

May 13, 2011

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New York State DEC
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Dear Mr. Podniesinski:

I am writing to you in regard to the March 31 letter from Dr. Vincent Scovazzo of the John T. Boyd Company discussing his review of the MLRP report and the submissions for the Cargill Deicing Technology Cayuga Mine in Lansing, NY.

There are several items I need to point out, as well as several issues that I believe are wrongly characterized.

First Item, the date of his letter shows as March 31, 2011 on the first page, but 2009 on the remaining pages.

Second Item, on page 3, paragraph 5, he has referenced "this anomaly" with no introduction for the reader to know what anomaly. In our discussions with the DEC and Dr. Scovazzo we have informed them of three "anomalies": the zone of disruption of the beds overlying the salt formations – suspected to be a solution collapse feature, in the northern reserves; the zone of bedrock thinning under the center of the lake caused by pre-glacial bedrock erosion also in the northern reserves; and the zone suspected of being a tear fault in the southern reserves. It appears that Dr. Scovazzo is referring to the bedrock thinning region and he should state that clearly.

Third Item, page 4, paragraph 3, Dr. Scovazzo again refers to "the anomaly" and the reader can infer that he is referring to the thin bedrock area. He should make this clearer, so that if this letter is read by someone 5 or 10 years from now, it will be understood.

Fourth Item, he references two contour maps that are missing from the submittals. Because we have recently changed the closure station locations (in response to MSHA requirements), the data sets would have yielded meaningless maps. Once we have collected several sets of readings from the new stations, those maps will be prepared. At that time we will forward them to Dr. Scovazzo for his review.

Fifth Item, on page 10, paragraph 4, last line "option" should read "opinion".

<u>First Issue</u>: On page 3, paragraph 5, Dr. Scovazzo states "The conclusion was that the shale below the 4A Salt will fail..." This failure is indicated for the two models which represent the mining done 10 years ago and the mining under way at present, but the future mining – under the thinnest bedrock – should not see this failure. Note that to date, there is no evidence that the shale in question is failing: no microseismic events (indicative of rock fracturing) are being detected from that horizon. Dr. Scovazzo rightly concludes that the modeling was very conservative in its assumptions.

Dr. Scovazzo also quotes (same sentence as above) "...and that the Bertie Formation potential for failure will increase as mining progresses north." This is true, but it is also true that the factors of safety indicated by the modeling remain above 1 (no failure) for the Bertie formation in all modeling scenarios and for all predicted time frames (and by extrapolation for the foreseeable future – at least to 100 years). The model is conservative (over-predicting of failure) but still shows that the strong layers above the mine will maintain integrity for a time well beyond the life of the mine.

It must be noted that all the modeling completed to date is being scrutinized closely by Cargill and much of it is being revisited by RESPEC as new questions arise. This is an ongoing effort to bring the model into better agreement with the actual mine measurements as well as to pull ever more detail and information from the model results. It is a multi-year effort.

Second Issue: On page 4, paragraph 2, Dr. Scovazzo states "BOYD considers not having barriers as poor practice, as barriers offer protection for the rest of the mine in case wide-spread pillar failures occur." We do not agree with his assessment. Large salt pillars are incapable of "pillar failure". Pillar failure is a crushing out or total yielding of the pillar material such that the overlying strata is allowed to collapse downward. Because of the plastic nature of the salt, the large pillars proposed will deform slowly and plastically, but will not collapse. For this reason, barriers among large pillars are of no benefit. Further, leaving barrier pillars as Dr. Scovazzo suggests is wasteful of the State's mineral resources.

Third Issue: On page 4, paragraph 3, he states "However, BOYD views the RMA data as proving the opposite, even when considering the effects of the three-entry breakthroughs." He does not state what in the data shows the opposite of Gary Petersen's (RMA) conclusions. Cargill does not agree with this assessment. However, this issue will be re-evaluated now that an additional year of data is available and two additional panels can be added to the study. Dr. Scovazzo refers to the ESG Canada micro-seismic data, and this is part of our overall monitoring effort. As yet, the micro-seismic data is not well understood and how the data should be used is not clear. This too is an ongoing, multi-year effort and until we understand the significance of the microseismic data, no knowledgeable conclusion is possible.

Dr. Scovazzo states in paragraph 4 that "BOYD's present view of mining below the thinning carbonate is that Cargill should proceed using the RESPEC recommendations but incorporate barrier pillars." We do not agree with Boyd's view. The improvement in behavior with barrier pillars is negligible, which is why RESPEC did not recommend using them. Further, the mine

design to be used beneath the thin bedrock areas has yet to be determined. It will be several years before new areas of thin bedrock will be mined beneath and until then modeling and monitoring will continue in an effort to define the best mining design for the bedrock conditions.

Fourth issue: Page 9, paragraph 2, he notes "A measurement of 1 in. per year is often accepted as a convenient point in examining extensometer data, as this value is close to, but normally less than, the value required for bed separation...". We can accept his conclusion, but this criteria does not apply to the Cayuga Mine. Cargill has developed its own criteria for judging extensometer data based on over 30 years of study of the roof behavior. Please note that extensometer data is not used by the mine as an indicator of global stability, but only of local roof stability. Most of the areas with high extensometer rates are in areas of "large pillar" design, which is generally agreed to be the most stable from a global standpoint.

The Items listed above are pointed out so that the report can be revised to be clear and accurate for the record. The <u>Issues</u> above are discussed so that the State can better understand Cargill's position and the ongoing efforts being taken to address global stability for the life of the mine. This effort is not taken lightly because Cargill's objective is to safely and profitably mine the entire mineral reserves over the coming decades.

With best regards,

David Plumeau, P.E.

**Business Unit Senior Mine Engineer** 

Cc: Russ Givens, Mine Manager