 2, 2007 and September 14, 2007, which includes the responses to Information Requests by all parties and from the technical session held this summer. It is preceded by a non-technical summary report.

INAC would like to thank you for the opportunity to present our review of the issues as identified in our technical report. We look forward to reviewing comments from other parties and help resolve outstanding issues. We would like to confirm our attendance at the Pre-Hearing as well as the Public Hearing scheduled on October 16, 2007 at Fort Resolution where INAC staff and our consultant Mr. Adrian Brown from Adrian Brown Consultants Inc. will be available to discuss any concerns of the Review Board and other parties.

If you have any questions about this technical report, please do not hesitate to contact Lionel Marcinkoski by phone at (867) 669-2591 or via email at marcinkoskil@inac.gc.ca, or Catherine Mallet at (867) 669-2402 or malletc@inac.gc.ca.

Sincerely,

David Livingstone
Director, Renewable Resources and Environment

cc. INAC EA Working Group

INDIAN AND NORTHERN AFFAIRS CANADA

TECHNICAL REPORT

on the

# PROPOSED TAMERLANE VENTURES INCORPORATED PINE POINT PILOT PROJECT

September 21, 2007

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## NON TECHNICAL SUMMARY

As part of its mandate, Indian and Northern Affairs Canada (INAC) and its retained expert, Adrian Brown Consultants, Inc. (ABC), have completed a technical review of the documents related to the Tamerlane Ventures Inc. Environmental Assessment (EA) that was submitted of the Mackenzie Valley Environmental Impact Review Board (MVEIRB). The review focussed on the water-related aspects of the proposed projects. In conducting our review, we participated in several rounds of information requests, a technical hearing to discuss and attempt to resolve issues identified herein. This report presents an outline of INAC's recommendations, which are summarized in Table 1.

*Table 1: Summary of INAC Review of Tamerlane Ventures PPPP*

| # | Issue | Tamerlane Submission | Recommendation |
|---|---|---|---|
| 1 | Mine inflow prediction (IR#46) | ▪ Mine inflow computation: 941 $m^3/h$ (3,120 $m^3/h$ max) | ▪ Revise boundaries and reanalyze |
| 2 | Injection well water disposal (IR#47) | ▪ Conceptual design<br>▪ Sediment removal pond<br>▪ Monitoring plan<br>▪ Physical impact evaluation | ▪ Provide additional details<br>▪ Propose alternatives<br>▪ None (acceptable)<br>▪ Provide chemical evaluation |
| 3 | Sewage disposal (IR#48) | ▪ Treat and dispose of via injection well | ▪ None (acceptable) |
| 4 | Discharge water quality prediction (IR#49) | ▪ Discharge water quality estimates | ▪ Re-compute and analyze |
| 5 | Fuel Storage (IR#50) | ▪ Hazardous Spill Contingency Plan | ▪ Use 2007 Guidelines for Spill contingency Planning, INAC, Water Resources |
| 6 | Closure and Reclamation (IR#51) | ▪ Return to pre-mining land use. | ▪ Revise with measurable closure criteria. |
| 7 | Freezewall contingencies (IR#52) | ▪ Line perimeter trench<br>▪ Shutoff system for wells<br>▪ No plan for plant leaks | ▪ Assess precipitation impacts<br>▪ None (acceptable)<br>▪ Propose contingency plan |
| 8 | Froth flotation (IR#53) | ▪ Flotation proposed<br>▪ No environmental impact | ▪ None (acceptable)<br>▪ Re-evaluate impacts |

Although Tamerlane Ventures Inc. have been able to address some of the key issues that have been raised in the context of the technical session and information requests, there are still a number of outstanding issues with respect to the proposed project which raise uncertainties regarding the potential effects of this project. Until the outstanding issues have been resolved, INAC considers the EA to be incomplete since it does not provide an adequate basis for assessing the impacts of the proposed project.

