

## CH2M HILL Team Responses to Questions from EPA

### Technology

**1) Please provide a detailed description of your technology.**

Response: CH2M HILL and its technology team partner are participating in a competitive procurement. Technology details are considered proprietary at this time. Additional details can be made available to EPA if procedural requirements are implemented to safeguard the confidential nature of the information. A Propellant Tunnel Furnace with integrated Pollution Abatement System is proposed. Thermal treatment will be completed using a natural gas fired Thermal Oxidizer with integrated combustion air fan to provide the necessary air to fuel ratio for a completely oxidizing environment. This helps to ensure the complete thermal destruction of all organic species of concern and products of incomplete combustion. The fully automated system will offer waste feed cutoffs, stop feeds and safety features.

**2) Please include a process flow diagram.**

Response: CH2M HILL and its technology team partner are participating in a competitive procurement. This information is considered proprietary at this time. Additional details can be made available to EPA if procedural requirements are implemented to safeguard the confidential nature of the information.

**3) What are your utility needs (daily quantity)? (i.e., fuel, electricity, water, etc.)**

Response: Natural gas, electricity and water.

**4) Other than M6 and fuels, what quantity of other raw material or treatment material you will use (major materials only; no proprietary chemical information) in your treatment process.**

Response: There are no other major materials required for the treatment process.

**5) Any special needs required?**

Response: No special needs required.

**6) What are the controls in place to prevent an explosion, excessive heat, or uncontrolled reaction?**

Response: All standard protocols for explosives handling will be in place including protocols for mitigating static discharge, spark and moisture control.

**7) What pretreatment (i.e., grinding, slurry, etc.), if any, is required? Please provide a detailed description.**

Response: Other than wetting, no pretreatment is required.

**8) How will the propellant be handled prior to treatment?**

Response: The propellant will be transported to the Loading Area where the propellant will be wetted, weighed, and conveyed to the tunnel furnace.

## Equipment

**1) Detailed description of each piece of equipment. This includes pollution control equipment.**

Response: CH2M HILL and its technology team partner are participating in a competitive procurement. Technology details are considered proprietary at this time. Additional details can be made available to EPA if procedural requirements are implemented to safeguard the confidential nature of the information. CEM systems are manufactured by several vendors. The equipment employed will be certified to meet the air emissions requirements of the Agency.

**2) Describe Siting and footprint requirements. (i.e., distance between multiple units, etc.)**

Response: There is ample room at Camp Minden to safely install and operate the tunnel furnace. The actual spacing of the equipment, proximity to magazines and utility connections, will conform to the requirements of the work plan and safety plan (including DoD 4145.26-M and DoD 6055.09-M) and will be finalized during the planning phase of the project.

**3) Any specialized equipment for handling/transporting and/or pretreating the propellant?**

**Please describe.**

Response: Our feed system will incorporate equipment and processes for wetting the propellant prior to thermal treatment.

## Relevant Experience

**1) Please describe your direct experience in handling and treating bulk M6 Propellant. This description should include volumes, where, and was it a bench scale or full scale operation.**

Response: Our Team partner, Expal USA, has experience at Camp Minden removing Tritonal from the same storage magazines that currently house the M6 propellant and CBI. They have a detailed understanding of the condition of material and how to move the material safely to the treatment area using already approved standard operating procedures. In several instances, Expal USA personnel have already had to move M6 and CBI to be able to access the Tritonal included in their existing SOW.

**2) Please describe your experience in handling and treating bulk propellants similar to M6. This description should include volumes, where, and was it a bench scale or full scale operation.**

Response: See response to above.

**3) Describe how you will manage/handle the M6 and CBI from bunker to disposal of the waste generated in your process.**

Response: Our team partner, Expal, has safely handled M6, M30, Tritonal and other explosive materials at Camp Minden without incident. We will fully describe our waste handling process, including the use of proprietary explosive materials assessment tools, in our proposal to the LA Military Department.

