

NEGATIVE DECLARATION PART 3 CONTIUED

REASONS SUPPORTING THIS DETERMINATION

Pursuant to State Environmental Quality Review Act (SEQRA) regulations in 6 NYCRR Part 617.7, DEC has reviewed the Full Environmental Assessment Form (FEAF); Cargill's "Modification Application for Permit to Mine"; additional reports completed by Cargill's consultants that evaluated long term impacts to the global stability of the mine and the S3 main due to the proposed storage of water; and documents prepared by Boyd, entitled, "Planned S3 Submain Sump" and "Revised Planned S3 Submain Sump Cayuga Mine, Cargill, Inc.", and as Lead Agency, completed Part 2 – Identification of Potential Project Impacts of the FEAF and determined that no moderate or large environmental impacts will occur. However, completion of Part 2 of the FEAF identified the potential for small impacts on geological features. The below sections provide explanation for DEC's determination that the project will not result in any significant adverse environmental impacts, and therefore, an environmental impact statement need not be prepared.

Detailed Discussion of Current Proposal, History and Background

Current Proposal: Cargill Inc. (Cargill) has managed water inflows, from surface water runoff, process water and shaft seepage, into the mine. For several decades, Cargill stored most of the water on the 4-Level with temporary storage over the last few years in a basin near the U12 panel on the 6-Level. Cargill reports this temporary water storage to the Department of Environmental Conservation (DEC), as required by the Mined Land Reclamation Permit for this facility, as "other inflows". This brine temporarily stored near the U12 panel is utilized on underground tramways for dust suppression.

Due to lack of capacity in the areas previously utilized for water storage on the 4-Level, Cargill intends to establish additional water storage capacity on the 6-Level. The storage location, specifically in the abandoned S3 mains and its adjacent E3 – E9 panels, has storage capacity of approximately 360 million gallons, which equates to a minimum of 15 years of storage at current inflow rates. For the life of the storage capacity in the S3 mains and adjacent panels, it is intended to be the only location for permanent storage of water in the mine. Consistent with current and historical practices, inflows of water are conditioned to maximize the saturation of chloride before being stored in the S3 mains to minimize the potential for solutioning of the pillars (i.e., dissolving of mine roof support pillars). There are no other proposed changes to Cargill's approved mining operations and methods.

History: Cargill took over operations of the mine in the 1970's. Since taking control, Cargill has been managing inflows of water into the underground salt mine to ensure the health and safety of the miners, to reduce potential impacts to the environment, and to allow for optimal operations of the mine. Since 2003, as part of the existing permit conditions, Cargill is required to submit annual reports regarding the inflow of water into the mine and its storage location. Sources of inflows have historically been reported from surface run-off, waters entering the mine through the shafts, and brine from the stormwater treatment facility that does not meet the standards for discharge to Cargill's State Pollutant Discharge Elimination System (SPDES) Permit outfalls. As reported annually by Cargill since 2003, the inflows of water into the mine have been directed to the 4-level and stored in mined-out workings.

Water directed to the 4-Level is conditioned in a saturation basin to maximize the concentration of chloride before being pumped to abandoned areas within the mine to minimize the potential for solutioning of the pillars. Impacts from the storage of water to 4-Level are assessed by DEC and John T. Boyd Company (Boyd) at routine site visits to observe ground conditions. Boyd is a third-party expert mining and geological consultant that reviews subsurface salt mining application materials and mining reports, providing technical support to DEC regarding those materials. In addition to pillar integrity on 4-Level storage area, DEC and Boyd regularly monitors closure rates and subsidence data. Monitoring subsidence and closure rates is required as the natural movement of unmined rock salt within the mineral deposit will eventually cause mine openings to close. The rate of closure is monitored via convergence stations and surface subsidence data by LiDAR. These data provide information on overall global stability and conformation that the observed behavior of the mine is consistent with the mine design. Reported closure and subsidence rates show that the localized roof falls and the storage of water have had no adverse impacts to overall global stability of the mine and that the mine is behaving as expected per mine design. Visits to 4-Level storage area found roof falls to be common and were mostly confined to stone cut passages (non-salt). In areas where falls occurred, the roof had attained stable arches.

In 2019, investigative drilling was conducted in the U12 panel after anomalous closure rates, compared to other areas of the Cayuga Mine, were observed. The drilling identified pressurized fluids in the strata above the roof of the mine in that panel. At that time an additional source of inflow was reported, identified as “other inflows” in Cargill’s annual report, and found to be fully saturated with chloride. The closure rates in the U12 panel have returned to normal after the drilling was completed and the release of the pressurized brine. This brine, temporarily stored in a basin on the 6-Level, is utilized for dust suppression.

