

**Golder Associates Ltd.**

2390 Argentia Road  
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**REPORT ON**

**2007 TAILINGS DAM INSPECTION  
SPANISH AMERICAN TAILINGS MANAGEMENT  
AREA**

Submitted to:  
Rio Algom Limited  
Elliot Lake Division  
P.O. Box 38  
Elliot Lake, Ontario  
P5A 2J6

**DISTRIBUTION:**

6 Copies - Rio Algom Limited, Elliot Lake, Ontario  
2 Copies - Golder Associates Ltd.

April 2008

07-1118-073-4



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April 17, 2008

07-1118-073-4

Rio Algom Limited  
Elliot Lake Division  
P.O. Box 38  
Elliot Lake, Ontario  
P5A 2J6

Attention: Ms. Debbie Berthelot, Reclamation Manager

**RE: 2007 TAILINGS DAM INSPECTION  
SPANISH AMERICAN TAILINGS MANAGEMENT AREA**

Dear Debbie:

This letter report presents the results of a visual inspection of the Spanish American Tailings Management Area (TMA) by Peter Merry of our office on October 17, 2006.

Golder Associates (Golder) has conducted annual inspections of the Spanish American TMA since the mid 1990's. The annual inspection by an engineer is an integral part of a care, maintenance and surveillance program to ensure dam safety and physical stability of the tailings facility.

Denison Environmental Services (DES) has been retained to manage all of Rio Algom's tailings management facilities in and around Elliot Lake. Their responsibilities for Spanish American TMA includes routine maintenance and environmental sampling.

This report should be read in conjunction with the previous inspection reports, which detailed the historical performance of the facility.

The weather was cool and cloudy with occasional drizzles on October 17 following rain the night before the site inspection.



## **BACKGROUND**

The Spanish American TMA is situated within the former Olive Lake, south and up gradient of the Denison TMA-1. The tailings area contains about 0.45 million tonnes of tailings, mostly in the east end of the basin. Site reclamation consisted of the construction of two low head berms at the outlet of the lake and the relocation of tailings below the current water level in 1993. These berms were designed to replace a beaver dam that existed at the lake outlet and to maintain the tailings submerged under 5 ft of water. The berms are approximately 5 ft high and 30 ft long and consist of a till core with rockfill shells. They are the only containment structures at the Spanish American TMA which is a rock rimmed basin.

The Spanish American TMA effluent drains to the Denison Mine TMA-1. The quality of the effluent has been excellent.

The Spanish American TMA elevations are referenced to the Quirke Mine Datum. The Quirke elevation can be converted to the Geodetic Datum elevation by the following relationship:

$$\text{Geodetic Elevation (m)} = [\text{Quirke Elevation (ft.)} - 69.7 \text{ (ft.)}] / 3.281$$

## **INSPECTION PROCEDURES**

The visual inspection was intended to assess the general condition of the facility and the adequacy of maintenance that had been carried out. The results of the inspection together with photographic records are summarized on the attached inspection Forms A and B for dams and ancillary works, respectively.

## **CONDITION OF FACILITIES**

There has been no noticeable change in the condition of Spanish American TMA since 2006. The outlet berms are in good condition.

At the time of the site visit the spillway on the South Berm was operating normally. There was no indication of beaver activity at the pond outlet.

The vegetation on the berms especially on the spillway inlet will require should be cleared. As well some cutting of vegetation along the access road should also be carried out.

## **CONCLUSIONS AND RECOMMENDATIONS**

The Spanish American TMA is in good condition. The inspection on October 17, 2007 did not note any maintenance issues that required immediate attention. Removal of vegetation on the berms and along the access road is recommended for 2008.

We trust that this report adequately describes the condition of the Spanish American TMA. Please feel free to contact us if you wish to discuss any aspect of the inspection.

Yours very truly,

**GOLDER ASSOCIATES LTD.**

*Original signed by:*

Peter Merry, P. Eng.

WPM/SNK/dh

Spanish American Report 2007 26OCT07.doc

*Original signed by:*

Shiu N. Kam, P.Eng.  
Principal



### SPANISH AMERICAN TAILINGS MANAGEMENT AREA FACILITY INSPECTION SUMMARY REPORT

Inspecting Officer: Peter Merry Report No.: 07-4 Inspection Date: 18/10/06  
 Inspecting Agency: Golder Associates (DD/MM/YR)

#### WEATHER:

Temperature: 8 °C Description: Cloudy with occasional light drizzles  
Current Last 3 Days Other Comments:  
 dry    
 frost    
 rain   Light drizzles on October 17, rain the night before the site inspection  
 snow

#### FACILITIES INSPECTED: (A separate report sheet Form A or Form B to be prepared for each structure)

| <u>Structure</u>  | <u>Dam/Dyke</u>                     | <u>Spillway/Flow Control</u>        |
|-------------------|-------------------------------------|-------------------------------------|
| South Outlet Berm | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| North Outlet Berm | <input checked="" type="checkbox"/> |                                     |
| Miscellaneous     | <input checked="" type="checkbox"/> |                                     |

