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Technical Memorandum

To:	Kathy Arnold	From:	Mike Thornbrue
Company:	Rosemont Copper Company	Date:	March 15, 2010
Re:	Prescriptive BADCT Closure for Lined Facilities at the Rosemont Project	Doc #:	079/10-320832-5.3
CC:	David Krizek, P.E. (Tetra Tech)		

This Technical Memorandum documents the Prescriptive Best Available Demonstrated Control Technology (BADCT) closure recommendations for the lined facilities associated with the proposed Rosemont Copper Project (Project). This Technical Memorandum excludes the lined facilities associated with the Heap Leach Facility (HLF). The closure of the HLF was addressed in a separate Technical Memorandum.

This Technical Memorandum focuses on two (2) proposed facilities: the Process Water and Temporary Storage Ponds (PWTS Pond) and the Settling Basin. Additionally, the closure of small, non-stormwater ponds will be addressed. The recommendations proposed herein are based on the Arizona Mining BADCT Guidance Manual [Arizona Department of Environmental Quality (ADEQ), 2004].

1.0 PWTS Pond

The PWTS Pond is designed as two (2) basins that are formed by the construction of the PWTS Embankment. The west side of the PWTS Pond, the Process Water (PW) Pond, will be a prescriptive BADCT process solution pond. The liner system will include the following from bottom to top:

- A prepared subgrade;
- A geosynthetic clay liner (GCL);
- A 60-mil high-density, polyethylene (HDPE) secondary geomembrane liner;
- A geonet Leak Collection and Removal System (LCRS); and
- A 60-mil HDPE primary geomembrane liner.



The east side of the PWTS Pond, the Temporary Storage (TS) Pond, is a modified BADCT lined non-stormwater pond. The liner system will include the following from bottom to top:

- A prepared subgrade;
- A geosynthetic clay liner (GCL); and
- A 60-mil HDPE primary geomembrane liner.

Additional information concerning the design of the PWTS Pond is available in the Process Water Pond, Temporary Storage Pond, and Settling Basin Design Report prepared by M3 Engineering & Technology Corporation (M3) dated May 2009 (M3, 2009).

1.1 Aquifer Protection Permit Application

A general closure strategy for the PWTS Pond was developed based on the Arizona Mining BADCT Guidance Manual (ADEQ, 2004) and submitted to ADEQ as part of the Aquifer Protection Permit (APP) application (Tetra Tech, 2009). The following paragraphs are from the APP application text.

The PWTS Pond will be closed per BADCT guidance for a bermed non-stormwater pond. Any solid residue on the liner of the PWTS Pond greater than 1/4 inch thick which can be readily removed, by sweeping or high pressure water sprays, will be removed and disposed of as appropriate. The HDPE liner will be inspected for holes, tears, or defective seams that could have leaked. After inspection, the HDPE liner will be removed for offsite recycling or burial onsite if recycling is not a viable option. The GCL will be removed and disposed of as appropriate and, if necessary, the underlying surface will be visually inspected for signs of contamination. Sampling and analysis of the material may be necessary to determine the potential threat to groundwater quality and, if necessary, soil remediation will be conducted to prevent groundwater contamination. After the soil conditions have been approved, the PWTS area will be graded to drain surface run-off. The slopes of the pond will be ripped, covered, and reseeded as appropriate.

1.2 Design Report

A general closure strategy for the PWTS Pond was developed based on the Arizona Mining BADCT Guidance Manual (ADEQ, 2004) and submitted to ADEQ as part of the Process Water Pond, Temporary Storage Pond, and Settling Basin Design Report (M3, 2009). The following paragraphs are from the design report text.

