

TWRA Deer Carcass Incinerator Specifications Draft

The Tennessee Wildlife Resources Agency will establish an animal crematory for the purpose of incinerating deer carcasses for the appropriate disposal of potentially infectious material associated with Chronic Waste Disease. The crematory will be housed within a dedicated building in Fayette County Tennessee and will be operated by the County and its employees. This solicitation will be for the procurement of the Deer Carcass Incinerator.

Equipment:

Minimum Rated Capacity: Incinerator should be rated at a minimum of five-hundred (500) pounds per hour of one-thousand (1000) British Thermal Units ("BTU") per pound waste operating at 1000°C (1832°F) for up to sixteen (16) hours a day.

The Minimum Rated Capacity Incinerator shall include two chambers: Upper and Lower/Primary and Secondary. The incinerator operation shall be fully automatic and intended for incineration of high moisture content waste including bedding, animal carcasses, and other prion disease tissue. The incinerator shall be constructed with reliable, industry standard components. All doors shall be safety interlocked with provision for padlocks. Burners and hydraulics must require a key for operation as a safety and security measure. Waste reduction of animal remains shall be a minimum of 95% by animal weight. Startup, loading, purge, and preheat shall be automatic.

Combustion Chambers and Burners:

Natural gas and electricity will be the ignition and burn system.

Primary Combustion Chamber: Four (4) Eclipse 750,000 BTU natural gas burners, or equal. Burners shall have direct spark ignition and ultraviolet ("UV") scanner flame protection. Primary burner shall have interlocks to ensure safe operation; switches must be in the on position, load and unload doors must be proven locked, start-up and pre-purge interlock. Chamber heat release shall not exceed 15,000 BTU/cubic foot/hour. Minimum 233 cubic feet chamber volume. Minimum 48" x 24" load door on side of chamber. Minimum 66" large animal feed and ash removal opening on the end of chamber. Minimum 76" x 8 1/4" thick refractory lined unload door hinged on structural bearings, safety interlocked to burners and with padlock provisions.

Hearth Area: Minimum of 40 square feet, insulated. Refractory dam shall allow liquids up to 9" deep to collect in the primary chamber without leakage. Minimum chamber shell dimensions: 85" x 137". Chamber lined with a minimum 5" 2,550°F refractory, 1" board insulation, and shell constructed of 3/8" & 3/4" American Society for Testing and Materials ("ASTM") A36 plate steel. Shell constructed of minimum 3/8" & 3/4" ASTM A36 plate steel. A minimum 1/8" outer jacket shall be provided with a 3" air gap between shell and jacket. The air jacket shall be aspirated by

combustion air resulting in preheated combustion air, improved efficiency, and cooler shell temperatures.

Secondary Combustion Chamber: One (1) Eclipse 3,700,000 BTU/hour, or equal, modulating natural gas burner with 10:1 minimum turndown ratio for burners. Burners shall have direct spark ignition and UV scanner flame protection. The fuel train(s) shall be equipped with 2x main fuel valve with proof of closure (“POC”) switches, fuel modulator with proven low fire start (“LFS”), hi and low gas pressure switches, and manual ball valve. Secondary burner interlocks to ensure safe operation; switches must be in the on position, load and unload doors must be proven locked, start-up and pre-purge interlock.

Shall include a 10 horsepower backward inclined combustion air blower driven to generate a minimum of 2200 standard cubic feet per minute (“SCFM”) combustion air at 15” water column (“WC”) static pressure. The combustion air blower shall supply high pressure air to the fuel burners, the secondary chamber combustion air manifold, and shall be equipped with seven (7) modulating butterfly dampers. The dampers shall be actuated by seven (7) Honeywell™ modulating motors, or equal, to provide modulated combustion air to the primary burners, secondary burner, and to the secondary combustion air manifold. This fan shall be equipped with an inlet silencer to reduce the noise level.

