

From: Thomas West <twest@westfirmlaw.com>
To: Gerstman, Marc
CC: Russo, Steven; Hennessey, Yvonne
Date: 9/26/2011 1:30:59 PM
Subject: FW: Discussion of HVHF GP Analytical Parameters

Marc and Steve, consider this one last pitch before the stormwater permit is released to the public to encourage the Department to reduce or eliminate radionuclide testing. As per previous e-mails, there are no circumstances involving the release of water from a well that will not contain chlorides. As such, testing for chlorides continues to be the single best benchmark available for monitoring drilling, stimulation and production.

If the Department is going to consider any type of benchmark testing for radionuclides, we would recommend gross alpha and beta testing only. We also refer you to the technical comments below, which note that any testing for radionuclides should be done unfiltered samples to avoid false positives from NORM associated with on-site soils without any impact from drilling, stimulation or production.

Thank you for your continuing attention to these issues.

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*This transmittal is subject to our standard e-mail legend.

From: Ted Rahon [mailto:ted@cophysics.com]
Sent: Saturday, September 24, 2011 11:33 AM
To: Dave Cornue
Cc: 'Brad Gill-IOGANY'; 'Eddy Grey-Triana'; Tom West; Yvonne Hennessey; 'Dan Arthur-ALL'; 'Dave Cornue'
Subject: Re: HVHF GP Analytical Parameters

Dave,

After review of the proposed DEC regulations, I see your concern regarding the DEC's proposed requirement for quarterly radionuclide analysis for storm water runoff from both under-construction and operating gas wells. I see that the DEC is requiring this sampling for all sites regardless of whether any produced/flowback water is in an impoundment, in tanks, or not on site at all.

Certainly, there is no source of radionuclide discharge to storm water from an operating well with no produced water being on site. Concerning an active drilling site, I can see that produced/flowback water in an impoundment could be a source of release to storm water if the storm were severe. Produced/flowback water in tanks would not be much of a risk for discharge except in the event of a pipe break or other accident.

Therefore, I recommend that you suggest to the DEC that the requirements be tailored to the risk of radionuclide release depending on the status of the site.

You might also suggest only performing quarterly gross alpha and beta analysis as a screening test. If either one showed an elevated gross radionuclide concentration (for example, > 30 pCi/l), then specific radioisotope analysis would be performed. This would help economically.

In addition, any radioactivity analysis of water should be performed after the water sample is filtered because the natural background concentration of radionuclides in normal soil, if suspended in agitated storm water, would cause erroneously-elevated apparent radionuclide concentrations. Non-dissolved suspended solids due to agitation is not a human health risk as eventual settling would occur before entering anyone's water supply and, of course, no one would drink cloudy, dirty water.

The real objective is to prevent higher concentrations of dissolved radionuclides from being released from produced/flowback water.

Call me anytime to discuss.

Regards,
Ted Rahon
Ted Rahon

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From: Dave Cornue [mailto:dcornue@all-llc.com]
Sent: Monday, September 26, 2011 12:22 PM
To: 'Brad Gill-IOGANY'; 'Eddy Grey'; Thomas West
Cc: Yvonne Hennessey; 'Ted Rahon'; 'Dan Arthur'; 'Dave Cornue'
Subject: Discussion of HVHF GP Analytical Parameters

Brad/Tom:

The email below provides comments on NORM analytical testing received from Ted Rahon of CoPhysics. Ted makes some good points. We have also outlined a few more general comments in the following.

