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

Summary of the Stakeholder Committee Teleconference on Materials Management
Tuesday, March 31, 2009

Present at Role Call: David Allaway (OR DECQ), Richard Carmichael (TX CEQ), Timothy Christman (OH EPA), Amy Dindal (Battelle), Tim Franceschini (Shell), Robert Giraud (DuPont), Maria Gordon (Battelle), Jennifer Griffith (NEWMOA), Dan Harris (OH EPA), Jim Harrington (NY DEC), Sara Hartwell (US EPA), Leslie Karr (US Navy), Louis Maccarone (RI DEM), Douglas Mellema (USACE), Tom O'Neill (NJ DEP), Carlos Pachon (US EPA), Robert Phaneuf (NY DEC), Teri Richardson (US EPA), Ramon Simon (Bayer), Russell Sirabian (Battelle).

Welcome
Teri Richardson (US EPA) thanked those who had been on the previous calls and welcomed new members. She described Materials Management as a convergence of two previous EPA initiatives, waste minimization and pollution prevention. In the new program, the emphasis is on recycling and energy recovery. She expressed hope that the committee would come up with a list of potential technologies that addressed these issues, and looked forward to working with everyone.

Introduction of New Participants
Amy Dindal (Battelle) welcomed two new MMR Center stakeholders: Sara Hartwell (US EPA) and David Allaway (OR DECQ). She asked them to introduce themselves to the committee.

Overview of ETV MMR Center Progress
Amy Dindal presented an update on the MMR Center's activities since the initial February 18 teleconference. Two separate calls had been set up in March to address the two areas of interest to the Center. Some stakeholders were committed to only one subject, so we have a Remediation Committee and a Materials Management Committee. But many stakeholders maintain an interest in both areas. The Materials Management area is wide open, and we are looking for concurrence of the stakeholders before moving forward with any technology. We need collaborators and vendors to make this happen.

Discussion of Potential Materials Management Technology Categories
Amy reviewed the scope of the MMR Center, and presented considerations for prioritizing technologies as well as categories for consideration:

- **Plastics Recycling**
  Advance Composites wants verification of its technology, but does not have money to support it. Amy Dindal said that under ETV the focus would be on the technology rather than the end product, although the stakeholders (David Allaway and Sara Hartwell in

particular) were clear that evaluation of the end product would be a critical part of the evaluation in their review. The stakeholders thought there was merit in further considering the Advance Composites technology, and we should engage municipal waste companies in the process. Russell Sirabian (Battelle) and Jennifer Griffith (NEWMOA) asked whether the mechanical properties of the plastic (perhaps the pellets themselves) could be tested in a laboratory and those properties then used to make predictions about product performance. Sara Hartwell said it could be done, but it is still important to have lab testing of the actual product. Robert Giraud (DuPont) mentioned that the Shell West Hollow Lab in Houston at one time had a test facility with the expertise to determine properties of the pellets and plastics. An action item was to look into what testing can be done on the plastic materials. Tim Franceschini (Shell) will check if the West Hollow Lab is an option or, if not, what other facilities can be used. We also need to identify the merits of verification (what do we need to know to make a decision whether to use this technology), considering who the users are of this technology, which tends to be the large waste management contractors.

- **Plastics Sorting Technologies**
  It was discussed that sorting technologies are more for purchase and the purchasers would be the private companies such as Waste Management that would do the sorting of mixed recycled materials. David Allaway offered that there are privately owned facilities that sort mixed recyclables. Sara Hartwell said that a lot of sorting technology for single materials is fairly well established. What is lacking is technology for multiple plastic materials; these are not easily sorted for recovery. Robert Giraud mentioned that the State of Delaware used to have curb-side recycling based on codes of plastics but now they all go into the same bin, which is indicative of the fact that sorting technologies are already out there. Since sorting technologies are already in widespread use (e.g., there is optical sorting in use for colored glass), the need to verify these technologies was questioned.

  David and Sara brought up the issue of flexible packaging. The mix of municipal plastics is changing to flexible packaging from single material tubs and separate film. While these plastics may not be recyclable, they may be good for energy recovery. Flexible packaging, which is made of multiple polymers sometimes mixed with metal (e.g. coffee pouches), is gaining market share. This material is not being collected and currently goes in with garbage. There is a need for a technology that could recycle the mixed materials. There is a need for people to separate them, and for recycling to occur. Although no definitive action item was assigned, there was agreement that there is a need to identify technologies to address recycling or recovery of flexible packages.

- **Tire Recycling**
  CryoVortex cryogenically freezes the entire tire (no need to chop it up first), then produces tire crumbs. Robert Giraud asked if we can take a phased approach because this technology sounds energy intensive; we need to first look at how much energy is used for this process as a step in prioritizing its value. Jennifer Griffith mentioned that NEWMOA has seen energy-intensive proposals and because of this added expense they were rejected. Dan Harris (OH EPA) talked with his tire folks about this process. The issue is this: the crumb rubber has minimum surface area and is not useful for reforming into products. There are issues with the end market and economics. It is a technology that has been around a while, so perhaps this technology category should not be a priority.

  In looking for more ideas with tires, Amy made contact with EPA's Scrap Tire Workgroup and the US-Mexico Border Tire Group. Dave Allaway suggested that tire pyrolysis was

worth pursuing. There is a facility in Oregon for pyrolyzing tires. He will get us a name. Dan Harris mentioned that some vendors are trying to figure out how to take the steel belting out of the tire before recycling – Dan will provide more information.

- **Electronics Recycling**
  There is concern about the hazardous materials in electronics. There are data destruction technologies which destroy data from computer hardware. Different states have different regulations for cleaning the hard drives. There is also concern about the fate of precious metals in electronics. Are they candidates for smelting technologies? If the Draft HR bill passes, funds may become available to deal with these issues and may raise this problem to the level of national concern.