Review Officer: \_\_\_\_\_ Review Agency: \_\_\_\_\_ Date Reviewed: \_\_\_\_\_  
 (DD/MM/YR)

**ACTION REQUIRED:**  none

SPANISH AMERICAN TAILINGS MANAGEMENT AREA
FIELD INSPECTION FORM A
DAM/DYKE INSPECTION REPORT

Inspecting Officer: P. Merry Report No.: 07-4 Inspection Date: 17/10/06
Inspecting Agency: Golder Associates (DD/MM/YR)

DAM/DYKE INFORMATION:

Identification: Outlet Berms Crest Elevation: 1422 ft. Head Pond Elevation ~1419 ft.
Tail Pond Elevation:

DAM / DYKE

A) Crest

cracking [x] none [ ]
settlement [x] none [ ]
erosion [x] none [ ]
other movement [x] none [ ]
crest vegetation [ ] none [x] Shrubs and grass on both berms

B) Downstream Slope and Toe Area

erosion [x] none [ ]
settlement [x] none [ ]
bulging [x] none [ ]
sloughing [x] none [ ]
slope protection [x] good [ ]
slope vegetation [ ] none [x] Shrubs and grass on both berms
animal burrows [x] none [ ]
seepage [ ] none [x] location 1: Toe of North Berm
rate: [ ] damp [x] trickle [ ] steady (L/s)
clarity: [x] clear [ ] muddy
sample taken: [ ] yes [x] no
location 2:
rate [ ] damp [ ] trickle [ ] steady (L/s)
clarity [ ] clear [ ] muddy
sample taken [ ] yes [ ] no
toe vegetation [ ] none [ ] sparse [x] moderate [ ] heavy
type: Shrubs
sand boils [x] none [ ] location(s):

SPANISH AMERICAN TAILINGS MANAGEMENT AREA
FIELD INSPECTION FORM A
DAM/DYKE INSPECTION REPORT

Identification: Outlet Berms

C) Upstream Slope and Tailings Surface

erosion [x] none [ ] wave induced [ ] surface runoff
location(s):
degree [ ] minor [ ] moderate [ ] severe
settlement [x] none [ ]
bulging [x] none [ ]
sloughing [x] none [ ]
slope protection [x] good [ ]
slope vegetation [ ] none [x] Cattails and strubs along shoreline
animal burrows [x] none [ ]
whirlpool [x] none [ ]
sinkholes [x] none [ ]
tailings surface [x] water covered [ ]

SPILLWAY / FLOW CONTROL STRUCTURES

Type: [ ] none [x] spillway Invert Elevation 1420 ft. on South Berm
[ ] decant [ ] weir
[ ] other
Flow: [x] none [ ] clear [ ] muddy
Rate of discharge (L/s) [ ] estimated [ ] measured Gauge Reading

CONDITIONS AT DISCHARGE STRUCTURE

[x] good [ ] blockage of inlet [ ] debris [ ] corrective action: [ ] taken
[ ] beaver dam [ ] to follow
[ ] siltation
[ ] blockage of outlet [ ] debris [ ] corrective action: [ ] taken
[ ] beaver dam [ ] to follow
[ ] siltation
[ ] erosion [ ] channel [ ] corrective action: [ ] taken
[ ] side slope [ ] to follow
[ ] at discharge

Comments: No change in condition of spillway. Vegetation on spillway should be periodically cleared.

**SPANISH AMERICAN TAILINGS MANAGEMENT AREA  
FIELD INSPECTION FORM A  
DAM/DYKE INSPECTION REPORT**

Identification: Outlet Berms

**DAM / DYKE INSTRUMENTATION:** (plot any newly installed instrumentation on relevant plans and cross-sections)

|   | <u>Operational</u>       | <u>Damaged</u>           | <u>Measurement Taken</u> |
|---|--------------------------|--------------------------|--------------------------|
| <input checked="" type="checkbox"/> none  |                          |                          |                          |
| <input type="checkbox"/> piezometers      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> monitoring wells | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> survey stakes    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> other _____      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**COMMENTS AND RECOMMENDATIONS:**

*The berms have remained in good working condition. The vegetation on spillway and berm should be cleared.*

Action Required:       none                       further monitoring                       remediation

Plan or Sketch Attached

Photographs (number)      1 and 2      (locate all photographs on plan)

Review Officer: \_\_\_\_\_ Review Agency: \_\_\_\_\_ Date Reviewed: \_\_\_\_\_  
(DD/MM/YR)

**REVIEW COMMENTS:**  none

**ANNUAL FACILITY INSPECTION – SPANISH AMERICAN TAILINGS MANAGEMENT AREA**

**Client :** Rio Algom Limited.

**Project Number :** 07-1118-0073-4

**Site Location :** Spanish American Tailings Management Facility

**Photographer :** P. Merry

**Date :** October 17, 2007

**Drawn By :** P. Merry

Photograph 1

Upstream view of South Outlet Berm.



