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Commander's Update on the RFAAP Energetic Waste Incinerator (EWI) and Contaminated Waste Processor (CWP) Combined Facility

Background

The Radford Army Ammunition Plant (RFAAP) is a U.S. Army-owned facility that specializes in the production of military grade energetics. Throughout the manufacturing process, as with most manufacturing facilities, waste is generated. However, unlike most facilities, the waste generated at the RFAAP is contains hazardous combustible energy due to its energetic nature. Because of this, shipping waste over the road carries safety and environmental hazards.

There are two primary types of waste: Energetic Waste (EW) and Energetic Contaminated Waste (ECW). The EW generated at RFAAP comes from multiple sources, such as process waste (shavings), rejected material, pit waste, and other direct process sources. It typically meets one of multiple hazardous waste classifications under the Resource Conservation and Recovery Act (RCRA). ECW originates more typically from material handling sources, such as pallets, filters, hoses, pipes, gloves, pails, etc., that are contaminated with energetics, but are not typically classified as a RCRA hazardous waste. Currently, all EW is either incinerated at the existing Energetic Waste Incinerator (EWI) facility or at the open-burning grounds (OBG). Both of these facilities are permitted under the Virginia Department of Environmental Quality (DEQ) hazardous waste program.

The ECW must be visibly inspected to verify if it is contaminated, and physical samples are often taken to on-site labs for analysis. Once deemed contaminated, it must be appropriately decontaminated by either labor intensive non-thermal means or by thermal decontamination in a natural gas-fired decontamination oven. Once this decontamination process is complete, the ECW can be sent to any local transfer station or landfill.

Recognizing the aging condition of the EWI and echoing the public's desire to reduce the amount of open burning, the U.S. Army have initiated a program to design and erect a facility that can incinerate more than 95 percent of RFAAP's EW and ECW. Furthermore, the new facility will consolidate the processing of all EW and ECW into one air-pollution controlled facility that is more efficient than the existing operation.

Program Overview

The current EW and ECW operations are not the preferred means of managing the energetic process waste streams at RFAAP. Although the EWI technology in use is still very much the standard for incineration, we plan to replace the facility with a modernized system, subject to the availability of funding. The operating contractor coordinated with reputable consultants and leading design firms to design the next generation EWI-CWP Combined Facility for RFAAP. All designs were required to comply with the core values noted below.

1. Safety. Safety shall be the primary consideration for, but not limited to, each major stage (material handling, incineration, etc.), each component, each process, total operational process, and all employee interaction required to operate and maintain the facility.
2. Environmental Compliance. The design shall, at a minimum, be in compliance with all Federal, State, and Local environmental laws, rules, and regulations that will be in effect at the time of design acceptance by the operating contractor, and if any known future changes have been published that could go into effect within three (3) years past the official design completion date, the design shall be in compliance with those as well.
3. Waste Load & Operating Schedule. The new facility shall be capable of processing all known EW and ECW waste currently generated at the RFAAP, plus fifty (50) percent additional load for future use and/or make-up time following scheduled and unscheduled shutdowns. The new facility shall be designed to annually process all of the design waste and will be capable of running twenty-four (24) hours per day seven (7) days per week.

All bidders were also required to provide two possible incineration configurations that could achieve the following two critical requirements:

1. The new facility must reduce the amount of natural gas required to process the waste.
2. The facility must be designed to process future variants of existing energetic products produced at RFAAP.

Other requirements for the new facility included some level of incineration unit redundancy; a decontamination oven large enough to fit pipes and other larger equipment; a decontamination oven approximately the size of a household oven to efficiently decontaminate smaller tools and equipment; and an automated continuous waste feed-system for continuous incineration over a shorter time as opposed to batch feeding spread over three work shifts. For RFAAP, batch feeding is impractical because the manpower requirements would lead to increased worker exposure. In

addition, the volume of waste generated would be more efficient to treat in a continuous operation versus one that requires frequent startup and shutdown for batch generation.

The operating contractor, with the assistance of a third-party incineration expert, selected a potential winning bidder based upon the preliminary conceptual proposals. In addition to the required decontamination ovens, the potential winning bidder presented the following two systems:

1. Kiln system similar to the existing units, but with a more efficient and robust material handling system (kiln technology remains an industry standard)
2. Down-fired incinerator system: The down-fired incinerator is the leading choice for the new facility as it has many attractive attributes that meet or exceed the requirements put forward to the bidders.

Advantages of a Down-Fired System:

1. It has less moving parts, which typically translates into less energy to operate and maintain, and less operational downtime. Unlike a rotary kiln, the incineration chamber is static and waste material is largely transferred via gravity through the combustion process.



2. The interior walls of the incineration chamber are lined with ceramic tiles as opposed to refractory brick. Ceramic tiles can be heated and cooled more quickly and more frequently than traditional refractory brick, which will allow the system to be shut down completely and provide for quicker restart, resulting in less fuel usage.

3. Material handling requires less preparation and requires a minimal amount of deluge water in the material handling process.

4. Residence time is typically lower than that of kilns, which should improve the material feed and processing rate, respectively.

5. The higher operating temperature of the down-fired unit eliminates the need for an afterburner/thermal oxidizer to ensure organics destruction, further lowering fuel usage.

Summary

In summary, the U.S. Army is working toward a safe, efficient, and environmentally-friendly solution for the management of RFAAP's onsite solid and hazardous wastes. While the design of the system is not finalized, many of the system requirements proposed in the bidding process and confirmed by our technical experts and bid responses, show promise towards realistic achievement of our strict design and quality standards. The U.S. Army has taken deliberate and methodical steps to clearly define the needs of the new EWI-CWP facility as it pertains to both the plant and the local and global environmental impact. The new facility will significantly benefit both.

Next Steps

The design for the new facility will start in 2016. During this process, the detailed design elements and technologies will be selected and combined into a single package that will be used for construction. When the design matures, a permit application for the new facility will be submitted to the Virginia Department of Environmental Quality (VADEQ). Construction could begin as early as 2017, depending on design success, permitting, and funding. Improvements and upgrades to the current incinerators will

The image above shows a down-fired incinerator system that may be similar to the system selected for RFAAP. The new RFAAP incinerator will be custom -designed to satisfy specified design requirements.

continue until the new facility is completed. Updates on this and other RFAAP projects will continue to be discussed at our public meetings.