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Transmittal

DATE: March 13, 2006

FILE NO.: 2499.4

TO: New York State Department of Environmental Protection
Bureau of Resource Management & Development
Division of Mineral Resources
625 Broadway, Third Floor
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DESCRIPTION

1 Letter dated March 13, 2006 re:
2006 Annual Report Review
Cayuga Mine, Cargill, Inc.
Syracuse Formation
Seneca and Tompkins Counties, New York

MAR 14 2006

Transmitted for John T. Boyd Company by:

Vincent A. Scovazzo

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March 13, 2006

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New York State Department of Environmental Conservation
Bureau of Resource Management & Development
Division of Mineral Resources
625 Broadway, Third Floor
Albany, NY 12233-6500

Attention: Mr. Steven M. Potter
Director

Subject: 2006 Annual Report Review
Cayuga Mine, Cargill, Inc.
Syracuse Formation
Seneca and Tompkins Counties, New York

Gentlemen:

John T. Boyd Company (BOYD) received a letter¹ and digital data from Cargill Deicing Technology (Cargill) on February 3, 2006 as a supplement to the 2006 Annual Report. The letter contained a supporting report from Rock Mechanics Assist². On February 15, 2006, Mr. Steven M. Potter, Director, Bureau of Resource Management & Development of the New York State Department of Environmental Conservation (NYSDEC), requested that BOYD review the letter, digital data, and the Annual Report. The Annual Report³ was received by BOYD on February 17, 2006.

¹ Plumeau, David, 2006, untitled letter to Vincent A. Scovazzo, John T. Boyd Company, January 31.

² Rock Mechanics Assist, 2006, an untitled letter from Gary Petersen to David Plumeau of Cargill Deicing Technology, January 17.

³ Cargill Deicing Technology, 2006, "Annual Report for Mine File #709-3-29-0052; Cayuga Salt Mine, Application ID# 0-9999-00075-00001," signed by Steve Horne, to Joseph Moskiewicz, NYS Department of Environmental Conservation, January 5.

These documents were reviewed for their adherence to conditions of the Permit⁴ and in regard to discussions held at the Cayuga Mine among NYSDEC, Cargill, and BOYD on June 20, 2005.

Discussion of Annual Report

The Annual Report submitted by Cargill is in response to Special Conditions 7 through 13 of Permit Number 0-9999-0075/00001. These special conditions and Cargill's responses are summarized below:

Special Condition 7—requires Cargill to submit an Annual Report which is required to include items a through g of Special Condition 7.

Special Condition 7.a.—requires the inclusion of the Mine Manager's signed certification that "all mining related activities...were in conformance with this permit and the approved plans, or that variances have been reported and managed."

A certification dated January 1, 2005, is included in the annual report and is signed by Steven J. Horne, Mine Manager – Cargill Deicing Technology.

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 of 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 subsequent 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..." but goes on to say that "...weak rock in the immediate roof was encountered in the U52 mining panel and this panel was temporarily abandoned." Cargill, in their letter to BOYD¹ notes that 2 ft of the roof was removed "...to stable ground..." to control the instability.

⁴ New York State Department of Environmental Conservation, Division of Environmental Permits, Region 7, 2003, "Permit" DEC Permit # 0-9999-00075/00001, expiration December 31, 2007, January 6.

The Cargill letter to BOYD also notes that monitoring has shown that U40B is closing more rapidly than expected. To address this situation the following action is being taken:

- Backfill the area with waste salt.
- A 700 ft radius no-additional-mining zone has been established around U40B.
- An electronic closure monitoring system has been ordered that will collect data on an hourly basis.

To reduce the likelihood of this occurring again, Cargill will establish a 300 ft barrier between the main and panel and it will only be cut by 5 entries. Such barriers were previously requested by BOYD^{5,6}. In addition, Cargill will limit the width of the stress notches to 32 ft.

Mr. Petersen² studied and reported on the conditions in the U40B area and concluded that "...the overlying rocks are weaker in this area..." although he does conclude that the "...the mine is globally stable."

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:

- Cargill, 2005, "Cayuga Mine, Mine Planning Map, 2005/2006 Fiscal Yr." December as 3 YR MINE PLAN 05-06.dwg also included as hard copy in Attachment 1A, 1B, and 1C of the Annual report.
- Cargill, undated, "Cayuga Mine, 6 Level Workings," Not to Scale, as Royalty map.dwg.
- Cargill, undated, "Cayuga Mine 6 Level Working, Convergence Stations" as Complete Mine Overlay w_Surface Subsidence.dwg.
- Cargill, 2006, "Cayuga Mine, 4 Level Pond Map," January, as 4 Level Pond Map II.DWG.

⁵ John T. Boyd Company, 1995, "Review of RE/SPEC Inc. Report on the Stability of the Cargill Salt Cayuga Mine," prepared for NYS Department of Environmental Conservation, Report No. 2499.1, December.

⁶ John T. Boyd Company, 1998, "Meeting of December 19, 1997, Cayuga Mine," letter to C.B. McGranahan of the NYS Department of Environmental Conservation, File No. 2499.2, January 5.

