

From: [Mark Masarik](#)
To: [Greg Weigel](#)
Cc: [Susan Skinner](#); [Andrew Boyd](#); [Kira Lynch](#); [Howard Orlean](#)
Subject: Fw: Phosphine Gas Monitoring at Other RCRA Ponds
Date: 08/22/2007 03:59 PM
Attachments: [PH3 SURVEY OF TMPS 2007.xls](#)

Good Day, Jim Sieverson sent me and Howard the email below. I will be sending this to Kelly Wright, Roger Turner, and Susan Hanson under separate cover today. I will then schedule discussions with Howard, Greg, and Sue Skinner if she wants in at this time. more to come....Mark

----- Forwarded by Mark Masarik/R10/USEPA/US on 08/22/2007 03:51 PM -----

"Jim Sieverson"
<Jim.Sieverson@fmc.com>

To: Mark Masarik/R10/USEPA/US@EPA
cc: Howard Orlean/R10/USEPA/US@EPA
08/22/2007 03:34 PM Subject: Phosphine Gas Monitoring at Other RCRA Ponds

Mark

I apologize for not responding more quickly to your e-mails concerning gas monitoring at other ponds, but, as you know, there have been a lot of FMC-related activities demanding my attention. As far as your request for monitoring data at the other ponds for gas buildup, I have presumed that to mean phosphine monitoring data around FMC's RCRA ponds. FMC has done some industrial hygiene-related sampling around the TMPs on other RCRA ponds to ensure that our RCRA Pond Safety Rules continue to adequately protect pond workers. There are 46 TMP enclosures on other RCRA ponds (not including the 8 enclosures on Pond 16S). I have now monitored phosphine at all of those TMP enclosures, except Pond 8S, which has already been reported to EPA.

The approach to the industrial hygiene (IH) monitoring has been to use a hand-held phosphine monitor to scan around the exterior of each TMP where the metal top meets the walls and where the walls meet the concrete pad at the bottom. My term for this sampling is "*TMP enclosure perimeter (outside of TMP)*." I have also checked phosphine levels inside each TMP enclosure by opening the enclosure, placing a monitor directly on a pipe flange, closing the top, and waiting for a few minutes to allow the air inside the enclosure to equilibrate. I have prepared a summary of the phosphine monitoring data taken outside of the TMP enclosures and inside the TMP enclosures on other RCRA ponds and at Pond 16S (as a point of reference). Please see the attachment entitled "*PH3 Survey of TMPs 2007.xls*".

Phosphine was not detected outside of 35 TMP enclosures. At the other 11 TMP enclosures, only two enclosures (both at Pond 12S) had phosphine levels outside of the enclosure that were above the OSHA PEL of 0.3 ppm. These data should be reviewed in the context that none of the TMP piping connections were initially

designed to be gas tight, e.g., flanges are not gasketed. As part of initial mitigation efforts to minimize PH₃ emissions from TMPs at Pond 16S, FMC used silicone sealant to seal up the piping flanges inside the TMP enclosures on that pond, but sealing of pipe flanges has not been done at other ponds. So, the levels observed at TMPs on Pond 16S represent leakage out of a sealed system while the phosphine levels outside of the TMP enclosures located at the other ponds are related to leakage from an unsealed system.

As noted earlier, I also checked phosphine levels inside the TMP enclosures where PH₃ levels would likely accumulate to a higher concentration because of the lack of air exchanges. The presumption was that this would represent a worst case industrial hygiene exposure scenario. Phosphine was not detected inside 28 TMP enclosures. At the other 18 TMP enclosures, only 5 enclosures had phosphine levels inside the enclosure that were above the OSHA PEL of 0.3 ppm. However, when a TMP enclosure is opened, the air mixture inside the enclosure quickly dissipates so industrial hygiene exposures can be minimized by opening a TMP enclosure and waiting a few minutes. FMC believes that the RCRA Pond Work Rules continue to safeguard employees at the other RCRA ponds. FMC plans to repeat this survey periodically, consistent with sound site health and safety practices.

Additionally, FMC has been performing Phase 2 ambient air sampling along the fence line downwind of Pond 16, as required by the UAO. That daily monitoring using a hand-held phosphine meter has shown no detections of PH₃, i.e., all PH₃ readings have been 0.0 ppm.

FMC is hesitant to attempt monitoring of TMP source gas in addition to the IH sampling we already are doing, as no reliable analytical method for phosphine at higher concentrations has been identified. While “source gas” sampling was conducted pursuant to the UAO at Pond 16S, the Gas Characterization Report submitted to EPA showed that the analytical method required by EPA was not suitable for our circumstances and the source gas sampling at Pond 16S was inconclusive. The 100% design for the Pond 16S system is proceeding based on calculated concentrations using parameters measured in the gas extraction system.

As you are aware, FMC performs post-closure monitoring for temperature and pressure at all RCRA ponds. However, FMC is concerned that current post-closure monitoring for temperature and pressure may not be an adequate indicator for phosphine generation. FMC is investigating alternative RCRA post-closure monitoring options to better detect the potential for phosphine gas generation at low temperatures and/or pressure and will prepare and discuss with EPA a proposed modification to the post-closure monitoring plans for the ponds.

Clearly, given the low levels of phosphine measured in the IH survey at the other ponds, our first priority has to be controlling phosphine emissions from Pond 16S. Pond 16S received both phosphy wastes and lime-treated precipitator slurry and has a unique chemistry not found in other ponds that is more conducive to phosphine generation. While phosphine can be generated from phosphorus and compounds via hydrolysis, it is the alkaline pH conditions in Pond 16S that seem to have increased the phosphine generation rate there resulting in release of PH₃.

I would be happy to discuss with you further mitigation measures to insure that the public is not potentially exposed to ambient levels of phosphine. Those measures might include repeating the TMP industrial hygiene survey, sealing of pipe flanges at other ponds, increasing the physical distance covered by the Phase 2 ambient air sampling along the fenceline to include the area downwind of the other RCRA ponds, and/or working with EPA on alternative RCRA post-closure monitoring options to better detect the potential for phosphine gas generation at low



temperatures and/or pressure. PH₃ SURVEY OF TMPS_2007.xls