

Buddy Webster tells what's new at CR&E!



In this Issue...

- PUCDF 35% Design Support For the MPF & DFS
- CWD Conference
- TOCDF Trial Burn Support
- TOCDF Preoperational Survey Support
- UMCDF Secondary Waste Simulations
- Carbon and Sludge
- Anniston Systemization Engineering Support



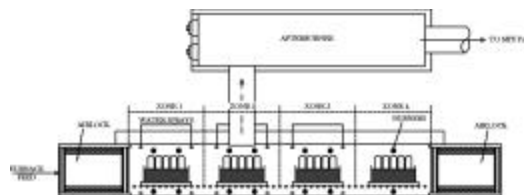
PUCDF 35% Design Support For the MPF & DFS

Over the last year and a half, Continental Research and Engineering (CR&E) engineers have been working with SAIC and Jacobs Engineering in development of a modified baseline incineration facility design for disposal of the chemical munitions stockpile at the Pueblo Army Depot. A 35% facility design was completed through these efforts.

CR&E developed furnace and Pollution Abatement System (PAS) designs for the modify facility. The Pueblo Army Depot stockpile consists of munitions containing only mustard agent. This was combined with CR&E's operating plant experience to develop equipment designs that are simpler, less expensive to build, more reliable and have a higher processing rate than existing baseline facilities. Key elements of the facility include:

- Only two furnaces (one MPF and one DFS) are utilized for the processing of munitions and energetics.
- The munitions are not drained prior to processing, eliminating the need for a LIC furnace and all associated agent draining and storage equipment.
- Munitions are frozen prior to processing to minimize equipment contamination when accessing the agent cavity.

- A four zone MPF is used, increasing munitions processing rate by approx. 30%.



- A modified DFS is used which eliminates the need for a Heated Discharge Conveyor (HDC) to achieve 5X decontamination of processed parts.

The design effort entailed completion of General Arrangement, Process Flow and Piping and Instrumentation drawings for both furnaces and their associated Pollution Abatement systems. System start-up and shutdown procedures, functional specifications, Functional Analysis Workbooks and detailed mass and energy balance calculations were also completed for these systems.

CR&E hopes to utilize the information developed during this design effort to support the baseline incineration facilities in improvement of their operations.





2002 International Chemical Weapons Demilitarization Conference

CR&E attended the 2002 Chemical weapons demilitarization conference in The Hague, Netherlands. The conference is a source of information on the chemical weapons demilitarization international market. Although the United States appears to be leading all countries in the destruction of chemical warfare weapons the rest of the world is starting to take notice and are proceeding in destruction of their chemical weapons stockpiles.



The Hague is noted for tulips and flower gardens, prior to the start of the conference, Gary McCloskey, Col. Lesniak, Steve Depew, Jay Markarian and Buddy Webster toured the tulip gardens in Belgian. The tour was slightly late in the season but the gardens were still extraordinary. No one enjoyed the tour more than Steve Depew, I'm sure Steve will return to the gardens soon.



EG&G DEFENSE MATERIALS, INC.

TOCDF Trial Burn Support

CR&E is assisting EG&G in preparation for the Toole Chemical Demilitarization Facility (TOCDF) VX Trial Burns. CR&E is currently reviewing Sop's, required modifications, agent quantification system calibrations, management plans and setting up the schedule for the performance of the trail burns for the Deactivation furnace, Liquid Incinerator, and Metal Parts Furnace. The VX rocket DFS trial burn will be the first to be completed. The scheduling must be precise to allow for

furnace shakedown, operator training and performance of the test within a limited period of time. Additionally the trial burns for the Metal Parts furnace and the Liquid incinerator will follow closely behind the Deactivation Furnace trail burn.



TOCDF Preoperational Survey Support

CR&E has provided EG&G technical support during the corporate preoperational survey's for processing VX rockets and VX Ton containers. CR&E's Buddy Webster and Jill Lozis participated in the VX rocket pre-op. and reviewed SOP's, safety procedures, hazard analysis, operational activities, power outages and contingencies.

CR&E's Buddy Webster participated in the VX ton container corporate preoperational survey. During this pre-op. SOP and operational procedures were reviewed to prepare TOCDF for co-processing VX ton containers while processing VX rockets.

During both preoperational reviews, CR&E worked with a team of individuals from throughout the demilitarization industry to assist TOCDF in being prepared for the start of the VX campaign. EG&G is currently working through the last of the deficiencies and state regulator requirements prior to starting the campaign.



UMCDF Secondary Waste Simulations



As the Umatilla Chemical Demilitarization Facility (UMCDF) proceeds with processing chemical agent and weapons, it was recognized that secondary wastes would be generated during normal operation and maintenance activities. CR&E has been working with Washington Demilitarization

Company (WDC) to evaluate the processing of these secondary wastes in the Metal Parts Furnace (MPF), Liquid Incinerator (LIC) furnaces and the Deactivation Furnace System (DFS) so that the processes may be permitted for these activities.



