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New York State Department of Environmental Conservation
Bureau of Resource Management & Development
Division of Mineral Resources
625 Broadway, Third Floor
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Attention: Mr. Steven M. Potter
Director

Subject: Annual Report Review - 2008
Cayuga Mine, Cargill, Inc.
Seneca and Tompkins Counties, New York

Gentlemen:

John T. Boyd Company (BOYD) received a letter[1] from Mr. David Plumeau and digital data from Cargill Deicing Technology (Cargill) on February 6, 2008, as submittal of the 2007 Annual Report. This unsigned letter was accompanied by prints of some of the AutoCAD maps included on a CD of digital data. The New York State Department of Environmental Conservation (NYSDEC) forwarded a hard copy of the Annual Report[2] to BOYD on April 22, 2008. In Mr. Plumeau's letter, he noted two difficulties:

1. Room closures and closure rate maps were not included because of software glitches with the new Surfer® 8 program. Once generated, these maps will be forwarded to BOYD as hard and digital copy.

2. West shore subsidence data was not included because of problems with the contract surveyor. This data has been received and is being reviewed by Gary Petersen of Rock Mechanics Assist, and this data and Mr. Petersen's report will be forwarded upon completion.

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[1] Plumeau, David, 2008, untitled letter to Vincent A. Scovazzo, John T. Boyd Company, January 30.

[2] Horne, Steve, 2008, "Annual Report for Mine File #709-3-29-0052, Cargill Salt Mine," Cargill Deicing Technology, January 4.

Special Condition 7.b.—requires "A summary of all non-routine mining incidents as defined in Special Condition 8. ..." Special Condition 8 defines non-routine as "incidents during mining, processing, or other mine related activities that may adversely affect mine stability, ground and surface water or other natural resources, or the health, safety, welfare or property of the general public." Special Condition 9 expands on Special Condition 8 by requiring Cargill to submit "all correspondence with the Mine Safety and Health Administration involving non-routine mining incidents...". During a meeting held on August 17, 2004, between Cargill, NYDEC, and BOYD, it was agreed that statements will be included in the Annual report "to point out known, encountered, or discovered geologic and geotechnical anomalies and mine action to address such anomalies."

The Annual Report states that Cargill "...is not aware of non-routine incidents...". The Annual Report does note that "The E-3 panel encountered a rock roll that caused the mine to stop the mining there. As such, the S-3 panel was restarted."

Cargill, in their letter to BOYD[1], notes the following

- For the second year in a row, "...work has underway on re-evaluating the geologic anomaly previously identified on seismic lines north of Frontenac Point. No further mining will be done toward the northern reserves until that evaluation shows that it is prudent to."

(2)

- The Cargill letter to BOYD again notes that "The U-40B area continues to converge more rapidly than was expected. Backfilling that region with waste salt has been ongoing since August, focusing on the panel intersection areas first." The previously established 700-ft radius no mining zone around this area is still in effect.

- "Rock intrusions so hindered E-3, that it was decided to abandon that area." and "Rock intrusions were also encountered at the mouth of U-57, in S-3 and in U-59."

Special Condition 7.c.—requires "An updated Mining Plan Map depicting the current extent of mining activities, and the proposed advancement of the working face for the subsequent three years." At the August 2004 meeting, it was agreed that in addition "A mine map showing instrumentation location and type and shore line..." will be included in the Annual Report.

Mine maps in AutoCAD format were supplied by Cargill to fulfill this condition. They are:

- An untitled, undated AutoCAD file "Complete Mine Overlay w_Surface Subsidence.dwg" showing fourth and sixth level mine maps, topography, roof and floor rolls, and subsidence monument locations.
- An untitled, undated AutoCAD file "Rock Roll Map.dwg" showing sixth level mine map and roof and floor rolls.

instrument readings support or conflict with prior stability models especially in areas employing new mine, panel, or main configurations."

Cargill forwarded closure stations in the form of Excel files. Mr. Petersen reviewed this data and presented his findings in the 2007 Rock Mechanics Assist letter[5], concluding:

> *"...the mine is globally stable. I did not see any regional areas or panels where the closure rates were significantly increasing without a logical explanation. There are a couple of areas where the closure rates are higher than typical, but not unstable. These areas are Unit 40B, Unit 12, and Unit 24."*

Closure measurements can be evaluated to indicate possible instability in three ways:

1. By studying the graphs of the rate of closure over time. The shape of these graphs indicate areas of instability, areas of concern, and areas of stability. Mr. Petersen evaluated the closure in this manner.

2. By establishing trigger values for total closure. This method that is applicable in harder, less viscous rock, but not applicable for the Cayuga Mine as closure in salt will continue until the openings are closed.

3. By establishing trigger values for long-term closure rates. Since this is not being completed by the other investigators, BOYD applied such trigger rates in its evaluation of the closure readings.