September 21st 2007

## INTRODUCTION

Indian and Northern Affairs Canada (INAC) has a mandated responsibility to protect the environment and promote sustainable development in the Northwest Territories. The Department also has federal responsibility for managing water resources and advises the Minister on water-related matters. The Department participates in environmental assessments, and ensures that the appropriate Water Acts and Regulations are applied, such as the *Northwest Territories Waters Act*. The Department is also responsible for the management of the land in the Northwest Territories under the control, management and administration of the INAC Minister by virtue of the *Territorial Lands Act*, Territorial Land regulations and the *Federal Real Property and Federal Immovables Act* and subsequent Regulations as they apply to territorial lands. Departmental staff provides expert advice to the NWT Water Board and boards established pursuant to the *Mackenzie Valley Resource Management Act*.

In our departmental capacity as an expert advisor, INAC and its retained consultant, Adrian Brown from Adrian Brown Consultants, have conducted a technical review of the documents related to the Tamerlane Ventures Incoporated Pine Point Pilot Project (EA0607-002) Environmental Assessment (EA). In this report, INAC provides specific comments related to water and environmental issues on the following eight topics:

1. Mine inflow prediction
2. Injection Well water disposal
3. Sewage disposal
4. Discharge Water Quality
5. Fuel Storage
6. Closure and Reclamation
7. Freeze Wall contingencies
8. Froth flotation (Dense Media Separation Technology)

In particular, INAC has key concerns relating to the injection wells (#2), discharge water quality predictions (#4), closure and reclamation (#6) and the Froth flotation used in the dense media separation technology (#8).

INAC and its consultant, Adrian Brown, will be attending the pre-hearing conference as well as the public hearing and will be available to discuss any of the concerns raised in this technical report.

## SPECIFIC COMMENTS

### 1. Mine inflow prediction

Reference: IR0607-002-46, ToR Section I-1-4 (Predicted inflows of water to the mine)
Response: Tamerlane, 2007a, pp. 27-28
Supplemental: EBA, 2007b

#### 1.1. Issue:

Tamerlane has not provided a credible mine inflow estimate. This estimate predicts mine dewatering, plant water supply, and water disposal at the site.

#### 1.2. Developer's Conclusion:

Tamerlane states in the original response (clarify – at the technical hearing held last summer) that the estimated basal inflow to the freeze wall-protected mine is 55 cubic meters per hour, and that the "agreed upon" worst case is 2,000 $m^3$/hr. Tamerlane has provided a computation of the inflow (EBA, 2007b) that concludes that the expected inflow is 941 $m^3$/hr, with a range of 796 $m^3$/h to 3,120 $m^3$/h.

#### 1.3. Review Conclusion

INAC has reviewed the inflow computations, and finds the results to be within the expected range, but represent a low estimate, because of the assumptions made by Tamerlane in the earlier calculations. A detailed estimate is required.

#### 1.4. Rationale

The mine inflow estimate is likely low, due to the use by EBA of inappropriate boundary conditions:

1. The mine diameter is limited to a maximum of 20 meters, whereas it is clear that the mine has a diameter of approximately 180 meters. It is hydraulically inappropriate to reduce this diameter to reflect partial extraction and/or backfilling of the mine. Use of the actual mine diameter is expected to increase the inflow estimate significantly (perhaps a factor of 1.5-2)[1].
2. The setting of a fixed head side boundary beneath the freezewall is considered to be inappropriate, as drainage to the mine will reduce the head in this location. Use of a remote fixed head lateral boundary is expected to reduce the flow estimate, by perhaps 20%.
3. The setting of a no flow boundary at the base of the Pine Point formation (assumed to be 60 meters below the freezewall) is unconservative. This boundary should have been a fixed head boundary, reflecting the likely presence of relatively high lateral permeability units at the base of the Pine Point. Use of a fixed head boundary in this location is expected to increase the flow by 420 $m^3$/h

[1] This estimate is based on the sensitivity of the results of the EBA analysis to diameter. However, it may be unreliable, as the EBA sensitivity analysis is clearly incorrect: the reported flow for 10 meters and for 20 meters diameter are both higher than the flow for 12.5 meters, the base case.

to 1,680 $m^3/h$ (50% of expected and maximum flows), based on a Darcy computation using EBA's parameters.