In order to evaluate the practicality of processing these secondary wastes, their combustion characteristics had to be identified by research or laboratory analyses prior to being incinerated. CR&E worked in conjunction with Hazen Research, Inc in Golden, Colorado in testing samples of these wastes to determine the amount

of heat release that would be generated upon combustion and the elemental breakdown of the materials. The assays included determining the amount of residue that would remain after combustion. CR&E and Hazen also conducted several tests in an active furnace to evaluate the destruction method and the time required to achieve complete destruction of certain secondary waste samples.

For every secondary waste being considered for each individual furnace system, a thorough analysis of was completed to determine combustion efficiency and carbon monoxide generated, relative to agent. Further studies for the secondary wastes proposed for the LIC, those that are in liquid form,



were completed to determine if the physical properties of the liquids presented any compatibility or performance problems with the existing spray nozzles. This included an evaluation of the droplet

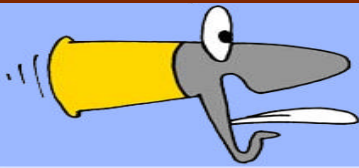
size distribution produced by the spray nozzles and the evaporation rate of the resulting droplets to determine if the rate of destruction was consistent with the residence time in the furnace. Field tests were conducted using the actual spray nozzles from UMCDF at an independent location to verify the results of the study. This information was critical to the site in completing and justifying the permit modification. These characterizations enabled CR&E to complete detailed mass and energy balances that would determine the necessary operating parameters for the furnace, optimum feed rates, and other



combustion behavior.

GB
105MM
4.2 IN
8 IN
VX
WETEYE
MINES HD
TC
750 lb





Carbon and Sludge???

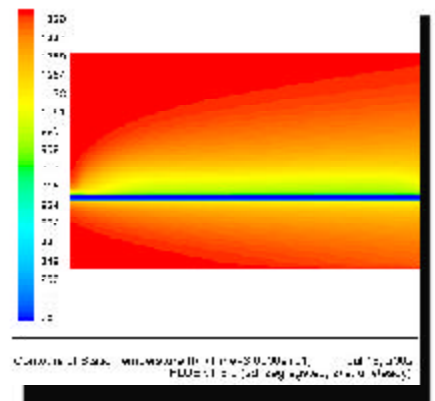
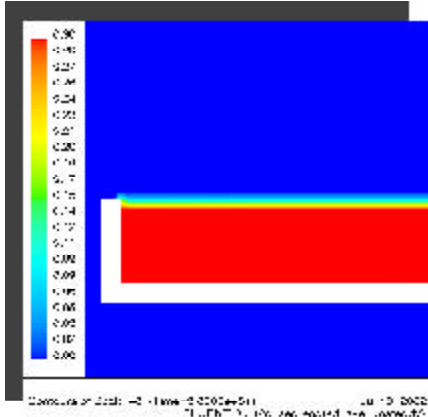
One of the wastes generated at the chemical weapons facilities is carbon from the HVAC filtration systems. Sludge waste is also generated. Both of these are contaminated with water, which has a significant impact on the duration of heat-up.

In addition to the water, the sludge contains a large fraction of solids, which must meet the US Army's criteria of "5X." This criteria requires materials to be heated to a minimum temperature of 1,000 °F for 15 minutes. One of the difficulties is determining the time for all the material to reach the 1,000 °F minimum.

Computational Fluid Dynamics provides insight into the heat transfer of the medium in question. By changing the physical properties of the material and the geometry in question, it is possible to determine heat transfer, boil off time and "5X" time. These predicted values are verified against several experimentally determined points to determine the validity of the model. The

model can then be changed as desired to predict process parameters under new conditions, without conducting expensive experiments.

In this particular study, several two and three-dimensional models were constructed to examine heat transfer and water boil-off within the materials. The results are still being compiled, but the output of the models is depicted here. A carbon or sludge is surrounded by a steel shell, which in turn, is surrounded by hot furnace gas. As this is a transient heat-up problem, temperature and water content are monitored as a function of time. In the upper diagram, hot furnace gases are passing over the tray and carbon. The lower figure illustrates water content within the charcoal. Red indicates 30% water content, the starting value of this particular calculation.



Anniston Systemization Engineering Support



CR&E is providing Westinghouse Anniston (WA) with engineering support during the final stages of systemization. CR&E is currently assisting WA in the following Activities:

- Liquid Incinerator residence time calculation and the residence time venturi indication.
- Liquid Incinerator baseline refractory documentation. Forms have been completed and provided to WA Engineering.
- Overall MPF Systemization support. Providing support to furnace modifications in preparation for surrogate trial burn.
- MPF 5X/thermal capability test plan. The draft plan has been written and provided to WA Engineering.
- Materials confirmation support for scheduled MPF repairs.

The Bullet-in is designed to keep CR&E's customers informed of developments, projects and of CR&E's involvement in the National effort to destroy chemical warfare munitions.

For more information on our operations, please contact our office at (303) 758-7373 or email: cre@cre-denver.com