Project Setting and Water Storage: The S3 main is in the far south end of the 6-Level under Cayuga Lake. Mining started in this area of the mine in the early 2000’s and was completed approximately 10 years later. The S3 mains and adjacent panels are at the lowest elevation of the mine. The overall elevation decreases from the south end of the S3 main to the far north end by 120 feet. This area of the mine is where water would flow regardless of mine operator action. The closest active production panel, U78, is at least 6 miles from the anticipated maximum fill point in the S3 main.

Using LiDAR scanning technology, Cargill estimated that the S3 main and adjacent panels will hold approximately 360 million gallons. The volume of this area is expected to yield a minimum of 15 years of storage capacity at current inflow rates. The calculated storage capacity is sufficient to contain the inflows for the duration of the mining for the currently permitted reserves on the 6-Level.

Previous SEQRA Reviews

DEC reviewed the technical mining issues and potential environmental impacts associated with the existing Cayuga Salt Mine operations and issued Mined Land Reclamation Permits for such mining activities. The permitted operations are described in the 2000-2002 comprehensive Mined Land Use Plan, the 2000 Expanded Environmental Assessment, and the 2014-2015 Modification Application for Permit. These documents are based on data and studies covering a 30-year period. The DEC reviews were specific to mine design, mining methods, rock

mechanics, mine stability, and geology of overlying bedrock. Except for the relocation of the storage area, the existing Cargill operation will remain unchanged by this proposal.

The permitted 13,579.3-acre LOM area has been subject to SEQRA environmental assessment through previous permit application reviews, therefore, the scope of DEC's current review under SEQRA is limited to the proposed modification to establish additional storage capacity on the 6-Level of the mine.

Technical Discussion

Room and Pillar Mining, Underground Mine Layout, Underground Mining Methods, and Roof Reinforcement: Cargill proposes no changes to the underground pillar design, mine layout, mining methods, or roof reinforcement techniques as part of the proposed modification. Current operations have been previously reviewed and evaluated, and remain unchanged.

Geotechnical Consideration and Geo-mechanical Modeling: The applicant provided additional information relating to geotechnical evaluation, modeling and mine stability for the proposed storage expansion area. Cargill hired several consultants to provide technical consulting services and perform studies to assess what, if any, impacts the storage of water in the S3 main and its adjacent panels would have on geotechnical conditions and the overall global stability of the mine. Cargill's consultants include: Agapito Associates, Inc., Kenney Geotechnical Engineering Services, PLLC, and JMT of New York, Inc. DEC and Boyd reviewed these studies for the purpose of identifying environmental risks as related to geotechnical conditions and mine stability.

Results of the geotechnical investigations and the geo-mechanical modeling show that the storage of water in the S3 main and the adjacent panels will not impact global stability. Modeling scenarios included reducing pillar dimensions by one foot in all directions to predict potential impacts of salt dissolution if the brine was undersaturated. Although the modelling results indicated the reduced sized pillars would not have an impact on global stability, Cargill constructed a brine monitoring and mixing system that utilizes waste salt from underground processing to mix with the water if saturation levels drop below 22%. Brine at 26.6% salt is fully saturated. The system is connected to the mine's communication system and instrumentation continuously monitors flow streams to confirm that the incoming salinity of brine is sufficient for storage. If the saturation levels drop below 22%, the communication system alerts mine management to activate the brine making system. Therefore, water stored in this section of the mine will be brine near full saturation thus eliminating the potential for dissolving of the pillars.

Additional modeling predicted potential roof falls in the area as the claystone above the salt is susceptible to moisture. Any roof falls caused by the increase in moisture will be localized in the S3 main and adjacent inundated panels. Roof falls should not be confused with pillar or panel failure. If roof falls were to occur, it would only result in an approximate 10-foot (plus or minus) vertical fall through that section (i.e., the thickness of the claystone above the salt) and would not negatively impact the global stability of the pillars or the mine. A 400-foot-thick carbonate beam is the horizontal rock formation above the mine that isolates surface water from the mining areas and maintains global stability of the mining panels. The presence and thickness of the carbonate beam was recently verified via reprocessing of seismic data. This carbonate beam is situated at least 1,000 feet above the S3 main; therefore, a 10-foot-high roof fall

between the stable pillars would be insignificant. Furthermore, if a roof fall were to occur, the rock would rubblize and help fill the panels, thereby providing additional support to the main roof and pillars.

