AECOM
17007 – 107th Avenue
Edmonton, AB, Canada T5S 1G3
www.aecom.com

780 486 7000 tel
780 486 7070 fax

September 12, 2011

Doug Townson, NWTAA, B. Arch.
Project Manager
Northern Contaminated Sites, Western Region
Public Works and Government Services Canada
4th Floor Greenstone Building, 5101 – 50th Avenue
P.O. Box 518
Yellowknife, NT X1A 2N4

Dear Doug Townson:

Project No: 60162477

Document Number: 305-Demo Debris-15-LET-0003-Rev0_20110913

Regarding: Giant Mine – Structural Condition of Roaster Complex

Introduction

The purpose of this letter is to present a structural evaluation of the Roaster Complex at Giant Mine. The complex consists of a total of 7 buildings as well as a series of exterior roaster flues, arsenic storage silo and a 45 m tall exhaust stack. This evaluation was limited to reviewing PWGSC provided information showing the structural condition of the structures, as well as reviewing information presented in a 2009 Risk Management Report. Additional structural information on the roaster flues was previously provided in an evaluation completed by AECOM in April 2010. It should be noted that AECOM has not completed an in person field inspection of all the structures referred to as the Roaster Complex.

Background Information

The Roaster Complex consists of the following separate buildings and facilities:

- Dorrco roaster
- Cottrell roaster
- AC Roaster/Pipe shop
- Calcine Plant
- Baghouse
- Silo-load out and silo
- Stack fan house/ 45 m stack
- Exterior roaster flues

It is understood that the majority of the buildings and structures within the Roaster Complex were constructed in the late 1940's and 1950's and were in service until milling operations ceased at the site (approx. 1999). The buildings were constructed using various construction methods and

materials including wood and steel frames. It is understood that the buildings have not been used and have been unmaintained since roasting ceased at the mine site. It is further understood that the buildings contain large quantities of asbestos and arsenic trioxide dust.

The reference information that was reviewed in this evaluation was limited to:

- "Structural Inspections Giant Mine – Various Buildings, Prepared by PWGSC, December 2007.
- Indian and Northern Affairs Canada – 2009 Risk Registry, November 17, 2009.
- AECOM Correspondence "Draft Roaster Flues Evaluation- Giant Mine" April 20, 2010.
- "Site Inspection of Roaster Exhaust Stack for Royal Oak – Giant Mine, Yellowknife, NT" FSC Group, December 1997.

Summary of Observations

In 2007 PWGSC completed a structural inspection of the Roaster Complex at Giant Mine. This report indicated the following:

- The wood structure of the old roaster building does not show any significant signs of rot.
- Some of the exterior asbestos paneling on the walls is not securely fastened and some of the fasteners appear to be corroded. In some locations the panels have been damaged or have been removed.
- Gaps are present between panels in the roof of the complex; in some areas, the roof panels were heavily corroded or missing.
- Interior catwalks in some areas were not structurally sound and were not recommended for use.
- There were no major signs of corrosion or deflection of the main structural elements.
- In order to note any additional failures of the asbestos panelling and/or panel fasteners, annual monitoring is recommended.

The November 2009 Risk Registry reported that there would be a High Community/Media Reputation Risk and a High Consequence Risk if there was a partial structural failure in the Roaster Complex which resulted in the release of asbestos or arsenic trioxide. The risk registry also reported a High Community/Media Reputation Risk in the event there was a fire in the Roaster Building which resulted in the release of asbestos and arsenic trioxide to the environment.

In 2010, AECOM completed an inspection of the exterior roaster flues. This report identified the following items:

- Due to the very poor condition of the metal flues located on the east side of the Cottrell building, there is a high probability that the corrosion of the bottom of the flue will continue and will eventually result in the failure of the bottom of the flue, which would release a large quantity of arsenic trioxide dust. Due to the poor condition of the flues, this release could occur without failure of a structural member, since the bottoms of the flues are partially unsupported.
- Due to the close proximity of the site to the adjacent highway as well as to other working areas of the facility, there is the potential that on-site workers or off-site public could be exposed to arsenic trioxide if there was an on-site release.

