

Super Critical Water Oxidation and the ACWA Process

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Assembled Chemical Weapons Assessment (ACWA)

- The issue: The proposed incineration of chemical weapons at nine stockpile sites across the United States.
- The advocates in local communities: Opposed the incineration of these toxic chemicals in their communities. Citizens of Kentucky convinced Senator Mitch McConnell that non-incineration technologies could be created to destroy the weapons. Communities banded together to pass a law through Congress which created the ACWA program.

The Journey to Alternative Methods of Destruction for Toxic Chemicals

- The ACWA program put out a request for proposals for alternative destruction methods. Over two dozen proposals were received. Of these, over a dozen were picked to move forward as bench scale projects.
- Eventually seven projects were chosen for more full scale development, the National Academy of Sciences Board on Army Science and Technology was recruited to assess the technologies.
- The challenge turned out to be different than expected in that the energetics were more difficult to destroy than the chemical warfare agents.

The Outcome

- Four of the nine chemdemil sites ended up deploying alternative treatment technologies for the destruction of their chemical weapon stockpiles. The incinerators that were built were very costly and very politically controversial.
- Supercritical Water Oxidation is one of the technologies which came out of this process and is capable of destroying toxic chemicals including difficult to destroy chemicals like PCBs, dioxins, and other persistent bioaccumulative chemicals.

Incineration in California

- In 1990 there were a dozen operating hazardous waste incinerators operating in California and a dozen proposed.
- All the proposed projects were defeated and all the existing incinerators closed by 2000.
- Proposals to site garbage incinerators have met stiff opposition from local communities and efforts to create incentives for incineration in state law have been defeated.
- Significant environmental justice concerns and community opposition to both the costs of incineration and the public health impacts from the emissions make this technology unviable.

California Produces Hazardous Waste that is Incinerated Outside the State

- Due to the serious environmental justice impacts of incineration, many communities in California refused to have their wastes from contaminated sites sent to incinerators in other states.
- These wastes are all eligible for destruction by non-incineration treatment methods.
- Many of these legacy wastes are very toxic: PCBs, dioxins, dieldrin, PCP. These are Stockholm Convention wastes that have been left in place in California.

Super Critical Water Oxidation (SCWO)

- While technological change takes place rapidly in some fields (communication, weapons development, robotics) the market for treatment technologies in hazardous wastes has not seen a great deal of innovation.
- The use of SCWO technology is an innovation which the taxpayers have paid for through the DOD program. Its application to the destruction of hazardous wastes in highly impacted communities would be an innovative pilot project.
- The technology has a pilot plant in California on the General Atomics campus in San Diego which can do pilot tests.

Technology Attributes

- Technologies developed for the ACWA program had to meet a number of innovative criteria:
 - Monitor-ability
 - Hold, Test, and Release Capability
 - Non-incineration
 - Permit-ability under RCRA
 - Community Acceptability

Conclusion

- Supercritical Water Oxidation (SCWO) is one of the technologies that is available to destroy toxic chemicals which is a non-incineration treatment technology and is able to destroy difficult organic wastes.
- A pilot project with SCWO would have a number of public policy advantages including creating the ability for California to destroy legacy wastes which have accumulated in environmental justice communities across the state as well as advancing in-state solutions for difficult wastes.