

MEMO

To: John Stard
From: Brian Penney
Subject: Minutes of TAC Meeting: Arsenic Disposal at Giant Mine
Date: June 19, 1996

In Attendance:

Royal Oak:

John Stard
Sadek El-Alfy
Bryan MacLeod
Brian Penney
Fred Matich, MAJM Corp.
Allan Moss, Golder Associates
Don Hayley, EBA Engineering Consultants
Serena Domville, Seacor Environmental Eng.
Kevin Hodgins, Ferguson, Simek, Clark

TAC Members:

D. Milburn
S. Thibaudeau
D. Jessiman
K. Hall
S. Harbichi
M. Borden
J. McMullen
D. Levert
N. Jameisen

Location: City Hall Boardroom

The meeting was delayed ten minutes to allow for people to arrive who were not aware of the change in location.

David Milburn began the meeting with a brief introduction and overview of the agenda (attached). He requested that everyone in the room introduce themselves and state their position and/or reason for attending.

David Jessiman informed the group of the history of this study and its importance to the Abandonment and Restoration plan for Giant mine. The deadline for submission is 1998 as per the expiry of the current water licence. This study was initiated in 1993 and after the annual report for 1994 there was concern that work on this study was not progressing. He added that it was encouraging to see the effort Royal Oak has put forth since that point.

Sadek El-Alfy thanked the TAC members for meeting with Royal Oak and introduced Bryan MacLeod and Brian Penney as new employees of Royal Oak. Sadek referenced the 1995 Annual Environmental report as it pertained to the arsenic study and commented that the meeting held in December 1995 was very constructive and aided in the writing of that report. He recommended

that a similar meeting be held in December 1996 to update TAC members to the current status of

the study. Sadek introduced Fred Matich as the coordinator for this study and asked Fred to introduce the other members of the team.

Fred also referred to the 1995 report, specifically the point that Royal Oak is committed to assembling experts to achieve the best possible solution/options for arsenic storage at Giant. Fred gave a brief overview of the scope of the study and stated it would be discussed in greater detail at the presentation in December. He then asked each member of the team to introduce themselves and talk briefly on their technical experience and their input to the study. This was done in the following order: Allan Moss, Dan Hayley, Serena Domville, Kevin Hodgins, Brian Macleod. Brian Penney then gave a brief explanation of his role at Royal Oak and his input to the team. Fred explained to TAC members the enormous amount of important information that had already been completed by Giant mine personnel and the vast amount of historical data that is available at Giant.

Priority is to be put on design criteria for new vaults and ensuring number 15 vault is acceptable before arsenic is stored. The study will also assess the condition and possible remedial efforts needed on all the old vaults. Resources at Giant are to be used to the maximum potential.

After the overview and introductions were complete Royal Oak personnel and consultants answered questions. The following is a summary of the questions and answers. Where possible the name of the TAC member will be given.

TAC Question

Is there a time frame in which the permafrost studies would be complete?

Dan Hayley

It was still too early into the study but he was confident that at least initial findings would be complete before year end.

TAC Question

Will the extent of the arsenic study be limited to arsenic in the vaults or would surface contaminations be considered?

Serena Domville

All aspects of arsenic on the Giant property and surrounding areas will be considered. Fred commented that Serena had already completed a comprehensive study of arsenic for the 1995 Annual Report.

TAC Question (D. Levert)

Will this study include a Risk Assessment and who will be responsible for that aspect?

Fred Matich

The risk assessment will be completed near the end of the study when all the facts and analysis are complete. The risk assessment will have input from all the experts on the team, many of whom are experienced in this area. It is not known at this moment if an additional firm will be contacted to do this, although it is a possibility.

TAC Question

Will the study identify technical options available for construction of new vaults and alternative solutions to arsenic storage?

Fred Matich

After enough factual data is collected the team will explore all options for vault design, in particular, vault shape. (Existing shape is inherited from traditional mining stopes). It is estimated that this area of the study will not proceed until 1997.

Sadek El-Alfy

There was a project in the late 1980's that investigated recovering arsenic from the vaults. It was concluded that approx. 80% of the total arsenic could be removed from the vault. The remaining 20% would involve hydraulic measures for removal. It was felt that this may cause more severe environmental concerns due to water contamination. This option has not been dismissed. The conclusion of the study may dictate what needs to be done regarding removal.