The PWTS Pond will be closed per BADCT guidance for a bermed process pond. Any solid residue on the liner of the PWTS pond greater than 1/4 inch thick which can be readily removed, by sweeping or high pressure water sprays, will be removed and disposed of as appropriate. The HDPE primary liner will be inspected for holes, tears, or defective seams that could have leaked. After inspection, the HDPE liner will be removed for offsite recycling or burial onsite if recycling is not a viable option. After removal and proper disposal of the Geonet the HDPE secondary liner will be inspected for holes, tears, or defective seams that could have leaked. The GCL will be removed

and disposed of as appropriate and, if necessary, the underlying surface will be visually inspected for signs of contamination. Sampling and analysis of the material may be necessary to determine the potential threat to groundwater quality and, if necessary, soil remediation will be conducted to prevent groundwater contamination. After the soil conditions have been approved, the PWTS area will be graded to drain surface run-off. The slopes of the pond will be ripped, covered, and reseeded as appropriate. In addition the following will be performed at a minimum:

- *Removal of liners from embankment slopes*
- *Breach berm between PW Pond and TS Pond (at low end)*
- *Rip west slope of PWTS Dam to expose channel rock fill.*

1.3 Current Closure Strategy

The PWTS Pond will be closed at the time of area-wide APP closure. The two (2) pond segments will be addressed separately. In both cases, the PWTS Pond are considered bermed ponds.

1.3.1 PW Pond

The PW Pond is considered a bermed process solution pond by Prescriptive BADCT standards. The pond will be closed using the following procedures:

- Any contained solutions will be allowed to evaporate or treated as needed to meet the appropriate water quality standard for discharge;
- Any residues remaining on the top HDPE liner will be collected, characterized, and disposed of according to the applicable regulations. Residue is defined as any solids collected on the liner to a thickness of greater than 1/4-inch or which can readily be removed by physical means such as sweeping or high pressure water sprays;
- The top HDPE liner and geonet will be removed, including the LCRS. The top HDPE liner and geonet will either be recycled or will be buried onsite. Piping, etc., associated with the LCRS will either be sent to an approved off-site recycler or will be placed in the Waste Management Area. Drain rock from the LCRS sump will be collected, characterized, and disposed of according to the applicable regulations;
- The bottom HDPE liner will be inspected for visual signs of liner damage, liner defects, or impact by leakage through the liner system;
 - If there is no evidence of past leakage, the HDPE liner and the GCL will be removed for appropriate disposal;
 - Where inspection reveals presence of holes or tears or defective seams, the HDPE liner and GCL will be removed and the underlying surface inspected. ADEQ may require sampling and analysis of the underlying material to determine

whether the potential impact poses a threat to groundwater quality. If required, soil remediation will be conducted to prevent groundwater impact;

- The HDPE liner and GCL will either be recycled or it will be buried onsite; and
- The area will be graded as needed to achieve post-mining reclamation goals.

1.3.2 TS Pond

The TS Pond is considered a bermed non-stormwater pond by Prescriptive BADCT standards. The pond will be closed using the following procedures:

- Any contained solutions will be allowed to evaporate or treated to meet the appropriate water quality standard for discharge;
- Any residues remaining on the high-density, polyethylene (HDPE) liner will be collected, characterized, and disposed of according to the applicable regulations;
- The HDPE liner will be inspected for visual signs of liner damage, liner defects, or impact by leakage through the liner system;
 - If there is no evidence of past leakage, the HDPE liner and the GCL will be removed for appropriate disposal;
 - Where inspection reveals presence holes or tears or defective seams, the HDPE liner and GCL will be removed and the underlying surface inspected. ADEQ may require sampling and analysis of the underlying material to determine whether the potential impact poses a threat to groundwater quality. If required, soil remediation will be conducted to prevent groundwater impact;
- The HDPE liner and GCL will either be recycled or it will be buried onsite; and
- The berm separating the PW and TS Ponds will be breached at the southern end as needed to achieve post-mining reclamation goals.

