Covanta Fairfax, Inc. (CFI)

I-95 Energy/Resource Recovery Facility

2012 SWANA Waste-to-Energy Excellence Award Nomination
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Title: Facility Manager
EXECUTIVE SUMMARY

The I-95 Energy/Resource Recovery Facility began commercial operation in June 1990. It is Covanta Energy's largest facility, processing 3,000 tons per day of municipal solid waste for a population of more than 900,000 in the Washington, D.C. suburbs of Fairfax County. The facility sells up to 95 megawatts of renewable energy to Dominion Virginia Power Company -- enough energy to meet the needs of over 80,000 homes. It is the first Covanta Energy facility to have a non-ferrous metal recovery system. The facility consists of four nominal 750 TPD refuse-fired boilers and two 63.8-megawatt turbine generators, along with ancillary equipment. Air pollution control equipment includes spray dryer absorbers, fabric filter bag houses, a carbon injection system and a selective non-catalytic reduction system. The heat energy produced during the combustion of municipal solid waste is converted into electricity that is sold to Dominion Virginia Power Company. Ferrous and non-ferrous metal is recovered from the residue waste stream for recycling and is trucked to an offsite metals broker. Ash residue is deposited in the adjacent I-95 Landfill Ash Monofil, owned and operated by Fairfax County.
Covanta Fairfax, Inc. is located on an approximately a 24 acre site within the boundaries of the approximately 503 acres that comprise the I-95 Landfill complex. The area is adjacent to the closed Lorton Reformatory and is now identified on the Fairfax County Master Plan as Laurel Hill Site which is being developed for mixed reuse by the county. It is located 15 miles to the southwest of Washington DC in the Mills Branch Watershed within the larger Chesapeake Bay Watershed. The area is 1 mile to the west of I-95, 2 miles north of the Occoquan River, and 1 mile east of Route 123. The area around the Covanta Fairfax facility can best be described as rural with the Northern Virginia Park Authority owning approximately 430 acres boarding on the west and south sides, and approximately 870 acres boarding on the north. Areas to the east toward Interstate 95 have seen an increase in single family and townhome development over the last 7 years. Additional information on our facility can be found here:
1. Engineering design systems and Technologies:

   a. Describe the Engineering designs and Technologies: Covanta Fairfax, Inc. (CFI) is a municipal solid waste facility that uses mass burn technology to convert Solid Waste into clean renewable energy (electricity) which supplies power to 80,000 homes in Fairfax County. Energy-from-Waste is the most responsible means of solid waste disposal. It reduces the volume of waste which must ultimately be disposed of in an environmentally-friendly manner, generates valuable renewable energy, and results in a net reduction of greenhouse gas emissions when compared to conventional land filling practices.

   MSW is delivered to an enclosed tipping floor and waste receiving storage pit by Fairfax County and private haulers. After the vehicles have been weighed on the scales operated by Fairfax County Division of Solid Waste Disposal and Resource Recovery, the vehicles are driven onto the enclosed tipping floor, where they dump their loads. The refuse storage pit has a capacity of 18,000 tons, equivalent to five days of continuous processing. The facility draws process air thru the enclosed tipping floor and into the operating units destroying any odor. Operations on the tipping floor and loading of feed hoppers is continuously recorded and monitored by the Control Room Operator via high resolution cameras.

   The facility is comprised of four Municipal solid Waste Combustor (MWC) units each rated at 750 Tons per Day (TPD) at a Higher Heating Value (HHV) of 5500 BTU/lb. The units are composed of a Martin Stoker reverse reciprocating grate, Zurn boiler, and Flack Air Pollution Control (APC) systems. The facility utilizes two Alstom turbines each rated at 62MW and sells electricity at 230,000 volts to Dominion Virginia Power (DVP). Solid waste is transferred by overhead cranes from the refuse pit to feed chutes. These cranes, retrofitted in 2005 utilize variable frequency controllers with reverse dynamic breaking actually generating electricity back to the facility when the grapple stops. The refuse is gravity fed onto the feed table and pushed onto the reciprocating stoker grate by computer controlled hydraulic rams. After combustion, the remaining bottom ash residue falls into an ash discharger where it is quenched and cooled. Flyash is recovered from the APC using screw conveyors to prevent fugitive emissions and transfer the flyash to a pugmill ash conditioning system.

