ARI Responses in Bold Type

From Andrew Salvadore 2/16/2009:

Here are few questions regarding the technology. Feel free to forward to him as preparation.

1. Local employment opportunities and other economic advantages?
   ARI would hire local workers to operate and maintain the system. This would require about 15 people for a 24 hr/day operation. The processing system uses fuel, materials, supplies, consulting resources, analytical work, mechanical parts/service, rental equipment, transportation services, etc. all of which would be obtained locally unless unavailable. Many jobs would be created.

2. What are our roadblocks to getting it approved?
   The roadblocks that can get in the way are public opposition, regulatory opposition or lack of funding. ARI can meet regulatory requirements for operating the system so regulatory opposition is likely to be resistance to an option that is more expensive than capping. If you have the support of the community, then this should be less of an issue. We will see on funding.

3. What is his definition of success?
   The definition of success will be clearly defined prior to implementing the project. Typically, the definition of success includes:
   - **Treated product contains zero detectable asbestos**
   - **Off-gas emissions are maintained at or below regulatory standards**
   - **Workers and the community are not exposed to asbestos fibers**
   - **Processing system maintains designed throughput capacity**

4. Safety advantages and benefits?
   All activities that require handling of asbestos take place in an atmosphere-controlled environment maximizing safety. No fibers have ever been detected in the emissions from the system. Work space has never exceeded the OSHA Permissible Exposure Limit of 0.1 f/cm^3. Benefits are that the asbestos is permanently destroyed, a useful recycled product is produced, the asbestos does not need to be hauled for hundreds of miles, and the land is re-claimed.

5. Onsite control of asbestos versus trucking away?
   Maintaining atmosphere control of asbestos handling activities is relatively easy to accomplish with relatively inexpensive equipment and simple procedures. Trucking requires more complicated handling requirements unless the loading of trucks out in the open is allowed (which I would hope not). If trucking were to be performed properly, each truck should be loaded in an atmosphere-controlled environment and

would need to enter and exit this environment through an air lock. The trucks should not be allowed to have any spillage allowed to fall off of the trucks and the loads would need to be secured to prevent blowing of fibers out of the load. All of these factors increase the cost and risks of transportation.

6. # of projects done, where, details?

Electrical 10 ton/day System

Date	Location	Waste	Quantity
Early 1996	Hanford	TSI*	404 yd^3
Early 1996	Hanford	Contaminated Soil	12 yd^3
Early 1996	Hanford	Transite w/TSI	12.7 yd^3
Early 1996	Hanford	VAT*	1 yd^3
Late 1996	Hanford	Duct Inslulation	10 yd^3
Late 1996	Hanford	TSI	269.5 yd^3
Late 1996	Hanford	Contaminated Soil	11.5 yd^3
Late 1996	Hanford	Asbestos Cement	4.5 yd^3
VAT	Hanford	VAT	1 yd^3
Late 1999	PSNS*	Asbestos/PCBs	18 tons
Late 1999	PSNS	Asbestos Waste	7 tons

Direct Fired System in Tacoma

Mid 2002	Tacoma	PCBs	10 tons
Late 2002	Tacoma	Asbestos Waste	11 tons
Early 2003	Tacoma	Wood w/LBP*	5 tons
Late 2007	Tacoma	Asbestos Waste**	~80 tons

*TSI is “Thermal Systems Insulation” for Piping and Ducting
*VAT is Vinyl Asbestos Tile
*PSNS is Puget Sound Naval Shipyard
*LBP is “Lead Based Paint”
** 2007 Project Consisted of Wide Variety of Waste Types

7. Who is his competitors using similar or even different technology?

The only other commercially available technology capable of accomplishing what ARI does is Plasma melting technology which is about 8 times more expensive and uses twice the energy.

From Bud Wahl 2/17/2009:

OK by me. My largest question is what are the economics of eliminating the white Mountains!!In Geo Saurman's day they suggested we build a plant and reduce them???

The economics are determined by three primary factors including local labor costs, energy costs and the size of the processing system. Based upon what I know of these cost factors and assuming that a large processing system would be used, we could expect to see processing costs in the range of $125 - $200/ton range. A more detailed engineering study would be required to further refine these figures. Use of alternative waste fuels (for example used cooking oil) can be used to augment fuel usage and processing costs can be significantly reduced. Use of alternative fuels would require additional regulatory approvals.

Sal, from Mary Jane a good question. What happens to the smoke and steam from the burning process when the material turns to paving material.

There is effectively no "smoke" from this process and asbestos does not burn. However, there is steam and the products of combustion of the fuel (most likely natural gas) to heat the rotary hearth and from the combustion of foreign materials that might be associated with the asbestos (such as wood). These gases are discharged to the atmosphere from a stack. Off-gas from the conversion of asbestos is very clean compared to other environmental thermal processes.

Do we keep the stuff or is there a financial transaction that the company doing the clean up gets to sell it?

We are probably getting a bit ahead of ourselves with this question but the answer is probably up to the government contracting authority that lets the contract. Usually the final disposition of the treated product is left to the discretion of the contractor but I am open to suggestions. I believe that there will be plenty to go around.

From Beth Pilling 2/17/2009:

I notice that the projects listed on the ARI website are relatively old except for the 2007 project dealing with lead-based paint. Unless there are other unlisted projects, I get the impression that the asbestos-related projects were small or of a demonstration type. It would be very helpful to have a description of ARI's asbestos removal projects that have very recently been completed or that are currently in progress. If there are none, it will be important to know why - has the technology proven to be impractical, or has funding been unavailable?

Please see Question 6 above for a processing history table. Historically, the low cost of landfilling and lack of regulatory or legislative incentives for treatment instead of dumping have prevented the use of the technology. This is why ARI has not pursued establishing the process commercially in the U.S. ARI has focused all of its marketing efforts overseas particularly in Europe and Japan where landfill costs are much higher. ARI is currently negotiating the installation of processing systems in the U.K., Australia, Belgium, France, Japan, Korea and Venezuela. Only recently and in specific locations in the eastern and western U.S. have land disposal costs coupled with high transportation costs made this process become more competitive with dumping. Ambler is one of these situations where the situation and economics appear to be favorable. ARI performed a more recent and larger project in 2007 on asbestos which appears in the table above. Detailed monitoring and analytical work from this most recent project is available for review.

I seem to recall a description of a rather similar process that was evaluated but not selected in the ROD for the White Mountains. Can we find out how the ARI process is similar or different from that and if similar, what are current circumstances that would make the process more feasible at this time?

I have not been made aware of this "similar process" that was previously evaluated so I cannot comment on it. Circumstances that make ARI's process appear attractive are:

- **Processing can be safely performed on site.**
- **Hazards and costs associated with transporting the waste long distances are eliminated.**
- **Economics appear to be comparable to that of combined landfilling and transportation costs.**
- **The U.S. has a political administration that is more willing to address environmental issues than in the previous 8 years.**