- Due to the presence of numerous openings in the buildings located in the Roaster Complex, there is the potential for ongoing releases of arsenic and asbestos containing dust from the buildings in the Roaster complex.
- Large quantities of asbestos containing pipe insulation are currently falling off of the flues and are being windblown around the area.
- Openings (missing windows, broken building corners, etc.) in the Roaster Complex buildings were present and friable asbestos insulation was visible. Wind gusts will potentially cause the asbestos and arsenic dust to migrate into the environment.

This report recommended that the scattered asbestos debris should be collected and all building openings covered. Different options for the removal of the different flue networks were also presented.

The 1997 FSC inspection report on the exhaust stack identified the following deficiencies:

- There was erosion visible in the exterior and interior masonry with the interior being in worse condition in the mortar at the top of the stack;
- Due to the build up of a precipitate at the top of the stack, the steel cap at the top has come apart and is being separated from it's mounting bolts; and
- A portion of the steel cap was also missing (i.e. fallen off) at the time of the inspection.

This report recommended:

- The stack be inspected on a regular basis, but not less than once per year;
- The stack be cleaned periodically to reduce the level of interior erosion; and
- The steel ring located at the top of the stack be remounted and bolted together.

Discussion

The background information indicates that there has been a noticeable amount of structural degradation in various elements within the Roaster Complex. Degradation has been observed in both non-structural (cladding) and in structural supports. Due to the length of time that has passed since the last structural inspections were completed, additional degradation of the cladding and other structural components on the exhaust stack, roaster flues and roaster buildings would be expected.

It is understood that there is a considerable volume of arsenic located in the abandoned flue network located on the east side of the Roaster Complex. Based on the deteriorated condition of the flues (especially the Cottrell flue) there is a considerable risk of a release of arsenic from the site if there was a failure of the flue system. In addition, due to the presence of building openings in the adjacent Roaster and Cottrell buildings, there is also a potential for further release to the environment of arsenic and friable asbestos.

Recommendation

Since the structures located within the Roaster Complex are no longer used or maintained for their original use, and they represent a potential risk to on-site users and the environment, it is recommended that the structures be abated of hazardous materials and deconstructed Due to the current condition of the different structures it is recommended that the deconstruction of the exterior flues and exhaust stack be planned as a near term action item (i.e. within 1 year), while

deconstruction of the remaining roaster complex structures should be completed within a long term (i.e. within 2-3 years). Due to the potential for items to fall off the top of the exhaust stack, there is the potential for on-site workers to be injured from falling objects. Therefore deconstruction of the stack is required before the start of the deconstruction of the other exterior flues.

Due to the amount of asbestos and arsenic trioxide within the Roaster Complex, all future deconstruction programs will need to be completed following a strict removal protocol by speciality contractors. In order to avoid mobilization costs for these contractors, consideration should be given to include the as much of the deconstruction of the roaster complex in a single contract.

Closing

Engineering judgment has been used in the preparation of this report and the conclusions and recommendations are based solely on the information made available. If further information germane to issues discussed in this report become available, AECOM Canada Ltd. reserves the right to revise the contents and conclusions outlined herein.

The above report has been prepared for the exclusive use of the Government of Canada in determining a course of action with respect to the issues outlined in this report. There are no representations of any kind made by AECOM Canada Ltd to any party other than the Government of Canada.

Should you wish to discuss this matter any further, please contact me at (780) 486-7000.

Sincerely,

AECOM Canada Ltd.

REGISTERED PROFESSIONAL ENGINEER
R.J. GILLIS
LICENSEE
NWT/NU

Sept 15, 2011

Bob Gillis, P.Eng.
Senior Project Engineer
Planning, Design & Development
bob.gillis@aecom.com

PERMIT TO PRACTICE
AECOM Canada Ltd.
Signature
Date Sept 15/11
PERMIT NUMBER: P639
NWT/NU Association of Professional Engineers and Geoscientists