   Bottom and flyash are transferred to a belt conveyor and sent over a grizzly scalper that recovers all materials greater than eight inches. The recyclable ferrous component is separated and sold to a scrap dealer. Materials greater than eight inches, and non ferrous, are collected and sent to local C&D landfill. The material below eight inches continues to a rotating magnet for further recycling of ferrous product. The remaining ash is then sent to a non-ferrous system which presently captures the three eighth inch and above non ferrous material. Installation is underway to capture the non ferrous that is minus three eighth of an inch.

   Flue gases are subjected to several pollution control devices designed to remove metals, acid gasses, nitrous oxides, and particulate material prior to the gases being exhausted to the atmosphere. The facility injects ammonia into the operating units to maintain NOx levels, and both lime and water into the scrubbers to condense metals and control acid gasses. The facility also injects activated carbon into the scrubber to control mercury and utilizes dolomitic lime for ash pH stabilization which prevents metals from leaching out of ash while subjected to acid rain. Each combustion train is continuously monitored for furnace temperature, opacity, CO, CO₂, SO₂, HCl, NOx, O₂, volumetric flow and moisture content.
In June of 2012 the Facility is switching from city water supply to reclaimed water. This initiative in conjunction with the County will supply water to the cooling towers from the Noman Cole Pollution Control facility after it has been treated and just prior to its return to the Potomac River. With CFI as the anchor point for this project, the County has been able to supply reclaimed water to the local ball fields and golf course removing nitrogen loading from the river.

b. Describe the operational plan design: Facility began commercial operation in June of 1990. The facility is open 365 days a year and receives MSW seven days a week from 0500 everyday till 1900 during the week and 1600 on weekends. All arriving solid waste vehicle are weighed at an inbound scale. Haulers are required to have a facility permit issued by the County, and are required to adhere to strict rules and regulations regarding the type of acceptable waste they deliver and the methods by which they deliver it. All personnel directly involved in the handling of incoming refuse are trained and instructed on proper waste receipt and handling methods. It is the preferred method of the Facility to unload all vehicles onto the tipping floor and not into the refuse pit directly. Sometimes, due to the nature of the load, the Tipping Floor Attendant may direct the vehicle to unload directly into the refuse pit.

As part of their job function, the Facility personnel working on the tipping floor observe the waste being discharged by the haulers. In addition, on a routine, periodic basis, solid waste trucks are directed to empty their load on the tipping floor for screening.

During heavy delivery hours, trucks dump more refuse to the pit than can be fed to the stokers. The crane operator must arrange, or "stack," pit refuse to allow for efficient delivery truck dumping. This means working towards keeping space open along the pit's front wall where the trucks dump, while stacking excess refuse in other parts of the pit.

The combined Bottom and flyash from the units which is 24% of the incoming weight of MSW is sent to the adjacent ash fill for disposal. The facility performs two TCLP tests on the ash product each year during alternating quarters.

The combustion plan is to feed as close to 32 tons per hour of MSW as possible into each furnace while staying within equipment process limitations and recommendations and within permitted air emissions standards.

The four combustion units undergo planned outages in the spring and fall of every year. Outages are staggered to keep as many combustion units continuously operating as possible.
ENVIRONMENTAL IMPACTS & REGULATORY COMPLIANCE

Covanta Fairfax, Inc. (CFI) is a municipal solid waste facility converting clean renewable energy into electricity which supplies power to approximately 80,000 homes in Fairfax County. Energy-from-Waste is the most responsible means of solid waste disposal. It reduces the volume of waste which must ultimately be disposed of in an environmentally-friendly manner, generates valuable renewable energy, and results in a net reduction of greenhouse gas emissions when compared to conventional land filling practices.