The EBA maximum flow estimate is 50% higher than Tamerlane's proposed installed maximum pumping capacity of 2,200 cubic meters per hour.

**1.5. Recommendation**

Tamerlane shall provide revised calculations and estimates for basal inflow to the mine, modifying the boundary conditions of the EBA analysis. The inflow results shall be used to revise the injection well design and the discharge water chemical analysis.

Based on the results, Tamerlane may need to modify the proposed dewatering pumping capacity.

**2. Injection Wells**

| | |
|---|---|
| IR Number: | IR0607-002-47 |
| ToR Section: | D-17, D-19, L-3, L-6 |
| Response: | Tamerlane, 2007a, pp. 31-36 |
| Supplemental: | Tamerlane, 2007c |

**2.1. Issue**

As an alternative to the use of the infiltration basin which was deemed to have environmental impacts, the developer proposed to dispose of water through the use of an injection well. The design of the system has yet to be developed but the developer provided a conceptual description of the wells in a supplement provided to the Review Board. The following information regarding the proposed injection well was sought from the developer:

1. Details: Location, installation, operation, injection system, and examples of use.
2. Environmental impacts
3. Sediment removal
4. Monitoring
5. Contingencies
6. Birdseye view

**2.2. Developer's Conclusion**

1. Details: The injection well system has not yet been designed, so all information on the wells is yet to be determined. A general (conceptual) description of wells provided. Examples submitted in supplement.
2. Impact: No significant hydraulic impact is anticipated. Chemical impact is not expected because ammonia is reacted or adsorbed in the subsurface.
3. Sediment: Tamerlane proposes a lined basin.
4. Monitoring: Injection monitoring will be conducted in the backup well, located down-gradient of the primary well.
5. Contingencies: Tamerlane proposes a lined sediment settling pond with 12,336 $m^3$ capacity to store water during an upset chemical condition; water would be treated and discharged. A backup injection well is proposed as the contingency for injection well failure.
6. Conceptual image: Not provided.

**2.3. & 2.4. Review Conclusion and Rationale**

1. Details: The well design as described in the response is acceptable. Detailed design should be submitted for review. The examples submitted in the supplemental are not responsive (they portray injection above the water table), but should be adequate for this submission.
2. Impact: The physical impact evaluation is acceptable. The chemical impact evaluation is not acceptable, due to the lack of source term chemistry and the lack of any quantitative evaluation of the impacts due to discharge.

3. Sediment Removal: The sediment removal facility is described, but no supporting design or water management system is provided. As noted in review of this facility in IR0607-002-45 above, the feasibility and necessity for this facility is questioned.
4. Monitoring: Acceptable.
5. Contingencies: Well backup is acceptable. Sediment pond contingency is not demonstrated to be necessary.

**2.5. Recommendation**

1. Details: Develop and present design of injection well.
2. Impacts: Develop and present quantitative chemical impact evaluation.
3. Sediment Removal Pond: Provide justification that this is necessary, and the best environmental option to control sediment and chemicals in the discharge water.
4. Monitoring: No recommendations.
5. Contingencies: Re-evaluate chemical and sediment contingency plan to either demonstrate necessity for pond, or present alternative control strategy.
6. Conceptual image: Provide.

**3. Sewage Wastewater Treatment**

IR Number: IR0607-002-48
ToR Section: I-1-5(i); L-3(c); L-6
Response: Tamerlane, 2007a, pp. 37-44

**3.1. Issue**

Sewage effluent disposal in the injection well is questioned. Tamerlane was requested to:

1. Identify alternatives.
2. Support the disposal method chosen, and present contingencies.

**3.2. Developer's Conclusion**

Alternatives considered and their outcomes were:

1. On-site drainfield: permeability too low.
2. Shipping raw sewage to Hay River: high cost and too much traffic.

Deepwell injection of discharge effluent is practiced widely, in locations where discharge can be kept remote from potential drinking water aquifers.

**3.3. Review Conclusion**

INAC accepts the introduction of treated sewage effluent into the injection well effluent as the best means of disposal.

