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U.S. EPA Environmental Technology Verification (ETV) Program **Materials Management and Remediation Center**

Summary of the Stakeholder Committee Teleconference
Wednesday, March 18, 2009

The meeting was called to order at 1:05 pm EDT by Amy Dindal, Battelle.

Present at Role Call: Sam Bass (USACE), Paul Beam (US DOE), Erica Becvar (USAF), Amy Dindal (Battelle), Kenneth Feathers (CT DEP), Angela Fisher (GE), Tim Franceschini (Shell), Maria Gordon (Battelle), Jennifer Griffith (NEWMOA), Douglas Grosse (US EPA), Jim Harrington (NY DEC), Dan Harris (OH EPA), Greg Harvey (WPAFB), Leslie Karr (US Navy), Brian Lewis (CA DTSC), Peter Lurker (WBAFB), Dan Powell (US EPA), Heather Rectanus (Battelle), Teri Richardson (US EPA), Ramon Simon (Bayer), Russ Sirabian (Battelle), Michael Smith (VT DEC), David Wandor (Dow).

Welcome

Since Teri Richardson, EPA, was detained, Doug Grosse, EPA, welcomed the call participants. Amy Dindal, Battelle, gave a summary of the MMR Center's activities since the first teleconference. She described what was done to recruit new stakeholders and the various outreach activities that the staff of the Center have undertaken. She invited suggestions from the participants as to potential vendors and collaborators. Now that the Quality Management Plan has been approved by EPA, the MMR Center is ready to proceed with verification testing.

Review of February 18 Telecon Summary Notes

Maria Gordon, Battelle, asked the participants for any comments on the summary notes from the February 18 teleconference. As there were none, the notes are considered final and will be sent to EPA for posting on the ETV website.

Introduction of New Participants

Amy Dindal asked the new participants on the call to introduce themselves and describe their work and interests: Sam Bass, Angela Fisher, Tim Franceschini, Brian Lewis, Greg Harvey, and Peter Lurker.

Discussion of Potential Remediation Technology Categories

Russ Sirabian, Battelle, led the discussion of potential remediation technology categories.

- **Sustainability Metrics.**

There was lively discussion on sustainability metrics--which should be included, what boundaries should be set, use some of the metrics developed by others (Leslie Karr, Sam Bass, Jennifer Griffith, Jim Harrington, Erica Becvar, Ken Feathers). Russ explained that the Center's role was not to develop sustainability metrics, but to use what is out there and implement them in verification testing (e.g., include CO₂ emissions as well as cost and performance). Amy added that ETV generates data and lets others interpret them. Jim

Harrington asked whether to consider the emission of CO₂ from the process and/or from the use of electricity. Ken Feathers said to focus on the technology itself, not the production of electricity, etc., which would be different at every site. The vendor should document what gives them a competitive advantage. Amy replied that vendors sometimes make claims and these can be incorporated into verification testing, but ETV does not do pass/fail evaluation of vendor claims. Russ stated that the report should include information for users to decide sustainability (how much energy required, how much material needed to be purchased). Jim Harrington said it should be done without increasing the cost of testing. Jim Harrington said metrics should be included, give as much as possible. Jennifer Griffith said to collect as many parameters as possible, and discuss what's feasible for each technology. Russ concluded that the issue would be revisited with the first protocol that needs to be developed but that the basic message from the stakeholders was to report on sustainability metrics associated with on-site activities and to include other information needed for technology users to characterize sustainability metrics associated with the technology.