To ensure mine behavior is consistent with mine design and S3 modeling results, closure rates are extensively monitored via convergence stations throughout the Cayuga Salt Mine. Convergence data has been actively collected in the S3 main for over two decades. Currently there are 25 analog and five electronic convergence stations measuring closure rates in this area. The electronic convergence stations provide real-time continuous geotechnical monitoring for the area. The active mechanical convergence stations are read semiannually. The average convergence rate for the last 10 years across all active stations in the S3 main was 0.18 inches/year. This yield pillar convergence response (i.e., rate of closure) is what would be expected in areas that have not been mined in several years and indicates the mine behavior is consistent with mine design.

The convergence stations in the S3 main and adjacent panels will continue to be monitored for global stability until inundated with water and the individual stations become inaccessible. In addition to monitoring the S3 main, there are 39 convergence stations in the adjacent U12 area and over 300 convergence stations that are maintained and monitored throughout the mine for the duration of the life of operations to monitor global stability as standard practice at the facility. This convergence data collected throughout the mine is routinely reviewed by Cargill and consultants specializing in geomechanics, DEC, and by third-party consultant Boyd.

With inundation of water and the removal of convergence stations, monitoring convergent rates will be rendered moot; however, the modeling results indicate a slight increase in global stability of the S3 main as the water begins to provide hydrostatic pressure on the pillars. This pressure will increase gradually as the depth and volume of water increases and will provide support to the pillars and eventually the roof when it reaches that level. Modeling indicates that any perceivable change to closure rates due to the filling of this area will be observed as a decrease in closure rates, not an increase, due to this hydrostatic pressure. After the convergence stations in the S3 main and adjacent panels are no longer functional, 47 monitoring stations in U12, SW1, and SW2 will remain active to monitor convergence in the nearby area. In addition, the 47 electronic convergence and microseismic monitoring systems in these adjacent panels will detect any abnormal mine closure rates.

As required by the existing permit, if abnormal closure rates are detected anywhere throughout the mine, Cargill is required to increase the frequency of measurements in the affected area and upon findings of Cargill's investigation into the cause of the abnormalities, submit a plan and schedule for implementation of corrective action(s) to DEC for review and approval. Corrective actions shall be designed specific to the cause of abnormalities as per the investigation results. Electronic convergence stations throughout the mine provide real-time continuous geotechnical monitoring, which will allow Cargill substantial time to develop and implement corrective actions.

Convergence data will be monitored to ensure the actual mine behavior is consistent with the design and modeling, and as described above, mine design and modeling indicate insignificant impacts to the S3 main and adjacent panels will occur from the storage of water in those areas. Therefore, DEC concludes no potential significant impacts to stability in this area or the overall

global stability of the mine are anticipated to occur from storing water in the S3 main and adjacent panels.

Surface and Ground Water, and Fish and Wildlife Resources: There will be no loss of nor impact to surface resources due to water inflows into the mine from surface run-off, waters entering the mine through the shafts, and water from the stormwater treatment facility being stored in the underground abandoned workings of the mine. No adverse impacts to groundwater, and subsequently Cayuga Lake, are anticipated since there is no known hydraulic connection between these natural resources and the mine workings. The S3 main and adjacent panels are over 1,800 feet below the bottom of the lake. This proposal will not impact global stability therefore not result in groundwater or surface water from Cayuga Lake entering the mine.

Modified operations will not result in brine entering Cayuga Lake and will have no impacts to fish or wildlife.

Considering the above, DEC has determined that no potential significant impacts to surface water or groundwaters will occur, and therefore no potential significant impacts to fish or wildlife will result from the change in brine storage areas.

Impacts to Land: No disturbances to upland nor shoreline areas will occur as the result of this proposal. Water inflows will continue to be stored within the proposed subsurface storage areas and will not result in surface erosion, surface water impoundments, or other impacts to the land.

Impacts to Land Use Planning and Zoning: The proposed modification is for areas within the previously approved Life-of-Mine area under Cayuga Lake, and as such, would not impact local land use. Therefore, no significant impacts to Land Use Planning and Zoning will result from this proposal.

Other: Impact on Other Resources or Other Environmental Concerns: No impacts to other resources or other environmental concerns were identified during the review of this project.

This application review and significance determination is only for the currently proposed modification as included in this application. Any future modification which, in the judgement of the Department, results in a material change in the environmental conditions at the site, or in the scope of the permitted activity, or would require one or more changes to any Mined Land Reclamation Permit conditions, will be considered a new application and will be reviewed pursuant to all applicable regulations.

For Further Information:

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