Air Pollution Control Equipment includes: Semi-dry flue gas scrubbers injecting lime, fabric filter bag houses, nitrogen oxide control system, mercury control system, and continuous emissions monitoring (CEMS) systems to measure stack emissions. The stack instrumentation is calibrated daily and undergoes a quarterly calibration gas audit (CGA) to verify accuracy. Additionally, federal and state regulations require a rigorous Relative Accuracy Test Audit (RATA) utilizing a third party to document the instrumentation data.

Opacity monitors are installed on each stack and operate continuously to monitor visible emissions. These monitors are calibrated daily and are subject to a quarterly audit test to verify linear response. Particulate emissions are tested annually by a third party contractor and the test results reported to federal, state, and local agencies to demonstrate compliance with applicable permit limits.

The facility has a spotless environmental compliance history from state and federal inspections and can be reviewed on the USEPA Enforcement & Compliance History Online (ECHO) here:

Covanta Fairfax, Inc.’s (CFI’s) I-95 Energy/Resource Recovery Facility (I-95 E/RRF) has a fully implemented environmental management system (EMS) that meets the requirements of the United States Environmental Protection Agency (EPA) former National Environmental Performance Track (NEPT) program and the Exemplary Environmental Enterprise (E3) level of the Virginia Environmental Excellence Program (VEEP), as well as Environmental Enterprise (E4) level of VEEP. The following core elements comprise the facility’s EMS:

- EMS Scope, Environmental Policy, and EMS Documentation;
- Roles and Responsibilities (EMS-001);
- Legal and Other Requirements (EMS-002);
- Environmental Aspects (EMS-003);
- Objectives, Targets, and Environmental Management Programs (including the Pollution Prevention Program) (EMS-004);
- Communication (EMS-005);
- Change Management (EMS-006);
- Operational Controls and Monitoring (EMS-007);
- Emergency Preparedness and Response (EMS-008);
- Document Control (EMS-009);
- Records Management (EMS-010);
- Training, Awareness, and Competence (EMS-011);
- Audits (EMS-012);
- Corrective and Preventive Actions (EMS-013), and
- Management Review (EMS-014).
Covanta Fairfax Environmental Policy

We will operate in an environmentally sound manner protective of employee health and safety. We will comply with our own environmental, health and safety policies and standards and all applicable environmental, health and safety laws and regulations governing the Company's business. Management will establish appropriate standards for environmental protection, health and safety. In the absence of clearly defined environmental, health and safety laws, regulations or standards, seek guidance from your immediate supervisor or Corporate General Counsel. We will keep accurate records pertaining to environmental, health and safety matters as required by law or regulation and our own policies.

Our environmental policy is embodied in five principles:

- **Protection**
  We will conduct our business in an environmentally sound manner that is protective of human health and the environment.

- **Compliance**
  We will manage our work to assure compliance with all applicable environmental regulations and requirements.

- **Conservation**
  We will minimize impact to the environment by encouraging pollution prevention at the source, waste minimization, facilitating use of recycling opportunities and responsible disposal of any production by-products.

- **Qualification**
  We will ensure that all employees have the necessary information, resources and training to make informed environmental decisions.

- **Commitment**
  Covanta is committed to be an industry leader in environmental protection by achieving superior awareness and performance through a process of continuous improvement.

The Covanta Fairfax’s environmental management system has been developed to put systems in place that will enable us to implement our Environmental Policy and to meet the EMS requirements of Virginia’s Environmental Excellence Program. The EMS has been documented by a series of core procedures that comprise the EMS Manual, each describing a major element of the EMS. It is a living system that will be periodically reviewed and updated to ensure that it effectively helps us achieve our environmental goals of full compliance and responsible environmental management.
Environmental Awards & Recognition – “Our Commitment to Continuous Improvement”

• 2006 – Virginia Environmental Excellence Program; Acceptance at E3 Level.