Closure rate data are significant because they offered insight into the collapses and the inundation of the Retsof Mine. Sustained closure rates of 15 inches/year or less were measured in stable areas of the Retsof Mine, while in the failure areas, closure was regularly measured with sustained rates over 230 inches/year with onset of failure around 600 inches/year. Although Retsof and Cayuga mines have different overburden and material properties, in the general sense a comparison seems warranted for a relative indicator of stability.

In BOYD's review of some 500 closure stations readings in 2007 supplied by Cargill, it was noted that none of the readings exceeded 230 inches/day. Below is a list of the

Van Sambeek believes that "The rock rolls caused disruptions in the uniform extraction of the panel" and that "...the pillar widths and room heights seemed to vary while the position within the salt seam moved up and down" contributed to this instability. These uneven mining conditions would also contribute to increase closure rates. RMA[4] noted that roof failures are occurring in Panel U-59 along abutment pillars and appear to be related to thin salt. In describing the failures, he noted, "The falls exhibit horizontal movement, roof shears, crushed rock zones, and failed bolts even in rather shallow falls (2-3 feet)."

- High closure readings throughout the mine are near panels of recent mining or are affected by recent developments. Recent closure readings show that the closure rates for these areas are also reducing, showing the ground is stable or is stabilizing.

- Four of the highest closure rates away from the influence of active mining are located in Panel U55, with two each in Mains NW2 and Panel E3 and one each in panels U-40B and U-67.

- The data show that all closure rates are decreasing. Closure stations NW2PIN #11, U55PIN #1; and U55PIN #3 have the same closure rate for the highest rate measured in 2007 and the last rate because only one reading occurred in 2007.

- Rock Mechanics Assist[5] discusses panels U-40B, U-24, and U-12 as having closure rates higher than typical based on curve shape, and in these areas the rate of closure is two to three times rates measured at other similar locations. In addition, RESPEC[6] noted that Panel U-24 has water on the floor from an unknown source and an increased closure rate. However, only one closure station, U40B #14, from these areas made the top 10 list, as shown in the previous table.

  U-40B has a higher extraction per centage than in other areas, thus higher rates should be expected. Reportedly, Cargill is actively backfilling this area. RESPEC[6] noted that this backfill activity may have caused a humidity-induced "spike" causing high closure rates, including closure station U40BPIN #14, on the top 10 list. RESPEC believes humidity is coming from the water used for dust suppression and water vapor from diesel exhaust used in the back fill. RMA[4] is more alarmed about Panel U-40B, noting, "The worst case is this higher than typical increase in closure rates could be a precursor of the bridging mechanism breaking down...," a view not supported by BOYD.

- Rock Mechanics Assist[3] discusses the rapid closure rate where SW 2 Panel crossed the U-12. This site does not have closure rates among the top 10. BOYD does not view this area as unstable or anomalous.

- RESPEC[6] noted that Panel U-24 has water on the floor from an unknown source and an increase in closure rates. This site does not have closure rates among the top 10

The following documents on water storage on 4 Level was forwarded to BOYD:

- Cargill Deicing Technology, 2008, "Cayuga Mine, 4 Level Pond Map, Updated: 15 Nov 2007," January, as "4 Level Pond Map MLRP Version Dec07.Dwg." included as a hard copy, Scale 1" = 600'. This map is also presented as AutoCAD file "4 Level Pond Map DEC06.Dwg."

- Excel file "UG Pond Volume Calculation 26Nov07.xls." A hard copy of this spreadsheet was included with the Cargill letter.

Cargill's letter[1] to BOYD notes the pond level was checked in fall of 2007. RESPEC[6] noted, "A word of caution is that the worst thing from salt dissolution perspective, is to allow the water level to repeatedly rise and fall. Fresh water will float on the pond surface and dissolve salt around the pond perimeter if it has contact with salt. Keep changes in pond level as small as possible and the water level as low as possible."

Gary Petersen visited the 4 Level ponds on March 8, 2007, and noted that pillars were being undercut by dissolving of salt. He noted that "The process of putting fresh water down #2 Shaft has been going on for 20 years or so equating to nearly 60,000 tons" of dissolved salt. It appears to BOYD that the Cargill program to install a pumping system in 2008 to bring production shaft water to the ED plant is important to complete in a timely manner.

The Annual Report notes that plans are to reduce the inflow into the mine over the next three years and to reduce runoff entering the mine from 18 gpm to near zero.

Special Condition 7.g.—requires the inclusion of "A summary of all other monitoring data required under the terms of this permit or Department SPDES permit issued to Cargill."

SPDES data and a short discussion are included in the Annual Report.

Special Condition 8—addresses non-routine incidents and is discussed under Special Condition 7.b.

Special Condition 9—addresses Mine Safety and Health Administration reporting involving non-routine mining incidents and is discussed under Special Condition 7.b. Cargill also notes in the Annual Report that Cayuga Mine has not been cited by MSHA in connection with any non-routine mining incidents.

Special Condition 10—addresses reporting requirements "Prior to undertaking any material change in the approved mining methods or techniques. ..." This condition does not require the reporting to occur in the Annual Report.