

Retrofitted Waste Pond (RWP) Phase 1 Earthwork / Phase 2 Slurry Wall  
Basis of Modification to the Top of Embankment Configuration to Facilitate a Side-by-Side  
Slurry Wall Trench and Mixing Pad around the Old Waste Pond (Station 45+00 to 183+48)  
March 09, 2022

As discussed during a February 16, 2022 meeting between the Utah Division of Environmental Quality (DEQ) and US Magnesium LLC (USM) personnel, USM summarized its meeting with RWP Phase 1 construction contractor, Odin Construction Solutions (Odin), regarding Odin's proposal to USM to also be selected as the Phase 2 construction contractor. During that meeting, Odin informed USM that, based on their experience, the optimum embankment configuration for slurry wall (hydraulic barrier wall [HBW]) construction has been 1:1 horizontal working platform width to vertical depth. Specifically, with the Old Waste Pond (OWP) embankment design elevation of 4,218 feet above mean sea level (ft amsl) and average HBW depth of 50 ft, Odin recommended a working pad width of 50 ft for side-by-side trenching and backfill mixing and placement of the HBW.

Therefore, the "USM RWP project team" (USM, Odin and Chad Tomlinson, P.E., Tetra Tech) evaluated modified top of embankment configurations that meet the goals and objectives of the Retrofitted Waste Pond Phase 1 and 2 design and construction:

- (1) Top of HBW elevation of 4,218 ft amsl;
- (2) Internal (pond-side) embankment slope of 4H:1V;
- (3) External (lake-side) embankment slope of 3H:1V; and
- (4) RWP Phase 2 construction will be completed on a schedule consistent with the Groundwater Discharge Permit (GWDP) and Consent Decree (United States v. Magnesium Corporation of America, et al., Case No. 2:01CV0040B; "CD").

From Station 0+00 to 35+00 the USM RWP project team has confirmed that there is already adequate embankment crown (pad) width to support side-by-side trenching and backfill mixing and placement of the HBW. Similarly, the southeast through southwest embankment (Station 183+48 to the west end at approximately 253+36) has a sufficient pad width to support side-by-side trenching and backfill mixing and placement of the HBW.

Therefore, this modification is only for the embankment around the OWP from approximately Station 45+00 to 183+48. As shown on the attached modified Phase 1 drawings, the modification does not materially change the alignment of the HBW. The modified configuration does widen the working pad for side-by-side trenching and backfill mixing and placement of the slurry wall as follows:

- (1) The embankment crown at 4,218 ft amsl has been reduced from 30 ft to 22.5 ft;
- (2) The HBW will be installed on the centerline of the pad at 4,218 ft amsl;
- (3) A mixing pad of 23 to 27 ft in width will be retained at an elevation of 4,213.5 ft on the outboard (or downstream) side of the embankment; and
- (4) A 2H:1V connecting slope from the mixing pad to the crown at 4,218 will be incorporated into part of the mixing pad.

The Phase 1 fill placement and compaction specifications (Specification 02222) and construction quality assurance and control requirements (CQAP) do not need to be modified and will remain in full force and effect during construction of the modified configuration of the embankment.

As it pertains to supporting construction traffic associated with the construction of the RWP, the equipment will not induce appreciable live and dead loads on the existing OWP soils given the height of the embankments and anticipated bearing capacities of the compacted embankment fill of 5,000 to 8,000 psf. The modification will not adversely impact the overall static stability of the embankment and in fact will likely improve stability due to the overall increase in width (mass) of the embankment and no change in the upstream or downstream slopes. The previous stability modeling completed on the original design indicated factor of safeties (FOS) between 2.1 and 3.0, which are significantly higher than an FOS of 1.5 for static loading recommended by industrial accepted guidance. Additionally, this change only nominally changes the distance from the upstream edge of the HBW to the edge of the upstream embankment crest. The original design called for the HBW to be installed 12 ft from the edge of the upstream crest, whereas, the current proposed modification would have the upstream edge of the HBW being installed at a distance of 9.75 ft from the upstream crest edge.

EOR Approval:

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