• 2008 – United States Environmental Protection Agency; Acceptance into the National Environmental Performance Track Program.
• 2008 – Virginia Environmental Excellence Program; Promotion to E4 Level.


• 2010 - Virginia Governors Environmental Excellence Award - Bronze Medal Recipient for Environmental Management System and Sustainability Initiatives.

• 2011 - Virginia Environmental Excellence Program; Renewal Acceptance at E4 Level.

• 2011 – Acceptance as a Level 2 Participating Charter Member to the Stewardship Action Council.
• 2012 – Covanta Fairfax named recipient of the annual SHE Gold Star Award for superior Safety, Health and Environmental Programs in the Mid-Atlantic by Covanta Energy, Inc.

• 2012 - Virginia Governors Environmental Excellence Award - Silver Medal Recipient for Water Environmental Techniques (WET).

Environmental Program Sustainability Initiatives

1. Total Facility Mercury (Hg).
   - Mercury in fluorescent lighting: Mercury contained in fluorescent light bulbs produced after 1988 is typically 11.6mg or 0.0004090oz. Covanta Fairfax, Inc (CFI) has been replacing these older lamps with low mercury bulbs (TCLP compliant) containing typically 5mg or 0.0001764oz of mercury based on a report by National Electrical Manufacturer's Association (NEMA).
   - Mercury in air emissions: CFI has optimized the carbon and lime injection for all 4 boilers that has resulted in a 51% reduction of Hg air emissions. Based on the annual stack tests conducted in accordance with 40 CFR 60, the Hg facility air emissions have decreased 51% from 46.4 pounds in 2006 to 22.6 pounds in 2011.

2. Non-ferrous and Ferrous Metal Recovery.
   - In 2007 CFI replaced the original non-ferrous recovery system with an improved non-ferrous metal recovery system to increase the amount of nonferrous metal recovered and avoid disposal in the Fairfax County landfill. Both of the ferrous and nonferrous metal recovery systems separate the metal from the ash residue after the municipal solid waste has been processed in the combustors. In 2011 over 29,000 tons of ferrous and non-ferrous metal was recycled avoiding landfill disposal.

   - Installation of Rentar fuel-conditioning devices on mobile equipment to improve fuel economy. Calculations are based on installing 4 Rentar devices on the four front loaders, each of which consumes 160 gallons of diesel fuel/day. In 2008 the annual fuel use decreased 5% from 175,200 gallons in 2007 to 166,440 gallons.
4. Parts Washer Solvent.
   - Covanta Fairfax, Inc. is a Conditionally Exempt Small Quantity Generator (CESQG) of hazardous waste. CFI replaced two existing parts washers in 2005 with units that use on-site distillation to recover clean solvent, thereby eliminating waste solvent. How it works: 1. Dirty solvent is flushed into the distillation chamber. 2. Clean solvent is transferred into the wash basin and available for immediate use. Recycle Process 3. Dirty solvent is heated under vacuum to vapor point. 4. Solvent is vaporized in the distillation chamber. 5. Oily residue is separated from vaporized solvent for periodic removal. 6. Solvent vapors are cooled back to liquid state in condenser. 7. 100% pure solvent is returned to reservoir and available for continued use. Oily residue is removed by a licensed contractor. Since installation in July 2005, no residue has been required to be removed from either of the two parts washers. The amount of parts washer fluid removed for disposal decreased from 425 pounds in 2005 to zero in 2011.

