From:	Helton, Kelsey
To:	miller.scott@epamail.epa.gov; John Mousa; huttonrh@gru.com
Cc:	Helton, Kelsey; Murchison, Nancy
Subject:	FW: Questions on FDEP"s Variance for Use of REMOX EC for GW Remediation at Koppers Superfund Site
Date:	Thursday, September 09, 2010 9:45:18 AM
Attachments:	Adventus Variance.pdf Final order variance Carus Corp.pdf

Scott. etal- FYI- DEP response to Mr. Prager's inquiry of previous ISBS pilot at Koppers and the related variance.- Kelsey

From: Murchison, Nancy
Sent: Wednesday, September 08, 2010 4:35 PM
To: Helton, Kelsey
Subject: FW: Questions on FDEP's Variance for Use of REMOX EC for GW Remediation at Koppers Superfund Site

From: Coram, Phil
Sent: Wednesday, September 08, 2010 4:27 PM
To: jprager@cox.net
Cc: McClaugherty, Donnie; Murchison, Nancy
Subject: Questions on FDEP's Variance for Use of REMOX EC for GW Remediation at Koppers Superfund Site

Dear Mr. Prager:

Thank you for your August 20 email to Director Janet Llewellyn about the issuance of a variance by the Department of Environmental Protection (DEP) to allow a pilot test of the use of REMOX EC at the Koppers superfund site in Gainesville. Janet asked me to respond to your inquiry. Your email was very thoughtful, and we share some of your concerns over the use of REMOX EC as part of proposed remedy for this site.

I will try to address the issues you raised in your email in the order in which they were presented. First, however, is a brief summary of pertinent DEP ground waters rules and the legislative variance process that may be helpful in providing background and context for our responses.

DEP's ground water rules do provide for a zone of discharge, which is defined as a limited volume of ground water beneath the site where ground water quality standards can be exceeded to provide an opportunity for treatment, mixture and dispersion of pollutants. However, in the case of remediation projects that use injection wells, a zone of discharge is only available for secondary ground water quality standards and only for primary ground water quality standards associated with the prime constituents of the remediation reagents. In the case of REMOX EC the prime constituent is sodium permanganate.

Therefore in order to use and test the effectiveness of REMOX at the Kopper's site a variance from the zone of discharge requirements was required for other constituents, not generally eligible for a zone of discharge, in the REMOX EC product that could have resulted in exceedances of other primary ground water quality standards. The variance order goes into great detail on the statutory requirements for variances.

There have actually been two variances issued by DEP for the use of REMOX EC, which are attached. The first variance was issued to Adventus Americas, Inc. (Adventus) on January 16, 2008, specifically for use at the Koppers superfund site in Gainesville, Florida. This is the variance under which the pilot study was conducted and approves the use of REMOX not to exceed a 10% concentration. The variance includes conditions for a zone of discharge to not exceed 150 feet from the point of injection, and ground water monitoring requirements.

A second variance was issued to Carus on July 24, 2008, that approves the use of REMOX not to exceed a 4.5 % concentration. This variance is not limited to a specific site, however, the use of this product must be through a Department approved plan, or other Department enforceable document, for each remediation project.

The following discussion specifically addresses the concerns you raised in your letter.

Item #1

The purpose of the pilot study was to test the effectiveness of REMOX EC at the Koppers site. The effectiveness REMOX EC, or lack of its effectiveness, is discussed in item # 5.

Item #2

When reviewing a petition for a variance, the Department does a team review to evaluate potential adverse impacts to human health or the environment that could result from the use of the product. Issuance of a variance in this case was not intended to validate the effectiveness of REMOX EC, but rather to place conditions on its use to ensure no adverse impacts to human health and the environment. The Department has not conducted any independent testing of this product, and evaluated the information provided by the petitioner. Again, future use of REMOX EC and the effectiveness of the product are discussed in item #5.

Item #3

The Department was provided reasonable assurance from the applicant that the constituents listed in the variance would not exceed the primary drinking water standard past the 150 foot zone of discharge. This is discussed in detail in the variance order. A compliance monitoring plan was implemented at the site. Monitoring results indicate that the pilot study was in compliance with the variance conditions. Again, future use of REMOX EC and the effectiveness of the product, and our recommendations on the long term remedy for the site are discussed in item #5.

Item #4

The Department is unaware that either Adventus or Carus has published notice for either variance. Each variance order explains that any person whose substantial interests are affected by DEP's action may file a petition for an administrative proceeding. Any petition filed by any person must be filed within twenty-one days of publication of the public notice or within twenty-one days of receipt of the order, whichever occurs first.