**3.4. Rationale**

As Tamerlane represents, the chemistry of the effluent appears to be compatible with the aquifer water that is the dominant constituent of the injectate. The most environmentally effective means of disposal is injection, rather than either trucking or creation of a drainfield.

**3.5. Recommendation**

Accept Tamerlane proposal.

**4. Discharge Water Quality predictions**

IR Number: IR0607-002-49
ToR Section: I-1-1
Response: Tamerlane, 2007a, pp. 45-55
Supplemental: Tamerlane, 2007d

**4.1. Issue**

Discharge water quality must be characterized and supporting computations provided.

**4.2. Developer's Conclusion**

- End-of-Pipe volume and key chemical parameters provided, without supporting computations.
- MSDS for flotation reagents provided.

**4.3. & 4.4 Review Conclusion and Rationale**

INAC has reviewed the response by Tamerlane, and finds the following deficiencies:

1. Supporting computations have not been provided and therefore are not reviewable.
2. Concentrations reported by Tamerlane for major constituents (TDS, sulfate) in the process discharge water are below the concentrations of the input water that is to be used in the process (groundwater from the mine dewatering system), which is incorrect. This suggests that the analysis assumed that the mill would be operating with Lakefield tap water (used for the testing), rather than R-190 deep aquifer groundwater.
3. The upper bound of the concentrations of all constituents in the discharge water can be computed by determining the mass of constituents that are leached out of the ore processed (from the lock-cycle leach data) and adding that mass to an amount of deep groundwater equal to the mine inflow. When INAC performs this computation using a mine inflow of 550 $m^3$/hr (without considering added flotation process reagents), it produces the following results for the discharge water:

| | |
|---|---|
| TDS: | 3375 mg/L |
| Sulfate: | 1780 mg/L |
| Copper: | 0.001 mg/L |
| Lead: | 0.001 mg/L |
| Zinc: | 0.021 mg/L |
| Ammonia: | 0.6 mg/L (assuming 2.5% loss of AN) |
| Nitrate: | 2.0 mg/L (assuming 2.5% loss of AN) |

**4.5. Recommendation**

Based on the above review, the following are recommended:

1. Re-evaluate the end-of-pipe concentrations of all constituents.
2. Submit detailed computational support for results.

**5. Fuel Storage**

IR Number: IR0607-002-50
ToR Section: D-13; L-3 (a)
Response: Tamerlane, 2007a, p.56

**5.1. Issue**

Details on the underground storage tank secondary containment was requested.

**5.2. Developer's Conclusion**

Schedule 40 piping will be buried from the tank farm to the shaft. Hazardous Spill Contingency Plan is designed to address any spill.

**5.3. & 5.4. Review Conclusion and Rationale**

INAC accepts this contingency for the underground fuel storage tank. INAC would like to review the Hazardous Spill Contingency Plan.

**5.5. Recommendation**

The Hazardous Spill Contingency Plan should be reviewed by the Mackenzie Valley Land and Water Board for approval in the licensing phase of this project. INAC's Guidelines for Spill contingency Planning can be followed for developing the Hazardous Spill Contingency Plan.

**6. Closure and Reclamation**

IR Number: IR0607-002-51
ToR Section: J
Response: Tamerlane, 2007, p.412-423, Tamerlane 2007b, p. x)

**6.1. Issue**

The Closure and Reclamation Plan lacks detail. In particular more information is required with respect to:

1 – Freeze curtain brine disposal
2 – Treatment of contaminated wash water
3 – Treatment of hazardous material
4 – Closure and reclamation of injection well
5 – Settling pond reclamation
6 - Post closure monitoring costs
7 – Future use of the site
8 – Closure objectives and measurable closure criteria for:
    a) Infrastructure
    b) Re-vegetation
    c) Groundwater monitoring

**6.2. Developer's Conclusion**

1 – Freeze curtain brine disposal: Returned to the manufacturer or GNWT for roadway usage. Internal pipes will be removed while external pipes will be left in place.

2 – Treatment of contaminated wash water: The wash water will be captured and hauled off site.

3 – Hazardous material treated: Tamerlane does not intend to treat any hazardous waste on site.