5. Water Environment Techniques (WET) – 2012 Virginia Governors Award
   **Storm Water Runoff**
   Objective: To address a Best Management Practice (BMP) in our Storm Water Pollution and Prevention Plan (SWPPP) in decreasing the amount of debris and/or sediment discharged from non point source storm water runoff into the Chesapeake Bay Watershed.
   - The facility installed debris/sediment filters in specially constructed concrete storm basins. Shown is the completed concrete catch basin with sediment filter secured with grate. Additional curbing and landscaping was installed to encourage storm water to be naturally absorbed. Excess storm water was directed to the debris/sediment filters. During replacement, the filters are weighed to determine the amount of material removed from runoff that is being discharged into the Chesapeake Bay Watershed.
   - A dedicated street sweeper was purchased to remove additional sediment and debris caused from normal truck traffic and storm water run-on from the adjacent I95 Landfill. The sweeper is weighed before and after operation to determine the amount of material removed from paved surfaces.
   - A decommissioned neutralization tank was modified to accept any potential overflow from the exiting sumps located on the Air Pollution Control (APC) Deck. During heavy rain fall events this passive system prevented any potential for an unauthorized storm water discharge. The 1000 year rainfall event occurring on September 8, 2011 proved the value of this system as it performed flawlessly during the unprecedented storm event.
   - A new oil/water separator was installed at the outlet of the truck weight scales. Municipal Solid Waste is weighed on truck scales prior to entering the facility. Any petroleum product leaking from the trucks is contained within the oil/water separator and prevents contamination from entering the storm water run-off.
**Waste Water**
Objective: Reduce and/or eliminate the amount of chemicals (sulfuric acid and caustic) used in the boiler water make up.

- CFI invested approximately one million dollars to replace the existing in-house demineralizer system with a Siemens Water Technologies double pass Reverse Osmosis (RO) system to provide boiler feed water, reducing the need for chemicals. Additionally the reject water is used for the Cooling tower make up water reducing city water consumption. This replaced the demineralizer system that previously used acid and caustic to adjust pH prior to discharge into the POTW.

**Water Reuse**
Objective: Reduce the amount of drinking water purchased for facility operations. Reduce the amount of nutrients discharged to the POTW. Fairfax County currently has a permit from the State of Virginia to reuse a small amount of treated wastewater from the Noman Cole Pollution Control Plant (NCPCP) in Lorton, Virginia for watering recreational fields adjacent to Covanta Fairfax, Inc (CFI). The NCPCP facilities are about to be upgraded to further reduce nutrients under a program to protect the Chesapeake Bay. As a part of a study to develop the Noman Cole Nutrient Reduction Program, a joint effort between Fairfax County and CFI determined that a water reuse project at the Fairfax County Resource Recovery Facility, owned and operated by CFI would be both environmentally and economically feasible. The reuse system would (1) provide general environmental benefits through the preservation of resources, (2) protection of water quality of the Chesapeake Bay through a modest reduction in the nutrient loading, (3) decrease the amount of drinking water purchased by CFI by approximately 1.25 million gallons per day, and (4) A net 1.2 – 1.44 million gallons per day will be evaporated at the CFI cooling towers, and thus reducing the discharge volume from the NCPCP. The project has been a joint collaboration between CFI and NCPCP since 2006 with ground breaking realized in 2010. Infrastructure consisting of the necessary piping, valves, pumps, and storage water tank (completed) is expected to be fully operational in Spring 2012. CFI serves as the anchor for the project allowing the construction to be justified with hopefully future users opting in.

6. Decrease NO\textsubscript{x} Emissions.

- The facility conducted a NO\textsubscript{x} optimization study in an effort to decrease the NO\textsubscript{x} emissions through reagent control and ammonia injection ports. The purpose of the study was to lower the amount of NO\textsubscript{x} emissions generated solely within the four Municipal Solid Waste (MSW) combustors as defined in our PSD and Title V Permits. Since 2007, CFI has decreased NO\textsubscript{x} emissions 17.8% from 1963 tons to 1613 in 2011.