Since it does not appear that any notice was published and we are attaching the variance orders to this email, you will have twenty-one days from receipt of this email to file a petition for any future use of REMOX EC under either of the

variances. Pages 7 and 8 of the Adventus variance outlines the information that must be provided in the petition. This information is repeated on pages 13 through 14. The petition must be filed with the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000.

Item #5

The federal Environmental Protection Agency (EPA) has proposed using in-situ biogeochemical stabilization (ISBS) to address the dense non-aqueous phase liquid (DNAPL) in the surficial aquifer within the slurry wall containment area.

Your concerns related to the use of the REMOX mix as part of the proposed ISBS remedy are similar to those that the Department's Division of Waste Management has previously communicated to EPA. DEP expressed reservations on use of ISBS (REMOX) to EPA in our June 9, 2010 comments on the final Feasibility Study. Our reservations are based on the results of the Koppers pilot study as well as the limited amount of long-term performance data for the technology from its use at other sites. In particular, the results of the pilot study did not demonstrate the ability to effectively deliver and distribute the REMOX mix throughout the treatment areas such that the anticipated reduction in aquifer permeability was achieved. Due to the technology's limited history of use at other sites, there is also uncertainty regarding the long-term effectiveness of the technology to treat or immobilize the DNAPL contamination at this site.

In response to the concerns expressed by the DEP, as well as the Alachua County EPD and Gainesville Regional Utilities and their "DNAPL team", EPA has included a contingent remedy for the surficial aquifer. If the ISBS (REMOX) does not meet performance specifications, in-situ solidification/stabilization (ISSS) has been proposed to address DNAPL in the surficial. ISSS is an effective and widely used technology that is commonly used at wood treatment sites. DEP supports the use of ISSS technology for this site if treatability tests confirm its effectiveness with site specific contaminants.

The fact that ISBS does not have an extensive history of use is a significant consideration in the remedy design process, and argues for a robust monitoring and verification process. However, the fact that an innovative technology has not been widely used should not be the sole basis to reject it as a potential remedy. Site-specific information including results of pilot tests (such as the recently completed pilot test for the ISBS) should be considered when evaluating any new technology. Appropriate criteria are crucial to evaluating performance and ensuring success of any remedial technology. Discussions are ongoing with EPA about the effectiveness of ISBS at the Koppers Site and what performance criteria will be required to evaluate the use of ISBS at the site and/or trigger implementation of a contingent remedy.

We agree that effective treatment and controlled distribution of treatment solutions is fundamental to the selection and application of a remedial technology. The discovery of purple-colored water in a monitoring well at the Cabot site cannot be readily explained with the information currently available. Other than the limited use of REMOX in the 2008 pilot study at the Koppers site, we are not aware of the use of any products that contain permanganate at the Cabot site. The DEP agrees with Mr. O'Steen, the EPA hydrogeologist, on the need for additional investigation in the

vicinity of monitoring well HG-29S/29D to explain the observed purple-colored water.

We understand your concern about the possibility that a large volume of REMOX has migrated off-site to the Cabot property. However, the results of compliance monitoring required for the pilot test do not indicate that this has occurred. It is unlikely that a concentration of permanganate that is high enough to be visible to the naked eye would travel a significant distance upgradient to the Cabot property or persist in groundwater for almost two years because of the reactive nature of permanganate as well as its tendency to attenuate. However, we believe that additional assessment, including groundwater sampling from area monitoring wells and analysis for constituents of the REMOX formulation, is necessary to determine the source of the purplish color.

We appreciate your input on the ISBS/REMOX technology. Although this is only one component of the overall site remedy, because the treated DNAPL will also be contained within the slurry wall/cap containment system, its potential contribution to the effectiveness of the overall source remedy is important and deserves careful consideration. The Department will continue to evaluate ISBS in terms of its appropriateness for use at the Koppers site and will continue to communicate any concerns we have to EPA regarding the proposed remedy.

If you have any questions concerning the Adventus or Carus variances please contact Donnie McClaugherty in the Department's Division of Water Resource Management at donnie.mcclaugherty@dep.state.fl.us or at 850/245-8645. For questions concerning the proposed remedial plan at the Koppers superfund site please contact Nancy Murchison in the Department's Division of Waste Management at nancy.murchison@dep.state.fl.us or at 850/245-8990.