  Amy Dindal asked what the different requirements for data destruction were state by state. Since there is no national consensus, folks tend to store their old computers for 4-5 years. Tim Christman (OH EPA) mentioned that a company makes a shredder for hard drives. Some corporations do not think there is any software that is good enough to ensure data is destroyed so they go to shredding. This technology takes hard drives and runs them through the shredder. Robert Giraud said that a technology that would be able to get Hg from compact fluorescent lights would be of interest. Robert Giraud commented that precious metal recovery (platinum, nickel, silver) was widely in practice in the Eastern U.S. and Canada. Tom O'Neill (NJ DEP) knows of a Connecticut operator who runs a smelting facility for precious metal recovery and said he would provide information. Dan Harris said that from a state perspective, high emphasis should be placed on verifying technologies that can do something with electronic waste. We need to make sure waste does not get into landfills. All the stakeholders should collectively look for opportunities in this area.

- **Other Recycling Areas**
  Amy Dindal described the mop that has been developed to mop up oil spills in lube shops and then recycle the oil. David Allaway spoke of anaerobic digestion of food scraps. His office is besieged with requests for information on this. Dan Harris said there is a huge interest in anaerobic digestion of farm waste, food waste, and municipal waste. An Ohio company takes auto fluff and processes it to remove metal. Sara Hartwell said that USDA folks would be helpful in reviewing anaerobic digestion technologies.

  Ramon Simon (Bayer) brought up plasma arc as a technology of interest as it takes organic materials and industrial waste and converts it to gas and energy. He feels that it is underutilized in this country but used extensively in others. There is good work in China looking at dioxin formation from plasma arc. There are a number of different companies with this technology, including plasma arc gasification technologies (technology takes waste and converts it to glass and syngas). In testing for leaching, simulated 100-200 year test showed that nothing leached out. Robert Giraud commented that here in the US, the infrastructure is available for incineration so we are not switching to plasma arc. Robert Phaneuf (NY DEC) said that there was a cost comparison done when plasma arc was proposed and the demonstrated units were found to be smaller and higher in cost compared to incineration. The technology is very energy-intensive, but there was debate about energy recovery. It was concluded that there could be interest in this area but it should include other methods such as pyrolysis, plasma arc, and others. These technologies are energy recovery processes and may fall under the ETV Greenhouse Gas Technology Center. If so, we should not be evaluating them in the MMR Center. It depends on whether we consider the technology one that primarily is used to manage a waste or if it considered waste to energy.

Amy will look into this and get a determination. The link to information on the ETV GHG Center is: http://www.epa.gov/nrmrl/std/etv/center-ggt.html.

- **Wastewater Treatment**
  Draygon Enterprises is interested in testing but has no money for support. The question is, can they handle higher flow rates. Dezavid, a Russian technology for sewage treatment, was also presented. The stakeholders offered no comments, other than these technologies appear to fall under the ETV Water Quality Protection (WQP) Center. These technologies will be forwarded to the WQP Center for consideration.

- **Septic System Remediation**
  Information was presented on Aero-Stream®. In response to Amy's question whether the state stakeholders think there is a problem with septic tanks, Dan Harris replied, yes, there is a need, but this is a MM committee, and he will ask his water program people what they think.

- **Manufactured Soils**
  Dan Harris commented that it is important to make a distinction between blended industrial waste, which will grow things well or have a use niche, and wastes that have been chemically altered to produce useable soil. Leslie Karr (U.S. Navy) has worked with Dr. Lee from RSMT on dredged material, which is of concern to the Navy. She said their patent is pretty broad. They look at your waste and blend them to make useable soil by binding some of the toxic metals. Dan Harris said we should evaluate how they determine the recipe. The recipe will change depending on the waste stream of the client. What sort of verification can you conduct? The vendor is interested in applying their technology to metals mining sites. Leslie Karr replied that this is what she thought of when the subject of manufactured soil was raised. People know about this technology. Will it only deal with part of our dredged material? What else can we use? Contaminants (PCBs, dioxins) bind or are treated to get a beneficial product, e.g., road aggregate, concrete. In general, there was stakeholder interest in pursuing this area further.

- **Nutrient Recovery from Municipal/Animal Sewage**
  No interest from the stakeholders in this area.

- **Other Technologies**
  Dan Harris brought up coal combustion waste, which is getting to be a national issue. A local Ohio company is making wallboard quality gypsum from waste, and he will provide additional information on this. Teri Richardson mentioned coal fly ash. Sara Hartwell has information on a multistakeholder consortium on coal combustion products. Sara forwarded the link to their website immediately following the call:
  http://www.epa.gov/osw/partnerships/c2p2/index.htm.

Review of Action Items

Russ Sirabian summarized as follows:

- Tim Franceschini (Shell): information on Shell's West Hollow Lab (properties of pellets and plastics)
- Battelle: look for technologies for sorting flexible packaging
- Dan Harris (OH EPA): to provide info on vendors/technologies to remove steel belting for tire recycling
- David Allaway (OR DECQ): provide info on Oregon for pyrolyzing tires facility

- Battelle: further pursue technologies for electronics recycling
- Tom O'Neill (NJ DEP): provide information on CT smelting facility for precious metals
- Dan Harris: ask water folks for input on septic system remediation
- Battelle: continue to pursue manufactured soil technologies

Next Meeting
The stakeholders will be polled to find the best date for the next teleconference in June.

Adjourn
Amy Dindal adjourned the meeting at 3:00 pm EDT.

Respectfully submitted,

Russell Sirabian
Maria Gordon
ETV MMR Center