7. Used Oil Heater

- With the installation of a Used Oil Heater in the Mobile Equipment Shop we have achieved the VEEP E-4 Goal #3. Projected zero off-site recycling of used oil (currently 10 tons/yr). Added benefit of eliminating recycling truck fuel use and resultant particulate emissions.
Environmental Public Outreach

- Covanta Fairfax initiated a program with the County Recycling group to reduce the amount of electronic-waste (“e-waste”) coming to the plant. Our main goal was to reduce the amount of lead and mercury that comes from computers, monitors and compact fluorescent light bulbs (CFL). Fairfax County and CFI sponsored five electronic recycling events around the county in partnership with Service Source, a sheltered workshop in Fairfax County that finds employment for persons with disabilities. Service Source has partnered with a computer recycling company, CDM e-cycling, in Baltimore, MD, to process e-waste for recycling. CDM e-cycling uses Service Source to disassemble CPUs and recycles parts and scrap from computers that cannot be refurbished. This program is now the very successful “Electric Sunday” e-waste collection program the county runs monthly.

- Teachers Challenge: Covanta Fairfax, Inc. has also sponsored the Covanta Teachers Challenge. The Teacher Challenge is a competition for educators who teach energy related topics. The competition was created to encourage collegiality among teachers and to give teachers an opportunity to share quality educational materials. To become finalists and compete in the Teacher Challenge, teachers must first submit a lesson plan that demonstrates how they teach about energy. Who May Enter the Teacher Challenge? Educators from K-12 schools, science and nature centers, museums, or other informal teaching venue.

- Lorton Community Action Center (a non-profit organization that has been providing numerous support services to those less fortunate for more than 35 years). Covanta Fairfax was recently a Titanium Corporate Sponsor of the 2012 Annual Gala Fundraising, and has provided school, Thanksgiving, Christmas clothing, gifts, and has conducted food drives on the behalf of this group.

- South County Federation, a local citizens group is scheduled to learn about Covanta Fairfax’s environmental sustainability program during a presentation this summer.
PERFORMANCE

1. **Describe the efficiency of the operation/discuss operational performance:**
   a. Since the start of commercial operation in June of 1990, the facility has processed more than 22.4 million tons of solid waste. The nominal annual throughput of the facility is 1,039,177 tons based on waste with an average energy value of 5,000 BTUs per pound and 85 percent availability to allow for maintenance. Our history has demonstrated that the facility can safely operate at 110 percent of this rated throughput. Excluding downtime when the boilers were undergoing planned semi-annual maintenance outages, 2011’s boiler availability was at 95.3 percent. Turbine availability (excluding major scheduled outages) was 98.2 percent. In 2011 the facility exported 600,108 MWH (mega-watt hours) of electricity, more than enough to power over 80,000 homes in Fairfax County. Ferrous recovery for 2011 was 27,663 tons and non-ferrous recovery for the same period was 1228 tons. The non-ferrous quality at the refiner averages approximately 78 percent. For Fiscal year 2011 ash generation, which includes the small amount of reagent addition for pollution controls, was 23 percent by weight of the refuse processed. Ferrous recovery was 2.59 percent by weight of the refuse processed, and non-ferrous recovery was 0.12 percent by weight of refuse processed. Gross electric generation for fiscal year 2011 was 692,049 MWH or 675 kWH per ton processed.

2. **Discuss ash management strategies:**
   a. Fly ash from the air pollution control equipment and boilers is transported in an enclosed system of screw conveyors and building structures to control fugitive dust emissions. The fly ash is mixed with enough water to keep it from becoming airborne in a fly-ash-conditioner. Bottom ash is mixed with a controlled amount of dolomitic lime to prevent the leaching of heavy metals from the ash waste. The bottom ash is collected in a water filled ash discharger. A ram pushes the cooled and dampened bottom ash out of the water bath onto an incline where vibrators assist in dewatering the ash via gravity separation. The bottom ash from the dischargers and fly ash from the conditioners is deposited onto a main belt conveyor. The combined ash then travels over a grizzly separator which removes oversized material larger than 10 inches. These “overs” are removed by a front end loader and stored in the Residue building in the “large metal” bunker. The smaller material and combined ash is deposited onto an inclined conveyor belt, where it then passes under a rotating permanent magnet for ferrous metals separation. The smaller ferrous metals fall into the “small metal” bunker, and the remaining ash and non-ferrous materials are deposited onto a small belt conveyor which feeds the Non-ferrous metals separating system. This material first goes onto a vibratory screener which removes the majority of the remaining ash from the non-ferrous material, and deposits the cleaned material onto an Eddy Current Magnet non-ferrous recovery system. Non-ferrous metals are separated and stored in the non-ferrous metals bunker, and the remaining ash and other material falls into the ash bunker. In the event of poor burnout, say from an emergency shutdown of a unit where trash needs to be run off the grates, the system allows for the collection and storage of the un-burnt material as it accumulates at the grizzly scalper; the material is then transported by front end loader back to the tipping floor for re-processing rather than allowing the material to be sent to the ash landfill. Both the ferrous and non-ferrous materials are loaded onto separate tractor trailer trucks for processing at various metal recycling facilities. The combined ash residue is transported via dump trucks to the adjacent ash mono-fill landfill operated by Fairfax County.