1. NORM:
 - a. The analytical methods specified are EPA drinking water methods:
 - i. Storm water samples are not drinking water – that is storm water samples will typically have elevated (above that of drinking water) TDS levels
 - ii. TDS can cause significant interference with the drinking water analytical methods
 - b. Lab testing as specified by DEC in their draft:
 - i. According to one lab, the thorium and uranium tests specified are no longer used and have been replaced by other methods
 - ii. The combined lab cost for all five tests will run approximately \$500 per sample
 - c. There are no field methods currently available for screening if the objective is to generate pCi/L data at detection limits similar to those of EPA's drinking water MCLs:
 - i. Alpha and beta are self absorbed-by the water matrix
 - ii. Water samples must be evaporated to solids prior to analyses
 - iii. DEC has not specified detection limits, EPA's drinking water standards are:
 1. Alpha = 15 pCi/L
 2. Beta = 4mR/yr – note this is in exposure-type parameter rather than a concentration
 3. Radium = 5 pCi/L
 4. Uranium 30 ug/L
 - iv. According to Thermo Scientific, any field screening at such levels, if even at all possible, would require lead-shielding for both the instrument and sample in order to eliminate background radiation.
 - v. People build homes with residential water wells in the Marcellus outcrop area of New York:
 1. Any NORM present in the Marcellus would be natural background in the outcrop area
 2. Any turbidity in either runoff or well water in the area may contain minute particles of Marcellus Shale which may test positive for NORM
 3. The entire Middle and Upper Devonian geologic section is made up largely of shale – the Marcellus is simply the lowermost (oldest) and most organic rich of these shales
 - d. Water samples should be field-filtered prior to analyses to remove any "background" shale solids that may increase apparent NORM levels in drinking water samples
 - e. Recommended alternative:
 - i. Screen for gross alpha and gross beta through laboratory analyses of field-filtered water samples
 - ii. If detections exceeding (whatever standard DEC decides to use) are

present, then test specifically for Radium, Thorium, and Uranium

2. GC/MS Hazardous Substance Library Search:

- a. This is testing beyond the range of compounds normally analyzed for in EPA test methods for VOC and SVOC
- b. This testing provides Tentatively Identified Compounds (TICs) – the ID of the compound is considered only tentative because it is not being compared to a laboratory standard
- c. TICs typically do not have regulatory standards associated with them, so it is not possible to evaluate results relative to promulgated environmental risk-based regulatory standards
- d. Testing will cost approximately \$415 per sample for VOC and SVOC combined.
- e. Recommended alternative:
 - i. Screen for TDS, chlorides, and pH
 - ii. If detections exceeding standards established by DEC are exceeded then more extensive testing could be considered based on the specific likely constituents present at the specific site
 - iii. Only if a release of an HVHF chemical to the surface of the drill pad occurs should subsequent stormwater screening samples be required to analyze for additional analytes as part of the testing required during initial screening testing (“i” above), such testing could include:
 1. Standard analytical parameters that test for known constituents of the HVHF fluids used on site
 2. Only if the released HVHF product includes chemical constituents not normally included in standard analytical tests should specific testing be performed to screen for such a constituent – and then the additional testing should be based on analysis against a known laboratory standard for that constituent, rather than the blind TIC testing approach
 3. Such an approach will:
 1. Save on the cost of routine sample analyses
 2. Expedite the testing and evaluation procedure, over that of a routine and broad-based TICs approach

3. Toxicity Testing:

- a. DEC provides no indication of what they expect to see for toxicity testing
- b. It could involve biological studies to evaluate toxicological properties and impacts to key species (e.g., Daphnia, fat-head minnows, etc.)
- c. This could be costly and time consuming – actual costing for this is impossible to anticipate accurately as there are too many unknowns (including the compound that might require testing and the tests that would be most appropriate), but we are told that something in the range of \$1,000 per compound per species would not be unrealistic
- d. Recommended alternative:
 - i. As mentioned in 2(f)(iii) above, if a known release of an HVHF chemical has occurred, and only when that chemical does not have any environmental-based regulatory standard in New York, should

toxicological testing be considered

- ii. Toxicological evaluation could include the following:
 1. Search for existing regulatory standards for the specific chemical compound in other jurisdictions (i.e., other states or federal EPA)
 2. Literature search for already established toxicological properties for the specific chemical compound in question
 3. Only if no risk-based regulatory standards or toxicological information is obtainable should any toxicological testing be considered
 4. Such an approach will:
 1. Save on the cost of toxicological testing relative to routine sample analyses
 2. Prevent redundant testing and toxicological evaluation should such specific chemical be a concern at multiple well pads (and also under multiple operators)
 3. Expedite the toxicological evaluation procedure – independent toxicological testing and evaluation could be both costly and time consuming
4. What other industry is held to a similar level of routine testing requirements (e.g. including TICs) for their storm water discharges in NY??? By requiring such a level of testing for every stormwater outfall, on every well pad, and on a quarterly basis, this can only be interpreted as a routine testing expectation by DEC. A review of the existing DEC Multi-Sector GP indicates that no other industry is required to routinely sample and test for such a comprehensive range of constituents as part of a stormwater permit. The key word here is "routine" – if a known release event has occurred at specific well pad then additional testing may be warranted. However, to routinely require such testing is excessive and not in keeping with the requirements imposed on other industries in New York.

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