2.0 Settling Basin Closure Strategy

The Settling Basin will receive non-filtered tailings slurry from the Tailings Thickeners in the event of a process upset. Tailings will be kept in the basin during process upsets and will be removed after the upset conditions have been corrected. Prescriptive BADCT has not been established for the Primary Settling Basin since it is a facility proposed for short-term storage of tailings resulting from potential upset conditions at the Tailings Filter Plant. The Settling Basin is considered a bermed pond.

The Settling Basin liner system will consist of the following (from bottom to top):

- A prepared subgrade;

- A GCL;
- 18 inches of 1.5 inch minus protective rock;
- A wire mesh screen, anchored vertically through the protective rock layer, sized to prevent the displacement of the protective rock; and
- 18 inches of 6" to 12" protective rock.

2.1 APP Application

A general closure strategy for the Settling Basin (referred to as the Primary Settling Basin in the APP application) was developed based on the Arizona Mining BADCT Guidance Manual (ADEQ, 2004) and submitted to ADEQ as part of the APP application (Tetra Tech, 2009). The following paragraphs are from the APP application text.

The Primary Settling Basin will be closed per BADCT guidance for a settling/storage surface impoundment. The GCL will be removed and disposed of as appropriate and, if necessary, the underlying surface will be visually inspected for signs of contamination. Sampling and analysis of the material to determine the potential threat to groundwater quality and, if necessary, soil remediation will be conducted. Once removal is complete, the Primary Settling Basin will be graded to drain surface run-off. The slopes of the basin will be ripped, covered, and reseeded as appropriate.

2.2 Design Report

A general closure strategy for the Settling Basin was developed based on the Arizona Mining BADCT Guidance Manual (ADEQ, 2004) and submitted to ADEQ as part of the Process Water Pond, Temporary Storage Pond, and Settling Basin Design Report (M3, 2009). The following paragraph is from the design report text.

The Settling Basin will be closed per BADCT guidance for a settling/storage surface impoundment. The GCL will be removed and disposed of as appropriate and, if necessary, the underlying surface will be visually inspected for signs of contamination. Sampling and analysis of the material to determine the potential threat to groundwater quality and, if necessary, soil remediation will be conducted. Once removal is complete, the Settling Basin will be graded to drain runoff. The slopes of the basin will be ripped, covered, and reseeded as appropriate.

2.3 Current Closure Strategy

The current closure strategy for the Settling Basin is based on Prescriptive BADCT guidance for a bermed non-stormwater pond. The pond will be closed using the following procedures:

- Any contained solutions will be removed using the slurry pump methods described in the design report, allowed to evaporate in the basin, pumped into the PW Pond and incorporated into the sulfide processing circuit or treated to meet the appropriate water quality standard for discharge;

- Any tailings solids remaining above the protective rock will be removed by heavy equipment, deposited in the Dry Stack Tailings Facility, and covered with waste rock;
- The protective rock layers will be removed and deposited in the either the Waste Rock Storage Area or the Dry Stack Tailings Facility;
- The GCL will be inspected for visual signs of liner damage, liner defects, or impact by leakage through the liner system;
 - If there is no evidence of past leakage, the GCL will be removed for appropriate disposal;
 - Where inspection reveals presence of one (1) or more holes or tears or defective seams, the GCL will be removed and the underlying surface inspected for visual signs of impact. ADEQ may require sampling and analysis of the underlying material to determine whether the potential impact poses a threat to groundwater quality. If required, soil remediation will be conducted to prevent groundwater impact;
- If the GCL cannot be recycled, it will be buried onsite; and
- The area will be graded as needed to achieve post-mining reclamation goals.

3.0 REFERENCES

- ADEQ, 2004. *Arizona Mining BADCT Guidance Manual, Aquifer Protection Program*. Publication TB-04-01.
- M3, 2009. *Process Water Pond, Temporary Storage Pond, and Settling Basin Design Report*. Prepared for Rosemont Copper Company. Report Dated May 2009.
- Tetra Tech, 2009. *Aquifer Protection Permit Application*. Prepared for Rosemont Copper Company. Report Dated February 2009.