ENTERED

Allen, Pam, NMENV

From: Maestas, Ricardo, NMENV
Sent: Wednesday, August 13, 2014 11:03 AM
To: Allen, Pam, NMENV
Subject: FW: Attorney privileged - WIPP

April

From: Skibitski, Thomas, NMENV
Sent: Friday, April 25, 2014 4:45 PM
To: Kendall, Jeff, NMENV
Cc: Kliphuis, Trais, NMENV; LucasKamat, Susan, NMENV; Maestas, Ricardo, NMENV; Smith, Coleman, NMENV; Holmes, Steve, NMENV
Subject: Attorney privileged - WIPP

Jeff,
Please see my comments in red. I addressed this reply to GC (Jeff) to keep it an internal discussion. PS, I am not an aerosol specialist and present my thoughts for discussion purposes only.
TS

From: Kliphuis, Trais, NMENV
Sent: Friday, April 25, 2014 1:53 PM
To: Skibitski, Thomas, NMENV; LucasKamat, Susan, NMENV; Maestas, Ricardo, NMENV; Smith, Coleman, NMENV; Holmes, Steve, NMENV
Subject: FW: WIPP

Food for thought...

Subject: RE: WIPP

I really don't think it's mysterious. And I think the MgO bag is not related. I assume this refers to the potential for the MgO to be the source of the particulates occluding the Station A filters. If a drum burst energetically enough to rupture and disperse the contents of 3000 pounds of granular MgO then it seems reasonable that some portion of that material is further reduced in size making it easier to disperse in the moving air. The air flow at the time of the event was about 230,000 cfm, reducing to about 60,000 cfm within a minute or so after the CAM triggered. For significant salt from the mine to be collected on the Station A filters a very significant event would have had to disturb a large surface area of stable and competent salt to create a dust cloud that could make it all the way to Station A – a mile away including a 2150 foot vertical climb. There does not appear to be evidence of such a large event. Rumor has it there is evidence of a broken bag of MgO...

It's really simple. Pu and Am tend to attach to very fine particles (PM 10 and smaller) and move in the environment. Agree, many contaminants have an affinity for fine grained particles. If there is a small chronic release (which would be likely around things like waste boxes), all that small very slightly contaminated particulate settles to the ground when the ventilation is off for the fire. This chronic accumulation, for the sake of argument, would have to be nearly un-measureable to never have been detected. If it does exist, some fraction of it will be immobilized as the waste face advances in the rooms (trapped under the barrels, undisturbed in the back portions of the room, etc.). Other material that is heavy enough to settle out would be tracked on the floor. Upon entry, the teams frisked the bottoms of their feet every 50 paces or so and did not detect radiation while the air was at their backs. This may not be the case along the exhaust corridor where, if there was a chronic exposure, it would be deposited and possibly detected on

surfaces. The air flow was seldom if ever turned off until the fire, and then only temporarily, so any particles fine enough to remain suspended should normally move with the air while some deposition would occur where the air velocity slows enough locally for it to begin dropping out. Think of how a snow fence works – the snowflakes borne on the wind move between the slats of a snow fence. The slats cause the wind to slow slightly causing the lighter (finer) snowflakes to drop out of the air stream on the leeward side. If there was a chronic presence of Am or Pu attached to the fine particulates they would be evident in areas where the fine dust accumulates – for example where the air slows because of changes in direction, on the surface of overhead lighting, in the exhaust shaft, etc. These areas can be swiped and concentrations or activities measured.

While it's on the ground, it is interacting with larger mined salt particles, which are hygroscopic. All the salt has this characteristic, even the fine particles in the air, which may also aggregate into larger particles and fall out. Wet salt is very sticky. Aggregate particles form. So now the Pu and Am are attached to larger aggregate particles. Agreed with the tendency to aggregate. The non-aggregated small particles normally stay in air suspension due to Brownian motion and would follow the air flow and move out of the mine in concentrations too small to detect because they are diluted by a lot of mine air flow. Agree with the dilution. But the aggregated larger particles do not react this way. They tend to move more slowly, low to the floor, by a bouncing motion called saltation. This would have been evident, and enhanced (and diluted), wherever the equipment ran as it would track the material (contaminated or not) around. It may be possible to swipe the waste handling equipment tires, undercarriage surfaces, and maintenance areas to see if detectable quantities are still present there. For that matter, foot traffic back away from the active spaces would also track and spread this material. Maybe common areas like the underground lunch room or muster areas should be swiped with attention paid to hidden dusty areas like the underside of tables, benches, etc. That is why they did not reach the detector at Station B for several days. Particulate radiation was measured on the filters at station B on February 14/15. The event occurred at (2/14) 23:13 hours and the filter collected particulates for about 9 hours and 20 minutes (2/14 start at 07:54, stop 2/15 at 08:35) after the event and release. When they do reach Station B, they are at a concentration which is now easy to detect. There was enough mass for accurate measurements at the Station B filters, some of which bypassed the HEPA filtration system through the dampers into the exhaust plenum. The larger particles are also easier to collect on a filter than the small non-aggregated particles. True, but they are also more likely to drop out. The filters collect particulates down to 3 microns – suitable for dust size particles, not so good for smog, smoke or soot. Station A filters were collected daily and while not analyzed individually, they were aggregated to represent composites and we had very few measureable detections in the many years of continuous monitoring. That could argue that there was very low (nearly unmeasureable) material in the air chronically – or were attached to extremely fine particles. They're also easier to collect on a swipe. The hits they are getting in Panel 7 indicate there are a detectable quantity of these aggregated particles still in that area. These have all been measured after the release and are expected on all surfaces in the exhaust path downstream of the event location.

If the people checking out Panel 7 would take some samples of just the top layer of dust on the floor, they would perhaps collect some of these aggregate particles which had grown too large to be re-suspended when the exhaust was turned back on. The heavier particles would have settled out soon after the event, especially after the air flow was reduced. Frisking the bottoms of feet or walking across a "step off pad" (the tacky paper used on the floor when leaving a contaminated environment) would capture this material for analysis. I don't know if this is part of their decon process. Taking a sample with some sort of vacuum probe would be best, so as not to dilute the sample with a lot of uncontaminated material.

I think the reason the WIPP incident is a mystery is because there are a bunch of engineers are looking at the problem and they see it immediately as an engineering problem. Engineers think differently than aerosol scientists. Dr. Richard Arimoto, my old boss, is currently living in Rio Rancho. Somebody really should try to contact him and get his opinion on this. If they want the mystery solved (which probably needs to happen so WIPP is in a position to reopen), he can help. He has a more impressive reputation than me.