3. **Discuss emission controls design and applications:**
   The performance of the air pollution control devices are of the highest importance to the operation of the plant and protection of the environment. Flue gases are subjected to several pollution control devices designed to remove metals, acid gasses, nitrous oxides, and particulate material prior to the gasses being exhausted to the air. A thermal DeNOx system uses aqueous ammonia to remove nitrous oxides without ammonia slip. At the end of the air pollution
controls system is a reverse fabric-filter baghouse, which removes particulate matter entrained in the flue gas. Continuous Emissions Monitoring (CEMs) equipment is located throughout the flue gas path and helps monitor the performance of the air pollution control equipment to ensure compliance with permit conditions. Each combustion train is monitored for furnace roof top temperature, opacity, steam flow, CO, CO2, SO2, HCl, and O2. In the past ten years of operation, not one notice of violation was received, due in no small part to highly trained operators and automated predictive alarm systems that monitor CEMs data: these systems determine if permit limits are likely to be exceeded, and provide alerts so the operator can take action before a problem occurs.
PROGRAM PLANNING

The Special Waste program at Covanta Fairfax, Inc. was created in response to commercial and public agency requests for the “safe, secure and monitored” destruction of non-hazardous confidential documents and materials.

The Special Waste program was initiated by Covanta Energy in 1993 at a public Board of Supervisors Meeting and before the County’s Citizen’s Advisory Committee on Solid Waste Disposal in 1994.

The range of these “special wastes” extends from tax forms, damaged US currency, miss-printed USPS postage stamps, confiscated illegal drugs, etc.

Covanta Fairfax, Inc. also participates in the national Drug Enforcement Administration medicine collection events, in partnership with DEA and US National Guards, to provide secure and proper disposal of household medication. In 2011 over 10 tons of household medication was brought to the facility for destruction.

a. Description of the Special Waste management or collection system planning process – Does it work: Covanta 4Recovery, LP and Covanta Fairfax, Inc (COVANTA) have established a management process to review waste materials prior to their acceptance at CFI. The customer, or authorized representative, submits a Request for Disposal (RFD) to the C4R Environmental Health and Safety (EH&S) Group for review. The EH&S Group, along with the Facility Manager, reviews the information submitted by the customer to ensure that the waste can be processed safely.

b. The management review process involves four areas:

- Technical Completeness of the RFD
- Environmental Compliance Review
- Health and Safety Review
- Operations Review
**Technical Completeness**

The Request for Disposal (RFD) is composed of various documents submitted by the customer and assembled by the Client Services Representative (CSR):

- Supplemental Waste Request Form ('Yellow Sheet')
- Material Characterization Form (MCF)
- Back-up information such as Material Safety Data Sheets (MSDS), product inserts or labels, analytical results, formulation sheets, etc.

The C4R EH&S Group works with the customer to ensure that the information submitted in these documents is complete, accurate and representative of the proposed waste stream.

The C4R EH&S Group uses the Supplemental Waste Request Form ('Yellow Sheet') to communicate the profiled waste stream's acceptability parameters and approval specifications.