4 – Closure and reclamation of injection well: Injection well will be capped and left in place with all surface infrastructure removed.

5 – Settling pond reclamation: Removal of all sediments to be mixed into the backfill for return into the underground. The liner will be removed and the area contoured.

6 - Post closure monitoring cost: Prior funds estimated for the full reclamation of the infiltration basin will be utilized for post-closure monitoring.

7 – Future use: Return the area to similar pre-mining land uses for wildlife and the general public.

8 – Objective and criteria for:
a) Infrastructure, re-vegetation and groundwater monitoring:
Objective:

- Protection of public health and safety through the use of safe and responsible reclamation practices;
- Reduction or elimination of physical environmental effects once the mine ceases operation;
- Re-establishment of conditions that permit the land to return to similar pre-mining land uses;
- Eliminate the need for long-term monitoring and maintenance by establishing physical and chemical stability of disturbed areas;

Criteria: Through the effective removal of residual wastes (e.g. brine, waste hydrocarbons) mine infrastructure, re-contouring and re-vegetation of the area, this objective will be successfully.

**6.3. & 6.4 Review Conclusion and Rationale**

1 – Freeze curtain brine disposal: The brine should be disposed of in an appropriate manner. The external pipes should also be removed and if possible salvaged.

2 – Treatment of contaminated wash water: Acceptable

3 – Hazardous material treated: Acceptable

4 – Closure and reclamation of injection well: The injection well should not only be capped but be plugged with slurry (e.g. bentonite) to ensure environmental protection.

5 – Settling pond reclamation: If a sediment pond is required, the sediments should be treated, tested
and sent to an approved facility.

6 - Post closure monitoring cost: Tamerlane should revise their security estimate to account for post closure monitoring. This can be submitted in the licensing phase of this project.

7 – Future use: The objective is acceptable. Measuring criteria should be defined in order to assess the final reclamation of the site.

8 – Objective and criteria:
The objective is reasonable but measurable criteria should be established for the re-vegetation and groundwater monitoring. Measurable closure criteria are important as they are used to assess final reclamation of the site. Securities will not be released until the reclamation activities have been successfully completed and signed-off by the Inspector.

**6.5. Recommendation**

- The external pipes should also be removed and if possible salvaged.

The freeze wells should not only be capped but plugged with a low permeability material (e.g. bentonite slurry)

- The injection well should not only be capped but be plugged with a low permeability material (e.g. bentonite slurry).
- If a sediment pond is required, the sediments should be treated and sent to an approved facility.
- A revised security estimate should be submitted in the licensing phase of this project.
- Tamerlane should resubmit the Closure and Reclamation Plan to include and define measurable criteria for re-vegetation and groundwater monitoring. INAC's "2007 Mine Site Reclamation Guidelines" can be used as a guide.

**6.6 Outstanding Questions**

- At what point will the revegetation be considered successfully re-established and self sufficient?
- How will the physical and chemical stability of the aquifer be conclusively demonstrated?

**7. Freeze Wall Technology**

IR Number: IR0607-002-52
ToR Section: D-6; D-8
Response: Tamerlane, 2007a, p. 61-63

**7.1. Issue**

Freeze fluid must be prevented from escaping to the environment, both on the surface, and underground. Contingency in case of rupture of the freeze wall must be established.

**7.2. Developer's Conclusion**

Loss of circulating brine "can be prevented" by the following actions:

1. The freeze ring perimeter pipes will be enclosed with a 400 mm (16 inch) deep HDPE lined subsurface trench.
2. "It is possible" to place isolation valves at the surface that can be operated either manually or automatically to isolate the manifold and prevent brine loss.

In the event of loss, "the simplest" method of control is to dilute with sufficient amounts of fresh water.

**7.3 & 7.4 Review Conclusion and Rationale**

1. Freeze Ring Perimeter Pipes: The width of the containment system for the surface brine manifold system should be stated on the plan. Assuming the plan is executed as drawn, the plan does not account for the loss of capacity due to incident precipitation partially filling the trench and freezing on contact with the low temperature brine pipes.
2. Subsurface Pipes: The pressure-monitored automatic shutoff system for control of subsurface leaks in the DAR appears to have been downgraded from a commitment to a "possibility".
3. Freeze Plant: Tamerlane has not addressed brine containment in the surface plant area.
4. Tamerlane has not presented an engineered plan to demonstrate how the dilution of escaping brine with water will be accomplished.