**4) Do you have sufficient capital to build all of your facilities prior to receiving funds from Louisiana National Guard?**

Response: Yes. However, in order to maintain an acceptable cash flow for this project, CH2M HILL expects to be paid based on achieving interim milestone payments which reflect reasonable progress toward meeting the overall project performance objectives.

**Capacity & Throughput**

**1) What is the throughput of an individual unit on an hourly basis?**

Response: This information is considered proprietary at this time. Our preliminary design is a dual furnace system that optimizes throughput based on a cost benefit analysis. Additional details can be made available to EPA if procedural requirements are implemented to safeguard the confidential nature of the information.

**2) Can this technology operate 24/7?**

Response: Yes

**3) For a Batch process, describe the time for each batch, and break out the loading and unloading time along with the actual treatment time.**

Response: Our technology has been designed as a continuous feed process.

**4) How many units will be used?**

Response: Two

**5) What kind of maintenance is required and how long will the unit be off-line?**

Response: We have conservatively estimated a production uptime, taking into account time for maintenance, weather delays or other factors. We don't foresee any down time with 2 units running simultaneously, 24-7.

**Waste**

**1) Describe in detail the continuous air monitoring equipment used for this technology.**

Response: CH2M HILL and its technology team partner are participating in a competitive procurement. CEM details are considered proprietary at this time.

Additional details can be made available to EPA if procedural requirements are implemented to safeguard the confidential nature of the information. The proposed off-gas treatment system consists of, a thermal oxidizer to burn condensable and non-condensable gases formed in the combustion zone followed by chemical treatment to remove NO<sub>x</sub>, if required, and removal of fine particulates by filtration before the flue gas is emitted to the atmosphere through the stack.

**2) What is the maximum Destruction and Removal Efficiency of organics on an ongoing basis and how will you ensure that it is met?"**

Response: Destruction of organics occurs through the thermal treatment of M6 and CBI in the tunnel furnace. Additionally, the off gas system will removes 99.999 percent of emissions through a rapid quench process which eliminates the re-formation of organic compounds in the flue gas.

**3) What is the estimated overall volume of waste from this technology? This includes all waste streams – air, water, and solids.**

Response: The solid waste streams generated as a result of our proposed treatment process will include ash and off-gas treatment system residues/filters. Assuming that an estimated 15,700,000 lbs of M6 and 320,000 lbs of CBI require treatment, our process should yield approximately 80,000 lbs of ash using a conservative estimate of 99.95 percent efficiency.

Preliminary calculations indicate that the off gases and resulting hourly emissions to the atmosphere, after emission controls, from the burning of M6 propellant and the natural gas are:

- Carbon monoxide < 10 lbs
- Nitrogen oxides < 10 lbs
- Particulates < 1 lbs
- Methane < 1 lbs
- Non-methane hydrocarbons < 1 lbs

These quantity calculations are under quality control review and should not be considered final at this time. Off gas emission controls include: direct fire thermal oxidization, selective non-catalytic process to remove NO-X (NO<sub>2</sub> and NO) and bag house filtration to remove particulates.

**4) How will you monitor/sample for each constituent in M6 and CBI in your waste stream?**

Response: With respect to the solid waste stream resulting from the treatment process, a waste analysis plan is being prepared for our proposal. For initial and complete characterization, TCLP VOCs, TCLP SVOCs and TCLP metals, explosives and dioxin/furans are being contemplated. For air emissions, Continuous Emissions Monitoring is proposed. The CEMS we have specified measures O<sub>2</sub>,

CO, and CO<sub>2</sub>. If required by the State, a Trail Burn will be conducted IAW EPA protocols for organic compounds.

**5) What are the plans for disposal of wastes generated by this technology?**

Response: Off-site disposition at an appropriate, permitted disposal facility.

Health and Safety

**1) Please describe any unique health and safety issues associated with the technology. This will include using multiple units and the potential for a propagating explosion or uncontrolled chemical reactions**

Response: Our technology has been successfully used at a number of installations with numerous types of munitions with no safety incidents. We have not identified any unique safety issues. We will follow available SOP's and safety protocols that have been tried and tested at other sites. They will be included in our proposal to the LA Military Department.