



Mobile Incinerators for Contingency Bases

Through the demonstration and validation of mobile incinerators, the NDCEE will provide Department of Defense (DoD) decision makers, including United States (U.S.) Army Central (ARCENT) and Product Manager, Force Sustainment Systems (PM FSS), with the necessary information to determine if incinerators are a safe and viable option for reducing the volume of non-hazardous solid waste generated at contingency bases.

The primary objectives of the demonstration are to:

- Validate vendors' claims for solid waste incineration capacity
- Evaluate operational requirements and functionality of the incinerators, which can then be assessed against contingency base requirements
- Identify, monitor, and document the potential for adverse human health impacts during mobilization, operation and demobilization
- Quantify the impacts to the environment by analyzing the concentrations of emissions released from the stack
- Evaluate the financial impacts of implementing mobile incinerators at small- to medium-size contingency bases



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Problem Statement

Contingency bases often dispose of waste by open pit burning, which does not promote complete combustion and generates uncontrolled emissions that have the potential to cause adverse impacts to human health and the environment. Mobile incinerators have the potential to safely and effectively dispose of non-hazardous solid waste at contingency bases by applying an engineering control to promote complete combustion, therefore reducing emissions. Before these incinerators can be integrated into contingency bases, it must be determined that they are not only a viable replacement for open pit burning, but also that they will not increase the risks to soldier health or the environment.

Technology Description

Incinerators are designed to promote combustion by operating at higher temperatures with a constant supply of oxygen. In addition, incinerators control emissions to one release point, and some offer two burn stages, which are designed to further reduce the potential for hazardous air emissions.

Stakeholders at PM FSS have identified several small-scale incinerators with the necessary characteristics for deployment at contingency bases. The NDCEE project team evaluated and ranked the identified incinerators using weighted criteria, based on the needs of the contingency bases, as specified by ARCENT and PM FSS. The most significant criteria were: 1) the presence of a secondary burn chamber for removal of Hazardous Air Pollutants (HAPs), and 2) access for safe removal of ash from the incinerators. Additional criteria that were considered were mobility considerations such as the footprint and weight of the units, burn rate, capacity, and fuel consumption. The INCINER8 Model A850 (M) was identified as the highest rated incinerator, with the Therm-Tec Model CG-8 rated second.

Demonstration Overview

The demonstration will be conducted using municipal solid waste (MSW) collected and sorted to resemble the characteristics of waste typical to contingency bases. The demonstration site is a MSW transfer station located in Snowflake, Arizona. The highest rated incinerators, INCINER8 Model A850 (M) and Therm-Tec Model CG-8

will be evaluated in the demonstration. Multiple burns will be conducted with the same waste composition in order to:

- Validate vendors' claims for solid waste incineration capacity
- Evaluate operational requirements and functionality of the incinerators, which can then be assessed against contingency base requirements; assess the operational capacity and functionality of the incinerators specifically: mobilization and demobilization requirements, footprint, utility demands, fuel consumption, and throughput of waste
- Identify, monitor and document the potential for adverse human health impacts during mobilization, operation and demobilization including physical hazards, ergonomic issues, anthropometric design, thermal stress, and noise
- Quantify the release of constituents into the environment, including: Particulate Matter (PM,PM2.5,PM10), Sulfur Dioxide (SO2), Oxides of Nitrogen (NOx); Carbon Monoxide (CO); Polynuclear Aromatic Hydrocarbons (PAH); Total Hydrocarbons (THC); Hexavalent Chromium (Cr (VI)); Metals; Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), Hydrogen Bromide (HBr); Chlorine (Cl2), Bromine (Br2); Acrolein; Volatile Organic Compounds (VOC); and Polychlorinated Dibenzodioxins (PCDD)/Polychlorinated Dibenzofurans (PCDF)/Polychlorinated Biphenyls (PCBs)
- Quantify operator exposure to constituents including: VOCs; PAHs; Particulates (Respirable and Inhalable); Metals (Respirable and Inhalable); Naphthas; Formaldehyde; Acrolein; Acetaldehyde; HCl, HCN, HF; Benzene, Toluene, Xylene; and Vinyl Chloride; Compare the data to regulatory standards established by OSHA, as well as guidelines established by NIOSH, and the American Conference of Governmental Industrial Hygienist (ACGIH)
- Quantify exposure to the above constituents for people working near the incinerator by collecting area samples
- Complete a Toxicity Characteristic Leaching Procedure (TCLP) and solids analysis to characterize ash produced from the combustion of the MSW
- Complete an analysis of the financial impacts and feasibility of implementing the INCINER8 Model A850 (M) or Therm-Tec Model CG-8 incinerators at contingency bases, using the Environmental Cost Analysis Methodology (ECAM®) methodology

Technology Benefits and Advantages

- Potential to reduce soldier exposure to uncontrolled emissions
- Small size and mobility make them more applicable for contingency bases

Technology Limitations

- Set up and operation of the incinerators may require more operator training and equipment maintenance than currently required
- Incinerators require electricity and fuel to operate
- The volume of waste incinerated is less than with open pit burning

Technology Transition Opportunities

- Results of the demonstration will be reported in a Final Report, with an anticipated completion date of September, 2012. Technology transfer opportunities will be dependent on the incinerators' ability to safely and effectively incinerate the MSW typical of contingency bases.

Points of Contact

- John Horstmann, ARCENT, 803-885-8206, john.horstmann@arcent.army.mil
- Joe Jackens, NDCEE/CTC, 814-269-2589, jacksonj@ctc.com



INCINER8 Model A850 (M) provides a secondary burn chamber to reduce air emissions.



Therm-Tec Model CG-8 is constructed within a shipping container for ease of movement.



Therm-Tec Model CG-8 (Incinerator and Fuel Storage)