2007 GLOBAL DEMILITARIZATION SYMPOSIUM AND EXHIBITION

Update on Demil Technology Programs at General Atomics

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Work Sponsors

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BRIEFING OUTLINE

• iSCWO & Hydrolysis overview
• Current technology transition projects
• FY07/FY08 goals
• Conclusions
SCWO

- SCWO destroys organics with no production of NO\(_x\), SO\(_x\), dioxins, furans or greenhouse gases.
- Wastes are mixed with water and oxidized at 3400 psi and 1200F
- Suitable for pumpable organics including slurry mixtures of solid wastes
- Gaseous effluents dischargable to the air
- Liquid effluents dischargable to the sewer

*Environmentally friendly waste processing technology*
History of SCWO

• SCWO technology issues resolved in the 1990’s
• Cost & reliability became impediments to operational demil & commercial applications
• iSCWO developed to resolved cost & operational reliability issues
• iSCWOs now penetrating market for selected demil & commercial applications
• 1st iSCWO undergoing operational tests
ADVANTAGES OF SCWO

• SCWO oxidizes organic wastes
  - Oxidation of a combustible material at temperatures and pressures above the critical point of water, 374°C and 22.1 MPa (3200 psi)
  - Complete oxidation to CO₂, H₂O, and inorganic acids (or salts) for most organic feeds
  - No acid gases, dioxins, furans, or particulates discharge
  - Minimal Gas Discharge - Low NOₓ, SOₓ, CO, and TOC
  - Destruction of organic wastes occurs very quickly

• Process stability
  - Fully automated, easy & safe operation

Ultra clean, environmentally friendly waste processing technology
GA INDUSTRIAL SCWO (i-SCWO)

• Objectives
  - Simplified design targeted at specific applications
  - Low capital cost
  - Easy & quick fabrication
  - Robust, reliable & industrial hardened
  - Easy shipment & installation
  - Small foot print
  - Readily permitted
  - Suitable for 7/24 operation
  - Compatible with future energy conversion, HMRS or special feed prep modules
  - Low risk

  10 ton/day liquid waste processing unit
Hydrolysis

Hydrolysis Production Prototype Plant (HPPP)

Located at Tooele Army Depot
HYDROLYSIS PROCESS FLOW

- WATER
- CAUSTIC
- CADs

HYDROLYZER

POLLUTION ABATEMENT SYSTEM

LIQUIDS AND SOLIDS

GASES

RELEASE

RECOVERY AND DISPOSAL
Hydrolysis Production Prototype Plant

Objectives & Status:
- Designed for demil of aluminum bodied CADs
- Design processing rate = ~2 tons/day
- Design & construction complete
- Checkout & systemization complete
- Optimization testing in progress
- Permitting in progress
- Adding a PAS

Over 360,000 CADs = 80 tons Demil’d
CURRENT TECHNOLOGY TRANSITION PROJECTS

- **Tooele Army Depot (TEAD)**
  - Base Hydrolysis
  - 3 GPM iSCWO
- **Blue Grass Army Depot (BGAD)**
  - 10 GPM iSCWO
- **Alaska iSCWO**
  - 3 GPM iSCWO
Jim Elliott
General Atomics
STATUS OF TECHNOLOGY TRANSITION PROJECTS (TTPs)

- **TEAD**
  - CADs Hydrolysis HPPP
  - iSCWO (3 GPM)

- **BGAD**
  - iSCWO (10 GPM)

- **Alaska**
  - iSCWO (3 GPM)
TEAD TECHNOLOGY TRANSITION PROJECT

- CADs Hydrolysis HPPP
- iSCWO (3 GPM)
TEAD HYDROLYSIS TIP STATUS

- 2006 - Systemization tests & “trial runs”
- Dec 2006 - Received 3 NOVs from UTDEQ
- Jan 2007 - Submitted CAP
- Apr - Jun 2007 - System mods & tests
- May 2007 - UTDEQ approval of CAP
- Jun 2007 - Update Risk Analysis
- Jul/Aug 2007 - Rerunning “trial burns” for UTDEQ
- Oct 2007 - Complete all required UTDEQ actions
- Mar 2008 - Install PAS
- Early 2008 - Permit issuance

Production Demil Operations Early 2008
• 3 GPM iSCWO design complete
• iSCWO skid construction partially complete
• Building complete
• Awaiting further funding
• 10 GPM iSCWO
• Grind/Slurry feed prep system
• Heavy metals removal system
BGAD TECHNOLOGY TRANSITION PROJECT

- **Permitting:** RCRA Part B permit application submittal schedule for Jun07

- **Testing**
  - Completed scale-up tests
  - Performed reactor fabrication tests

- **10 gpm iSCWO**
  - Completed equipment design
  - Completed building design
  - Cleared site for building construction

- **Completed conceptual designs for:**
  - Grind/Slurry system conceptual
  - Heavy metals removal system
ALASKA iSCWO TECHNOLOGY TRANSITION PROJECT

- 3 GPM iSCWO design complete
- iSCWO skid construction partially complete
- iSCWO reactor fabrication nearing completion
- Site purchased - 1 mile from Elmendorf AFB
- Building design work in progress
- RCRA Part B permit application started
FY07 & FY08 Plans

• **TEAD**
  - Complete CADs HPPP operating permit
  - Support CADs demil operations
  - Build & install iSCWO unit

• **BGAD**
  - Obtain RCRA Part B permit
  - Construct the building
  - Start iSCWO construction

• **Alaska**
  - Submit RCRA Part B permit application
  - Complete iSCWO construction
  - Complete building construction

• **R&D**
  - iSCWO energy recovery
  - Acid hydrolysis
  - Analysis & testing of other munitions for hydrolysis
CONCLUSIONS

• Current Technology Transition Projects (TTPs) are all going well

  - TEAD CADs Hydrolysis Facility
  - TEAD 2 GPM iSCWO facility
  - BGAD 10 GPM iSCWO
  - Alaska 3 GPM iSCWO