The secondary combustion chamber shall also include an internal combustion air manifold with approximately 40 combustion air input jets. Combustion air manifold and air jets shall be embedded in the refractory lining of the secondary chamber. The combustion air manifold shall be a minimum of 52 square feet of heating surface and shall employ wasted energy lost through the secondary chamber shell to preheat secondary combustion air. The combustion air manifold shall be fabricated of 1/4” minimum A36 steel plate. Air jets shall be arranged for optimum combustion air turbulence. Air jets shall be fabricated of minimum 1” schedule 80 pipe.

- 211 cu. ft. Secondary chamber volume.
- 2.0+ Second secondary chamber residence time @ 1800°F.
- Dimension: 78.5” O.D. x 134” L.
- Chamber lined with 5” 2550°F refractory+ 1” board insulation.
- Shell constructed of 3/8” ASTM A36 plate steel.

Incinerator Waste Feeder:

Incinerator hydraulic loader shall include 35 cubic foot hopper approximately 30” h x 48” w x 54” l with a fire door, hopper lid, hydraulic pump, cylinders, cart up-ender, and at least two matching carts or totes. Approximate overall length shall be minimum 106”. Auto feeder assembly shall be inclined at a minimum of 1° into the primary chamber for drainage. Hopper opening shall be 44” x 38” minimum and have sufficient stroke to push waste 12” beyond fire door. A spray mist system shall be included for fire protection and post feed cycle rinse. Minimum 8.25” thick refractory lined fire door with dual heat shield. Hinge-type hopper lid with

rope gasket. Fire door shall be sealed with rope seals. Automatic reverse and recycle and upon ram jam or fire door failure to close. Operation of loader may be manual or automatic.

Ash Removal:

Shall include a 66" minimum large animal feed and ash removal opening at the end of chamber. Shall include a refractory lined unload door, hinged on structural bearing, safety interlocked to burners and provided with padlock provisions. Ash removal shall be by high power vacuum, fitted with drum adapters and two 55-gallon minimum drums, metal hose and wand and HEPA filter.

Exhaust Stack:

- Minimum forty (40) foot total height, lined and insulated.
- Particulate \leq 0.1 lbs./100 lbs. waste per hour minimum.
- CO \leq 100 parts per million by volume on dry weight basis ("PPMDV") hourly average
- Visible emission average shall be less than 5% opacity. No visible smoke shall be emitted from the exhaust stack.

Programmable Logic Control ("PLC") System with interface:

Control of loader and cart up-ender, secondary burner, primary burner, flame controls, temperature controls, air blowers, safety and operating interlocks shall be by the PLC. Panel shall include power distribution breakers, motor starters, and Human-Machine Interface ("HMI") display modules. Screen shall also display:

- Primary Temperature
- Secondary Temperature
- Time remaining to the next load cycle
- Burner firing rate
- Hydraulic Pressure
- Combustion air input rate.
- Charge ram position.
- Burner Enable time remaining.
- Blower Enable time remaining.

General Contractor Requirements:

Contractor must provide five (5) printed sets of operator and maintenance manuals.

- All program data for programmable devices
- Printout of actual programs
- All pressure, timer, switch, regulator, etc. recorded settings

- Electrical schematics with part numbers
- Piping schematic with part numbers
- Hydraulic schematic with part numbers
- Burner and combustion air piping schematic with part numbers
- Systems description
- Alarm listing and corrective procedures
- System overview drawings
- Technical bulletin of every device included in system
- In English
- Spare parts listing and prices

All equipment must meet industry standards as well as EPA and other government regulators.

Contractor must warrant and represent that the equipment will perform in conformance with the specifications set forth in this contract and shall be suitable for the incineration of waste in the capacities set forth in the specifications and will meet or exceed the environmental, safety laws and regulations, and emission parameters presented. The equipment shall be free of material defect for a period of one year.

- Contractor must deliver equipment within 180 days of receipt of Purchase Order.
- Contractor must provide all installation of equipment within thirty (30) days of delivery.
- Contractor must provide onsite training to five (5) employees' after installation to insure successful startup.
- Contractor must provide all preventive maintenance including parts and labor for a period of one year.

Consumables are not covered under the purchase or warranty.