Photograph 2

North Outlet Berm crest.



**SPANISH AMERICAN TAILINGS MANAGEMENT AREA  
 FIELD INSPECTION FORM B  
 DIVERSION CHANNELS & MISCELLANEOUS ITEMS INSPECTION REPORT**

Inspecting Officer: P. Merry Report No.: 07-4 Inspection Date: 17/10/06  
 Inspecting Agency: Golder Associates (DD/MM/YR)

**DIVERSION CHANNELS:**

Identification: \_\_\_\_\_ Inlet Invert Elevation: \_\_\_\_\_

Flow Control Structure: none

**A) Inlet Conditions**

- |                                       |  |  |       |
|---------------------------------------|--|--|-------|
| <input type="checkbox"/> good         | <input type="checkbox"/> scour & erosion | <input type="checkbox"/> debris              | _____ |
|                                       | <input type="checkbox"/> blockage        | <input type="checkbox"/> beaver dam          | _____ |
|                                       |  | <input type="checkbox"/> siltation           | _____ |
|                                       |  | <input type="checkbox"/> vegetation          | _____ |
| <input type="checkbox"/> slope & bank | <input type="checkbox"/> erosion         | <input type="checkbox"/> failure/instability | _____ |
|                                       |  | <input type="checkbox"/> taken               | _____ |
| corrective action                     | <input type="checkbox"/> to follow       |  | _____ |

**B) Outlet Conditions**

- |                                       |  |  |       |
|---------------------------------------|--|--|-------|
| <input type="checkbox"/> good         | <input type="checkbox"/> scour & erosion | <input type="checkbox"/> debris              | _____ |
|                                       | <input type="checkbox"/> blockage        | <input type="checkbox"/> beaver dam          | _____ |
|                                       |  | <input type="checkbox"/> siltation           | _____ |
|                                       |  | <input type="checkbox"/> vegetation          | _____ |
| <input type="checkbox"/> slope & bank | <input type="checkbox"/> erosion         | <input type="checkbox"/> failure/instability | _____ |
|                                       |  | <input type="checkbox"/> taken               | _____ |
| corrective action                     | <input type="checkbox"/> to follow       |  | _____ |

**ACCESS ROADS / SHORELINE:**

|                                   |  |                 |                                     |
|-----------------------------------|--|-----------------|-------------------------------------|
| Location: <u>Main access road</u> | <input checked="" type="checkbox"/> vegetation | Location: _____ | <input type="checkbox"/> vegetation |
|                                   | <input type="checkbox"/> debris                |                 | <input type="checkbox"/> debris     |
|                                   | <input type="checkbox"/> erosion               |                 | <input type="checkbox"/> erosion    |

**SPANISH AMERICAN TAILINGS MANAGEMENT AREA  
FIELD INSPECTION FORM B  
DIVERSION CHANNELS & MISCELLANEOUS ITEMS INSPECTION REPORT**

**DRAINAGE CULVERTS AND DITCHES**

|                 |                               |                                  |                                  |  |
|-----------------|-------------------------------|----------------------------------|----------------------------------|--|
| Location: _____ | <input type="checkbox"/> good | <input type="checkbox"/> blocked | <input type="checkbox"/> damaged |  |
| Location: _____ | <input type="checkbox"/> good | <input type="checkbox"/> blocked | <input type="checkbox"/> damaged |  |
| Location: _____ | <input type="checkbox"/> good | <input type="checkbox"/> blocked | <input type="checkbox"/> damaged |  |
| Location: _____ | <input type="checkbox"/> good | <input type="checkbox"/> blocked | <input type="checkbox"/> damaged |  |

**SITE SECURITY**

|              |               |  |                          |  |
|--------------|---------------|--|--------------------------|--|
| Main Gate:   | locks         | <input checked="" type="checkbox"/> good | <input type="checkbox"/> |  |
|              | fencing       | <input checked="" type="checkbox"/> good | <input type="checkbox"/> |  |
|              | warning signs | <input checked="" type="checkbox"/> good | <input type="checkbox"/> |  |
| Other Gates: |               |  |                          |  |

**COMMENTS AND RECOMMENDATIONS:**

*Overall site condition is good. Vegetation along main access road to berms should be periodically cleared.*

|   |  |   |  |
|---|--|---|--|
| Action Required:                                    | <input checked="" type="checkbox"/> none | <input type="checkbox"/> further monitoring | <input type="checkbox"/> immediate remediation |
| <input type="checkbox"/> Plan or Sketch Attached    |  |   |  |
| <input type="checkbox"/> Photographs (number) _____ |  | (locate all photographs on plan)            |  |

|                       |                      |                      |            |
|-----------------------|----------------------|----------------------|------------|
| Review Officer: _____ | Review Agency: _____ | Date Reviewed: _____ |            |
|                       |                      |                      | (DD/MM/YR) |

**REVIEW COMMENTS:**  none