- **In Situ Groundwater Remediation: Primawave Technology.**

The Navy has potential sites for testing this technology. Jim Harrington said that New York was pilot testing the technology. Leslie Karr wanted to know whether documentation was available on the testing. Jim Harrington said he would share the information. Jennifer Griffith thought it seemed useful to do testing with Primawave; she thought there was value in verifying the technology in different geologic settings. Russ suggested using it at multiple wells: use in half of the wells or use multiple injections; use one time, not the next; change the speed of injection; use tracer. Jennifer Griffith replied that even wells a few feet apart may have different geological conditions. Erica Becvar said it was helpful to have this discussion. Those who have already done the testing can share information. Ken Feathers said the technology was not used in Connecticut. He was concerned whether it can push product where it hadn't been before. Jim Harrington said testing produces site-specific results. Sam Bass commented that well construction may have an effect on the technology, for instance whether used in filter pack or direct push wells. Erica Becvar said it would be helpful to get third party testing. Russ summed up by asking Jim Harrington to send available information to Maria Gordon to send out to everyone. The meeting notes will be posted on the MMR Center website. Amy said there will be an established area on the website for ETV MMR information sharing.

- **In Situ Groundwater Remediation: Pneumatic Fracturing.**

Dave Wandor said that Dow did a preliminary evaluation of the technology in Alberta, Canada, also hydraulic fracturing. What is the correlation between hydraulic and pneumatic fracturing? A tiltmeter can be deceptive. There also daylighting issues: things go in unexpected places. Amy asked whether Dow has sites available, and Dave said there was a possibility. Ken Feathers said that pneumatic fracturing was used at a Superfund site in Connecticut, where the site was stratified with coarse and fines. Dave Wandor said they had tested mainly in clays. He will follow up about possible sites and report back to Maria.

- **In Situ Groundwater Remediation: Anti-Biofouling Agents**

Dave Wandor said Dow may have a site interested in testing the use of anti-biofouling agents. Sam Bass said there are some USACE sites also interested in testing the technology. However, they have limited support/funding, and he will have to check. One site is an extraction well, the other is a post-treatment, gravity injection site; They are at opposite ends of the country. Russ said that testing of anti-biofouling was more straightforward than with

other technologies. Angela Fisher said that Aquabuff was made by the same company as EOS; GE had used it in the lab, but not in the field. Sam Bass was not sure where USACE was in the evaluation process of Aquabuff. He will check on electron donor injection.

- **In Situ Groundwater Remediation: Aero-Stream Remediator (remediate septic systems)**

Jim Harrington said it was not used in New York. Ken Feathers said a separate group handled it in Connecticut. Sam Bass reported that it was not for the USACE. This technology will be discussed on the Materials Management call on March 31.

- **In Situ Groundwater Remediation: XDD, Fenton's**

Ken Feathers commented that Verutek is a Connecticut company. Russ asked whether to pick several vendors and their proprietary mix. Jim Harrington asked, what if you have multiple similar technology vendors that want to be tested? Amy replied, yes, this is a voluntary process that is open to all technology vendors. .

- **In Situ Groundwater Remediation: Chemical Reductants**

Jim Harrington said several NY sites were slated to use ZVI, but wasn't sure if it had been used yet. He'll explore and let us know. Leslie Karr said she would send a notice to their managers to see if they have a site for this category.

- **Remediation: Soil and Sediment Remediation**

Sam Bass said the USACE was interested in pore water sampling and AquaBlok. Ken Feathers said Connecticut has 3 acres of tidal flat (Stratford Army Engine Plant), where they are still characterizing metals, PCBs, and solvents. The pollution is big enough to allow comparison of technologies at the site. Sam Bass will follow up on this site. Leslie Karr said to look at reactive caps side by side; vendor will custom make them.

- **Remediation: Sediment Dredging**

Leslie Karr said the Navy is interested in this technology. It is easier to verify on a non-contaminated site. Jim Harrington remarked that NY has Onandaga Lake and the Hudson River—not sure what this technology gets you. Dredging projects tend to be bid out. Maybe this is too ambitious. Ken Feathers concurred. Dredging is mining technology and must be cost competitive. Jim Harrington said to look at all three dredging approaches to see which is competitive. Russ said it is not a high priority for our site for reasons brought up. Ken suggested to pass it on to dredging people if they're interested. Amy said a full presentation from Damon will be made available electronically to those interested.