TAC Question

Is permafrost a viable option given data already reported and future global warming predictions?

Don Hayley

Not enough investigation is done to answer the question at this time. There are several proven methods of enhancing permafrost. It is possible to freeze and cold sink the vaults and observe what happens when the mine is flooded. Tools are available to evaluate this possibility.

TAC Question

Ground water information is important in permafrost assessments to understand the flows after flooding. Also, when considering future conditions the data available today may not be accurate.

J. Stard
Page 4
June 20, 1996

Don Hayley

Considering future climatic data would most likely be an area covered in the risk assessment.

TAC Question

Given the importance of hydrogeological information in this study, why is it being delayed?

Fred Matich

It is not being delayed. The water flow at the mine is being controlled through pumping at this time. It is important to conduct this study systematically. Fred will be handling the hydrogeology aspect of this study. It is important to get all the related data before investigating the hydrogeology. Conclusions may be formed that require no flow, in which case the diversion of Bakers Creek may be necessary.

TAC Question (S. Thibaudeau)

This is the 3rd year of a 5-year study and it appears that the study is just beginning to take shape. How much data has been collected regarding competency of the rock surrounding the vaults? How many holes have been drilled since 1993, directed at supplying information for this study? How many holes have been drilled to study permafrost characteristics for this study?

Fred Matich

Because of the vast amount of information available from hundreds of drill holes that have been studied in the past, it may not be necessary to have an extensive drill campaign for this study. If TAC wishes, they can view the sector books for details on each vault. As per the number of holes drilled since 1993 that pertain to this study, it is given in the 1995 report (6 holes). It is felt that the data available is very good, additional holes will supplement this information. In terms of information obtained from drill holes, quality is more important than quantity.

Sadek El-Alfy

We are not denying that this study is behind schedule. Royal Oak and associated parties have been suffering from large turnover. We feel that with the time remaining a comprehensive study will be completed to the satisfaction of the Water Board.

TAC Question (S. Thibaudeau)

Do you feel that the one year left to complete field work and studies is enough to produce data that is representative?

J. Stard

Page 5

June 20, 1996

Sadek El-Alfy

We are not relying on one year of data collection. There are large amounts of information available from almost 50 years of operation at Giant mine. Vaults 11, 12, 14 and 15 were specifically designed for arsenic disposal and all drawings, designs and studies surrounding their construction are available.

TAC Question

When would hydrogeology be addressed?

Fred Matich

Mostly next year.

TAC Question (S. Thibaudeau)

Would it be possible to get an updated list of references that were used to write the 1995 report? It is important to see that there is substance to the data reported. Also a list of documents and studies that will be used in constructing the final report would be useful.

Fred Matich

The references used in the construction of this report will accompany the final report. A list of references used in constructing the 1995 report will be supplied.

TAC Question (D. Jessiman)

What is the time line on the production of a draft and final report?

Fred Matich

It is anticipated that a draft report will be presented for review before a final submission. This will fall within the time frame outlined in the 1995 report. More firm dates will be apparent during the presentation in December.

TAC Question (D. Levert)

We are very encouraged by the collection of experts that have been assembled by Royal Oak and fully assume that the study will be completed within the current deadlines. What is the life of Giant Mine?

J. Stard
Page 6
June 20, 1996

Sadek El-Alfy

With current reserves and exploration a mine life of approximately six years is expected, unless emission standards require major expenditures that would not make it economically viable to operate.

TAC Question (D. Milburn)

It is recommended that the December meeting be a full blown technical session. Would it be possible to see the vaults?


Royal Oak

The session in December is agreeable. Anyone wishing to view the vaults should make an appointment through John Stard.

Dave Milburn ended the meeting with a summary consisting of three points:

1. Royal Oak has assembled a very qualified team to address the arsenic storage study
2. It appears that Royal Oak will meet all terms of the current licence
3. A review of this study will be welcomed in December

He thanked Royal Oak and associates for their time and looked forward to future open communication


Brian Penney
Superintendent Environmental Services
June 20, 1996

cc: Bryan MacLeod