Griswold, Jim, EMNRD

From: Richardson, Clinton <clinton.richardson@nmt.edu>
Sent: Saturday, August 27, 2016 12:48 PM
To: Griswold, Jim, EMNRD
Subject: Re: CK Disposal

Jim:
The H2S Management Plan is Appendix A of the Site Operation Plan Attachment K. Section 1.2 indicates testing of incoming loads for H2S gas with monitors. If over 10 ppm, then the load must be treated with Ca(OCl)2 (calcium hypochorite). The will oxidize the H2S to H2SO4 (reduced sulfur to oxidized sulfur). A dosing table is provided as Table K.A.4 based on the level of H2S incoming. This dosing is targeted to reduce the concentration down below 1 ppm; however, dosing of the load continues until a 1 ppm level is achieved and before allowing it to be directed to receiving area. Chlorine compounds are used to oxidize H2S.

Section 1.3 provides an explanation of evaporation pond monitoring. Wind direction, wind speed, and H2S concentrations are to be monitored twice a day and recorded in a daily log. The action limit is 10 ppm. Reading are then to be taken downwind of ponds at the property boundary. Readings of dissolved oxygen and dissolved sulfur are to be taken in the ponds. The site evacuation limit is 20 ppm.

Section 1.4 indicated that pH and dissolved oxygen levels in the ponds are to be monitored daily. pH is to be maintained above 8.2 to 9.0. Sodium hydroxide is to be used to maintain optimum pH. Note that the mole fraction of total dissolved sulfur species that is H2S is theoretically less than about 5% at pH greater than 8 based on dissociation in water. At pH greater than 9, the H2S in solution is negligible. Stripping of H2S from the pond contents would be negligible. Aeration control will also be practiced by monitoring dissolved oxygen and maintaining the levels above 0.5 ppm.

Abiotic oxidation of H2S with oxygen has slow kinetics; however, abiotic sulfide oxidation kinetics improve when reduced iron and/or manganese are oxidized by oxygen to form oxidized metals which in turn oxidize sulfide. These reduced metals may be in the water that goes to the evaporation ponds. If there is any biological activity in the ponds, especially chemolithotrophic microbes, biotic oxidation may occur. Aerobic chemolithotrophic sulfide oxidation rates are much higher than abiotic oxidation rates.

The technology and procedures described in Appendix A seem reasonable enough based on scientific principles. The key is monitoring and process control!

The other thing that could be done is modeling of an emission rate and concentration of H2S from the evaporation ponds to estimate ground level concentrations downwind at the URENCO plant. You would need some meteorological data, estimates of emissions, and a suitable EPA Gaussian type plume model. This would involve a considerable effort, but may be necessary by CK Disposal to get a picture of what might be a realistic and worst-case scenario at the URENCO plant, and address the concerns raised in the attached letter. Hope this helps.
Clint

On Fri, Aug 26, 2016 at 3:21 PM, Griswold, Jim, EMNRD <Jim.Griswold@state.nm.us> wrote:

> Sorry that it's been a while. The attached letter was received last week. We are responding, as is the applicant, but I would like you to weigh in on the concerns expressed. Thanks.

CK Disposal, LLC
Applicant's Exhibit 9
NMOCD Case No. 15617

Jim Griswold

Environmental Bureau Chief

Oil Conservation Division

1220 South St. Francis Drive

Santa Fe, New Mexico 87505

505.476.3465

email: jim.griswold@state.nm.us