With regards,

****

Phil Coram, P.E.
Deputy Director
Division of Water Resource Management
2600 Blair Stone Road
MS 3500
Tallahassee, Florida 32399-2400
tel 850 245-8337
fax 850 245-8686
e-mail phil.coram@dep.state.fl.us

****

From: Joe Prager
To: Llewellyn, Janet
Sent: Fri Aug 20 14:47:07 2010
Subject: FW: Questions on FDEP's Variance for Use of REMOX EC for GW Remediation at Koppers Superfund Site
Dear Director Llewellyn:

I did not want to bother you with this letter and issue, which I addressed to Mr. Deuerling, but the email message I sent to him bounced. Also, I could not find a list of FDEP email addresses on your website.

Would you please forward this email to Mr. Deuerling, or the appropriate FDEP staff member, if he no longer works for your agency?

Thank you for your assistance.

Joe Prager, BANCCA.ORG
Gainesville, FL

From: Joe Prager [mailto:jprager@cox.net]
Sent: Friday, August 20, 2010 2:34 PM
To: 'richard.deuerling@dep.state.fl.us'
Cc: 'jeff.martin@dep.state.fl.us'; 'Kelsey.Helton@dep.state.fl.us'; 'chris@alachuacounty.us'; 'jjm@alachuacounty.us'; 'HUTTONRH@gru.com'; 'murryfj@cityofgainesville.org'; 'Pat Cline'; 'Robert Pearce'; 'bob palmer'; 'Cheryl Krauth'; 'k ideker'; 'jdpais@earthlink.net'; 'deidrebryan@cox.net'; 'Mike Carter'; 'robert perdue'; 'htaksier@gmail.com'
Subject: Questions on FDEP's Variance for Use of REMOX EC for GW Remediation at Koppers Superfund Site
Importance: High

Dear Mr. Deuerling:

We recently learned that the Florida Department of Environmental Protection (FDEP) granted a variance on July 18, 2008 to Carus Corporation, a Spanish company, for the use of REMOX EC as a stabilization reagent in groundwater remediation projects throughout Florida. This includes the Koppers Superfund site located near downtown Gainesville. We also understand that Adventus Americas partnered with Carus Corporation as the primary US distributor of REMOX EC.

In a recent pilot (test) project at the Koppers Superfund site (see attached PDF documents), approximately 542 gallons of concentrated 10% REMOX, (*although the variance appears to only be for the use of regular strength 4.5% REMOX*), as well as another 620 gallons of 4.5% regular strength REMOX were diluted with water and injected into the surficial aquifer at the Koppers site in an area known as the North Lagoon where DNAPL is present.

As you may now, the newly-released EPA Draft Remedial Workplan for the Koppers Superfund site in Gainesville calls for Beazer East to use large quantities of this same REMOX EC compound for in-situ treatment of creosote DNAPL. As a result, several of our citizens in the Gainesville community have questions and concerns about the use of REMOX EC at this site, including the following:

1. The Koppers Superfund site will essentially become a *beta test site* for this new product, which has only been used for full scale remediation at one other site (i.e. the Koppers Superfund site in Denver, CO).

2. There appears to be very little peer-reviewed data to back up the manufacturer's claims about the effectiveness of REMOX EC. While Adventus Americas published their own white papers about the REMOX product, and they claim that REMOX will bind and encapsulate underground DNAPL in the first two months after injection, we do not know if this information is valid, or is based merely on lab

test results and is just a part of the company's promotional efforts. Has FDEP done any independent testing of this product, or are you aware of any independent testing not performed by Adventus, Beazer East, or their affiliated companies? Can you provide any peer-reviewed reports on REM OX EC, or is it considered experimental?

3. The document filed with FDEP by Carus Corporation indicates that the REMOX EC formula, which primarily contains 4.5% sodium permanganate, is derived from manganese ore, and contains small amounts of toxic heavy metal contaminants including:

- **antimony**
- **arsenic** (in amounts **70 times higher** than the primary drinking water standard)
- **chromium** (in amounts **3 times higher** than the primary drinking water standard; the variance document does not specify whether this is hex chromium)
- **mercury**
- **beryllium**
- **cadmium** (in amounts **178 times higher** than the primary drinking water standard)
- **lead** (in amounts **83 times higher** than the primary drinking water standard)
- **thallium** (in amounts **20 times higher** than the primary drinking water standard)
- as well as **selenium** and **molybdenum.**

In addition, the product will leave **manganese** as a byproduct after its application, *in unknown quantities*. It is assumed that the manganese will affect groundwater at the site.

While the variance document submitted by Carus Corporation points out that the groundwater at the site is already contaminated, and states that these new contaminants "will only exceed the groundwater cleanup target levels for a 150 foot radius" of the injection point, we have concerns that there could be more widespread contamination than detailed by this document.