**7.5. Recommendation**

INAC recommends that:

1. A plan for dealing with incident precipitation be developed and presented.
2. Tamerlane affirmatively commits to the automatic brine shutoff system described in the Development Assessment Report.
3. Tamerlane presents a plan for brine containment within the surface plant area.
4. Tamerlane presents an engineered plan for mitigation of escaped brine by dilution.

**8. Froth Flotation Ore Beneficiation**

IR Number: IR0607-002-53
ToR Section: D-15
Response: Tamerlane, 2007a, pp. 64-66
Supplemental: Tamerlane, 2007d

**8.1. Issue**

Additional processing using froth flotation is proposed, and evaluation of environmental impact of froth flotation is required.

**8.2. Developer's Conclusion**

1. Froth flotation is affirmatively proposed.
2. Process is described in IR0607-002-49, response #3.
3. End of pipe concentrations are increased as follows:

| Characteristic | DMS Only | DMS + Flotation |
|---|---|---|
| pH | 7.6 | 8.6 |
| Sulfate (mg/L) | 1436 | 1575 |
| TDS (mg/L) | 2432 | 2180 |
| Cu (mg/L) | 0.0008 | 0.133 |
| Pb (mg/L) | 0.0008 | 0.081 |
| Zn (mg/L) | 0.017 | 0.061 |

4. No hazardous or environmentally hazardous chemicals will be used in the flotation process. MSDS sheets provided.
5. Power requirements have been recalculated including changes in power supply to include hydro power, and impact evaluations are in process.

**8.3. & 8.4 Review Conclusion and Rationale**

1. Confirmation noted.
2. Process description does not include flow diagram.
3. End of pipe concentrations do not appear to be correct. First, see comments for DMS only estimate at IR0607-002-49 review #3 above. Second, it is not credible that concentrations of major constituents will be less in the discharge water than the input (mine inflow) water. Third, it is not credible that upon addition of 22 tonnes/day of soluble material in the flotation circuit the TDS would reduce. INAC's conservative check calculation including flotation (not to be relied upon by Tamerlane) produces:

| Characteristic | DMS Only | DMS + Flotation |
|---|---|---|
| Sulfate (mg/L) | 1780 | 2066 |
| TDS (mg/L) | 3375 | 5054 |
| Cu (mg/L) | 0.001 | 108.5 |
| Pb (mg/L) | 0.001 | 0.001 |
| Zn (mg/L) | 0.021 | 34.4 |

It is noted that the copper and zinc concentration would likely be reduced by adsorption and precipitation at the expected pH; more sophisticated geochemical modeling or trial flotation in the laboratory would be required to demonstrate that this will not be a problem for discharge water.

4. INAC does not concur that no hazardous or environmentally harmful constituents are used in the flotation process. Copper, zinc, sulfate, sulfide, lime, totally dissolved solids, and BOD are added during the process, and are potentially hazardous and/or environmentally harmful to aquatic life and/or drinking water.
5. Tamerlane was unresponsive to the request for a description of the increase in power requirements that will be associated with addition of the flotation processing step, and the environmental impact.

**8.5 Recommendation**

1. Provide flow diagram and description of flotation process.
2. Re-compute discharge water quality, and provide computational basis.
3. Quantitatively or experimentally evaluate environmental fate and impact of hazardous and environmentally harmful constituents added for flotation.
4. Provide power use increase for flotation process, and an evaluation of environmental impact.

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## SUMMARY OF RECOMMENDATIONS

### 1. Mine inflow prediction

- Tamerlane shall provide revised calculations and estimates for basal inflow to the mine, modifying the boundary conditions of the EBA analysis. The inflow results shall be used to revise the injection well design and the discharge water chemical analysis.