- **Remediation: Chemical Recovery**

SVE. Leslie Karr said the Navy put together an ESTCP proposal for potential technology testing that may be able to be piggy-backed with the ETV program. Change out and evaluate whether the SVE process concentrates VOCs and CCC (cryogenic compression condensation) process; look at life cycle costs of technology. Jim Harrington said SVE has potential, a good alternative to oxidation. He has never used vapor instead of carbon as oxidizer. Leslie will keep the group up to date as to the status of the ESTCP proposal.

- **Emerging Contaminants Remediation**

- **1-4 Dioxane.** Brian Lewis said there are sites in California using 1,4-dioxane remediation. Tom Moore wrote a paper on it, and is writing a book on it. Ken Feathers said there is an 1,4-dioxane site in Connecticut. There are some issues related to discharge water; need to abide by Clean Water Act and its requirements.
- **NDMA.** Erica Becvar said that, depending on the proposals funded, they may have sites available for NDMA testing.
- **Endocrine Disruptors.** Leslie Karr said the Navy is very interested in 1,4-dioxane and NDMA, but not endocrine disruptors.

- **Munitions Response Remediation.** Sam Bass commented that there are dozens of sites where the USACE could do demonstrations on munitions response. There are many sites, but no money to do the demos. USACE is interested in UXO detection/discrimination. Leslie Karr concurred that the Navy is interested as well, but likely does not have funding. Russ said that munitions work must be closely coordinated with ESTCP.
- **Remediation: Monitoring Techniques**
Jim Harrington commented that passive samples have already been done. Amy said that SNAP sampler has already been tested, but is looking for broader acceptance, including EPA. There is also international verification being performed currently of passive groundwater samplers. Paul Beam spoke of geophysical technologies for site investigation for monitoring at the tail end. Heather Rectanus and Paul Beam gave names of groups doing short courses: Vironex, Gregg Drilling, Schlumberger. Sam Bass brought up mass flux measuring devices/techniques with ESTCP. Ken Feathers said there were regulatory hurdles.

A general comment from Brian Lewis was to suggest to the group to look to move forward with verification testing on sites in particular states where there are representatives on the ETV MMR stakeholder committee.

Review of Action Items and Next Meeting

Amy Dindal summarized the priority technology categories from the discussion as follows (bolded are areas which we will pursue first):

- **Delivery Methods**
 - **Pneumatic Fracturing**
 - **Pressure Pulsing**
- **Biological Processes**
 - **Electron Donors**
 - **Anti Bio-fouling Agents**
- In Situ Chemical Oxidants
- In Situ Chemical Reductants
- **Soil and Sediment Remediation**
 - **Reactive Caps**
- Emerging Contaminant Remediation
 - 1,4 dioxane
 - N-Nitrosodimethylamine (NDMA)
- Chemical Recovery for SVE by Vapor Condensation
- Munitions Response Remediation
- **Geophysical Techniques for NAPL identification**

Action items included the following:

- **Amy Dindal** is to establish an “electronic filing cabinet” for information in the form of a ETV MMR sharepoint site.
- **Russell Sirabian** is to get background information on Wavefront technology and post on ETV MMR sharepoint site.
- **Jim Harrington** is to send NY-DEC publicly available documents on Wavefront technology, ZVI sites, and experience with the Verutek technology to Maria Gordon for posting on the ETV MMR sharepoint site.

- **David Wandor** is to look into potential sites for testing technologies in the areas of pneumatic fracturing and anti-biofouling and provide suggestions to Maria.
- **Sam Bass** is to look into potential sites and funding sources for testing technologies in the areas of anti-biofouling, electron donors, reactive caps (including potential opportunities at Stratford Army Engine Plant in CT), and munitions response, and provide suggestions to Maria.
- **Leslie Karr** is to look into potential sites and funding sources for testing technologies in the areas of reactive caps, ZVI, SVE condensation, and munitions response, and provide suggestions to Maria.

The next stakeholder meeting will take place in June, on a date yet to be determined.

Adjourn

The meeting was adjourned at 3:00 pm EDT.

Respectfully submitted,
Maria Gordon
ETV MMR Center Stakeholder Coordinator