Since this is a relatively unproven compound, and since the site lies only 2 miles south of the Murphree Well Field (which serves as the supply for 185,000 residents of Gainesville) and lies adjacent to Springstead creek, which feeds into Hogtown Creek and our aquifer at Kanapaha Sink, this begs the question: *should FDEP be asking the EPA and Beazer to use a more proven and less toxic product or remediation methodology for use at this site, instead of giving a "thumbs up" to an unproven compound?*

In addition, was the potential risk to our nearby water supply ever considered when the original variance was granted to use REMOX EC?

4. The variance document (attached) indicates that with regard to any local citizens having an objection to the variance granted for REMOX EC by FDEP to Carus, that in order to *"limit the time by which all substantially affected persons may request an administrative hearing"* (and the affected persons in our case is the 185,000 residents of the greater Gainesville area that receive their drinking water from the Murphree Wellfield) *"you (i.e. Carus Corp.) may elect to post the notice, at your own expense, in the legal advertising section of a newspaper of general circulation in the county where the activity is to take place."* (i.e. The Gainesville Sun).

Do you know if this public notice was ever published either by Carus Corporation, or is this variance still open and subject to an administrative hearing at this time? Put another way, do you have on file the required proof of publication by Carus Corporation(s), as spelled out at the end of the variance? I ask this because we just learned about this variance only a few days ago from a Google search, and we are not aware of any general knowledge of the granting of this variance by the public in our community.

5. We recently received a copy of the Administrative Records Index for the Koppers Superfund site from the EPA on a CD. It contains some 220 PDF files, some of which include internal memos between EPA staff members. One of those documents (attached) is an email from William O'Steen, an

EPA hydrogeologist to the Project Manager, Scott Miller. In the document dated Jan. 5, 2010, Mr. O'Steen makes some interesting observations about newly discovered contaminated ground water from a test well at the CABOT SITE (which lies adjacent to the Koppers site on the east side of the property) that has a **"perplexing purple coloration".**

The last paragraph on page 3 of his letter states: *"The report speculates that the purple coloration of the groundwater samples may be related to field testing of potential chemical oxidation of contaminants at the Koppers property. This explanation is improbable…"* However, some now believe that this may not be the case, as sodium permanganate (REMOX), which was injected next door during the pilot test by Adventus at the Koppers site a few months prior, is known to ***exhibit a dark purplish color***. Mr. O'Steen refutes that very idea in his letter, based upon the distance between the pilot test of REMOX at the Koppers site to the west *and the assumed groundwater flow* at the Koppers site. However, he does state on page 4 that *"The report does state that the purple coloration is perplexing, and that further study of this coloration is needed. I support the concept of additional investigations in the vicinity of HG-29S/29D."*

This opens up a lot of questions as to whether there is a possibility that the hundreds of gallons of REMOX injected into the center of the Koppers site in the Northern Lagoon during the Pilot Test, migrated over onto the Cabot property to the east. Therefore, I am requesting any data you might have *to the contrary*, including any information about whether any other stabilization reagents such as sodium permanganate or potassium permanganate (both of which exhibit purplish coloration in groundwater) have been used at the 40 acre Cabot site (*not the Koppers site*), in the last few years. I ask this because I understand that FDEP would have had to grant a variance in order for such chemicals to have been used at the Cabot site, and in order to try to come to some kind of understanding as to why "purplish colored groundwater", along with newfound BTEX contamination, might suddenly appear at well HG-29D at the Cabot site, when prior samples from this well over several years *showed no such contamination.*

We think it is important to investigate this problem to ascertain if there is any possibility of offsite migration of REMOX, or any similar reagent, at the Koppers site, due to some previously undetermined hydrogeology, that might have implications for a larger full scale use of REMOX or other similar reagent at the Koppers site in the near future, as currently planned. In other words, *if the REMOX Pilot Test inadvertently caused offsite groundwater contamination*, it's important to determine this now, before Beazer East begins pumping thousands of gallons of REMOX into the Koppers site.

We hope you will be able to look into these issues and address the concerns we have described. If you are not the right person to address this letter to at FDEP, we hope you will forward it to the correct staff member.

Thank you in advance for your assistance in this matter – I look forward to your response on this vital issue.

Sincerely yours,

Joe Prager, President
BANCCA.ORG, LLC
Email: inbox@bancca.org
Gainesville, FL

provided to you. Please take a few minutes to comment on the quality of service you received. Simply click on this link to the DEP Customer Survey. Thank you in advance for completing the survey.