- Based on the results, Tamerlane may need to modify the proposed dewatering pumping capacity, and eliminate the contingency pond for chemical storage and treatment.

### 2. Injection Wells

- Details: Develop and present design of injection well.
- Impact: Develop and present quantitative chemical impact evaluation.
- Sediment Removal Pond: Provide justification that this is necessary, and the best environmental option to control sediment and chemicals in the discharge water.
- Contingencies: Re-evaluate chemical and sediment contingency plan to either demonstrate necessity for pond, or present alternative control strategy.
- Conceptual image: Provide.

### 3. Sewage Wastewater Treatment

- Accept Tamerlane proposal.

### 4. Discharge Water Quality Predictions

- Re-evaluate the end-of-pipe concentrations of all constituents.
- Submit detailed computational support for results.

### 5. Fuel Storage

- The Hazardous Spill Contingency Plan should be reviewed by the Mackenzie Valley Land and Water Board for approval in the licensing phase of this project.
- INAC's 2007 "Guidelines for Spill Contingency Planning" from Water Resources, should be followed for developing the Hazardous Spill Contingency Plan.

### 6. Closure and Reclamation

- The external pipes should also be removed and if possible salvaged.
- The freeze wells should be capped and plugged with a low permeability material.
- The injection well should be capped but be plugged with a low permeability material.

- If a sediment pond is required, the sediments should be treated and sent to an approved facility.
- A revised security estimate should be submitted in the licensing phase of this project.
- Tamerlane should resubmit the Closure and Reclamation Plan to include and define measurable criteria for re-vegetation and groundwater monitoring. INAC's "2007 Mine Site Reclamation Guidelines" should be used as a guide and can be obtained from the Water Resources Division at INAC.

**7. Freeze Wall Technology**

- A plan for dealing with incident precipitation should be developed and presented.
- Tamerlane should affirmatively commit to the automatic brine shutoff system described in the DAR.
- Tamerlane should present a plan for brine containment within the surface plant area.
- Tamerlane should present an engineered plan for mitigation of escaped brine by dilution.

**8. Froth Flotation Ore Beneficiation**

- Provide flow diagram and description of flotation process.
- Re-compute discharge water quality, and provide computational basis.
- Quantitatively or experimentally evaluate environmental fate and impact of hazardous and environmentally harmful constituents added for flotation.
- Provide power use increase for flotation process, and an evaluation of environmental impact.

## REFERENCES


- **EBA, 2007a:** *Evaluation of Deep Well Disposal, R-190 Mineral Deposit Site Near Hay River, Northwest Territories.* Letter report prepared by EBA Engineering Consultants Ltd., dated July 30, 2007.
- **Tamerlane, 2007a:** *EA0607-002 Tamerlane Ventures Inc's Pine Point Pilot Project (PPPP) Tamerlane Ventures Second Round Information Responses from Tamerlane Ventures Inc. to the MVEIRB.* Report submitted August 15, 2007.
- **Tamerlane, 2007b:** *EA0607-002 Tamerlane Ventures Inc's Pine Point Pilot Project (PPPP) Tamerlane Ventures Second Round Information Responses to IR0607-002-35 & IR0607-002-38 from Tamerlane Ventures Inc. to the MVEIRB.* Report submitted August 30, 2007.
- **Tamerlane, 2007c:** *Supplemental Response to IR0607-002-47.* Email submission of injection well examples by Tamerlane Ventures to MVEIRB, submitted September 10, 2007.
- **Tamerlane, 2007d:** *Supplemental Response to IR0607-002-49.* Email submission of flotation process MSDS by Tamerlane Ventures to MVEIRB, submitted September 10, 2007.
- **EBA, 2007b:** *Basal Inflow Evaluation, Pine Point Pilot Project Near Hay River, Northwest Territories.* Letter report by EBA Engineering Consultants Ltd., dated September 7, 2007, submitted by Tamerlane Ventures to MVEIRB on September 11, 2007.
- **Tamerlane, 2007e:** *Supplemental Response to IR0607-002-37.* Email submission on flood levels by Tamerlane Ventures to MVEIRB, submitted September 10, 2007.