



COLORADO

Division of Reclamation,
Mining and Safety

Department of Natural Resources
1313 Sherman Street, Room 215
Denver, Colorado 80203

MEMO

DATE: January 17, 2018

TO: Jared Ebert

FROM: Eric Scott

RE: Review of Adequacy Responses and Submitted Groundwater Study
Loveland Ready Mix; DRMS File M-2017-050; Knox Pit

I've reviewed the responses provided by LRM to the DRMS adequacy review questions (comments and responses 26–41 as submitted) as well as the submitted groundwater study prepared by Telesto and the associated appendices. The report makes clear that impacts to prevailing groundwater levels in the immediate area, both mounding and shadowing, are expected to occur during mine operations, and this will likely impact adjacent wells. Overall I feel that the responses and the supporting information in the study are sufficient, however, I've summarized a couple of items that I think may require some additional attention. Feel free to use as you like, and let me know if you have any questions.

Section 6.3 states that approximately 1.5 feet of freeboard is required in the water management pond to provide capacity to manage a 100 year storm event. Permittee should commit to enlarge the pond or install additional drain structures as detailed in the report if freeboard in the water management pond drops below 1.5 feet for longer than ?? 1 month?

Section 7.0 states that the groundwater model will be updated and verified as more data are collected. Permittee should commit to updating the model with all available monitoring data annually and submitting the results, and monitoring data, with the annual report

Section 7.1 states that GW depth/level data will be collected monthly for 1 year, dropping to quarterly thereafter until active operations are completed. Given the concerns for impacts to surrounding structures/wells, and the usefulness of the data for the GW model calibration/verification, permittee should commit to maintain the monthly GW level monitoring for the life of the permit.

Section 7.1.4 also states that, with well owner's permission, they will monitor levels in the identified nearby private wells semi-annually. For the same reasons listed above, this data should be collected quarterly if possible.

Section 7.1.6 states that LRM proposes a drawdown trigger level of 5 feet to trigger additional monitoring and possible mitigation if required. This seems reasonable, but permittee will need to establish the baseline elevations for each well that will be used to determine what the drawdown level in



that area is. No trigger level for mounding was proposed, however the text of the report indicates that a trigger level of 2 feet above baseline would be appropriate.

The groundwater quality data provided and proposed groundwater quality monitoring program are insufficient. The permittee will need to submit a groundwater quality monitoring plan and data sufficient to demonstrate that the site is in compliance with CDPHE Water Quality Control Commission (WQCC) Regulation 41 - Basic Standards for Groundwater. The submitted plan should include at least:

- Proposed groundwater sampling locations and frequency, including up-gradient background location(s) and points of compliance. In addition, it would be useful to sample the water in the water management pond during operations as it will directly recharge groundwater in the vicinity.
- Appropriate analyte list. At a minimum the full Reg. 41 Table 1 Inorganic Analytes list should be collected for establishing background levels and determination of regular monitoring parameters. Asbestos may be eliminated, however, TDS, pH, and iron should be included.
- Sampling protocol(s) and analytical methods/detection levels.

As stated previously, the applicant should strongly consider installing a slurry wall liner around areas to be mined prior to exposing groundwater or commencing dewatering. In conjunction with a simplified version of the proposed perimeter drain, a slurry wall would isolate the excavated areas from the surrounding aquifer. This would eliminate or greatly minimize the possibility of any off site hydrologic impacts and the resulting mitigation expense, as well as minimize pumping costs during mining and reclamation. Cost of installing an engineered clay liner would also be eliminated, and the required reclamation slopes would require only simple earthwork. In addition, if the liner was approved by SEO prior to exposing groundwater, the required reclamation bond for the site would also be greatly reduced.