These maps show the extent of mining, proposed three-year mine plan, instrument locations, subsidence monument locations, and shorelines of both the 4 Level flooding and of Cayuga Lake. A short description of current and planned mining operations aided in understanding these maps.

Special Condition 7.d.—requires the annual report to include a “summary of in situ measurements of rock mechanics required by Special Conditions 12.” Special Condition 12 requires the measurement and collection of in situ rock mechanics data “in accordance with the approved Mined Land Use Plan.” The data is to include “plots of relevant graphs. ...” “Exceptions to anticipated trends in rock behavior shall be noted and explained. ...”

At the August 2004 meeting, it was agreed that “All rock mechanics data” would be incorporated in the Annual Report “including, but not limited to, all instrumentation readings and observations from the initial readings to present. Data for subsidence, closure, and extensometers are to be provided electronically. These electronic files are to include raw and processed data, graphs, and explanations of any inconsistencies and anomalous readings including reasons for abandonment, reinstallation, etc., along with applicable observation in the vicinity of the instrument such as floor heave, water inflow, etc. Future reports are to contain comment on whether, in the opinion of Cargill, the 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 2006 Rock Mechanics Assist letter² concluding:

- “...after a review of the rock mechanics data that the mine is globally stable. The general rate trends in the yielding panels are decreasing...”
- A lengthy discussion on the instability in U40B and events (renewed mining, multiple intersections) that lead to the instability.

Closure measurement data are significant because they offered insight into the collapses, and inundation of the Retsof Mine. Sustained closure rates of 0.04 inches/day were measured in stable areas of the Retsof Mine, while in the failure areas, closure was regularly measured with sustained rates over 0.65 inches/day with onset of failure around 1.65 inches/day. 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 the 533 closure stations read in 2005 and supplied by Cargill, it was noted that none of the readings exceeded 0.65 inches/day. Eighty-six (86) closure stations had at least one reading that exceeded 0.04 inches/day. Of these, 85 closure

stations were recently installed (in 2004 or 2005) and all 86 were close to active mining areas where closure rates should be high.

BOYD offers the following comments:

- The closure station program at the Cayuga Mine is one of the most extensive known to BOYD.
- Station locations and frequency of readings are acceptable for giving an indication of global mine and panel stability.
- The monitoring of abandoned panels and levels also aids in understanding global mine stability.
- Closure station results provide a strong indication that the Cayuga Mine is globally stable.

Rock Mechanics Assist provided two maps to aid in review of the closure measurements:

- "Cayuga Mine Closure Rate July 2005"
- "Cayuga Mine Total Closure July 2005"

Special Condition 7.e.—requires the annual report include a "summary of subsidence monitoring data required by Special Condition 11. Special Condition 11 requires "Subsidence monitoring shall be conducted in accordance with the approved subsidence monitoring plan contained within the approved Mine Land Use Plan." "Exceptions to the trends shall be noted and explained. ..." Points applicable to Special Condition 7.e. were agreed upon at the August 2004 meeting and are noted above under Special Condition 7.d.

Mr. Petersen² reviewed the subsidence data and made recommendations as to survey grid modifications and frequency of subsidence surveys. Cargill³ appears to adopt these recommendations as no subsidence readings were completed in 2005 and the next subsidence survey is planned for the spring of 2006. Cargill also plans to rework the subsidence grid in the east area.

Cargill supplied to BOYD, in electronic form, subsidence data. BOYD reviewed this data last year and NYDEC is referred to BOYD's 2004 review⁷.

Special Condition 7.f.—requires the inclusion of "Information regarding the source and volume of any water inflow into the mine, and the disposition of such water." At the

⁷ John T. Boyd Company, 2005, "2005 Annual Report Review, Cayuga Mine," File 2499.4, April 4.

August 2004 meeting, it was agreed that a discussion about water disposal in Level 4 would be included in the Annual Report noting: "Updates of Level 4 filling including data on shore line advance".

Cargill reported the sources of the total water inflow that averages 37 gallons per minute. These sources are from the shafts, ED plant, and storm water. This water is moved to a containment pond on Level 4 and then onward to the lower areas of Level 4. Cargill estimates that 19 years of storage remain on Level 4. Shoreline location in Level 4 was not noted.

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.

Cargill notes two changes;

1. 5 tunnels will be used instead of 7 in opening up new panels, and
2. 32-ft-wide crosscuts will be used in the mains of instead 42 ft.

Special Condition 11—addresses subsidence monitoring as discussed under Special Condition 7.e. above.

Special Condition 12—addresses rock mechanics monitoring as discussed under Special Condition 7.d.

Special Condition 13—addresses the reporting and recording of citizen complaints. Cargill notes in the Annual Report that "no written citizen complaints" were received.

Site Visit

A site visit to discuss these finding with NYSDEC, Cargill, and BOYD should be arranged. Please contact us if you require additional information or if we may be of further service.

Respectfully submitted,

JOHN T. BOYD COMPANY

By:

A handwritten signature in black ink, appearing to read "V. A. Scovazzo", with a long horizontal flourish extending to the right.

Vincent A. Scovazzo
Senior Geomechanics Specialist

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