**Environmental Compliance Review**

The C4R EH&S group is required to compare the material characteristics outlined in the RFD with CFI permits (air and solid waste) and federal, state and local regulations. This determines if the facility can process the profiled waste without violating permits or applicable regulations. During this review, specific processing requirements and handling precautions are identified to maintain environmental compliance.

**Health and Safety Review**

The C4R EH&S Group analyzes the material in the supplemental waste stream to determine how and if they may be safely handled at CFI. Standards established by OSHA, ACGIH and other recognized industrial hygiene and occupational health organizations are used. Specific processing requirements, handling precautions, PPE and IH Monitoring requirements are then identified to ensure worker and public safety.

Upon successful completion of the Environmental Compliance and Health and Safety Reviews, the C4R EH&S Group sends a copy of the RFD, with all environmental and health & safety considerations, to CFI for the Operations Review.

**Operations Review**

The Facility Manager reviews the RFD and the comments provided by the EH&S Group to determine if the material can be processed at CFI. This review focuses on the logistics and mechanics of safe processing at CFI.

The Facility Manager makes the final determination of the acceptability of the waste stream based on the facility's capabilities and service agreements.

If the material is unacceptable from either an operational, environmental or health and safety perspective, the RFD is rejected.

Each waste stream must successfully complete this approval process before it can be accepted for processing by C4R and CFI under the Supplemental Waste Program.
The Covanta 4Recovery and Covanta Fairfax, Inc. management review process has proven to be an effective means to ensuring that hundreds of tons of Special Waste are being destroyed in a secure and sustainable safe manner annually.

c. Discuss the plan for managing the Special Waste: Covanta Fairfax, Inc. has taken additional steps to ensuring that the Special Waste Program is managed according to all relevant federal and state regulatory requirements and sound Environmental and Health & Safety practices by hiring a fulltime Special Waste Coordinator (SWC).

The SWC is responsible for working cooperatively with the facility operation personnel and Fairfax County Staff to expedite receipt of deliveries and ensuring waste management plans are adhered to, the SWC handles all related delivery & administraion paperwork, customer contracts, waste training, waste QA/QC profiles and tracking all procedures associated with the Special Waste Program.

d. Discuss how community concerns were addressed and resolved: To address community concerns, Covanta Fairfax and Fairfax County management staff meet monthly to discuss the facilities operations, Special Waste Program and community concerns. These meetings have proven for over twenty years to be a postive and effective platform for open comunication for our clients and surrounding communities.

e. Discuss plans for future expansions or refurbisment: To prepare for the growing demand of special waste services, Covanta 4Recovery has hired additional Sales managers and Customer service representatives to expediate services and address the large demands.

To address the growing community and customer demand for secure E-waste recycling, Covanta Fairfax, Inc. along with E-Covanta have started working on plans for an e-waste collection pilot program at the Fairfax facility.
WORKER HEALTH AND SAFETY

“A Total Health and Safety Policy is the ongoing integration of health and safety into all activities with the objective of eliminating illness and injuries and continuously improving performance.”

- Covanta Energy Safety Procedure 1

Management Leadership

The Management at Covanta Fairfax is committed to providing a safe and healthy workplace for its employees and continually strives to go beyond compliance matters relating to health, safety and the environment.

Management has a very clear understanding of the hazards presented by the work processes and have implemented effective measures to identify and evaluate these hazards. These efforts include: job safety analyses (JSA’s), standard operating procedures (SOP’s), industrial hygiene assessments, ergonomic reviews, PPE evaluations and hazard risk analyses.

Employee Involvement

Employees are involved in all phases of the company’s safety and health program. Each employee receives monthly safety and health training and participates in safety audits, surveys and facility inspections. Employees report all unsafe conditions directly to managers, supervisors and/or through the completion of a near-miss report. In turn, employees are given responses concerning hazard notification through plant wide safety alerts, shift start up meetings and direct verbal notification.

Employees also have access to a number of safety programs available at the facility. These programs include membership on the SHE (Safety, Health and Environmental) committee, initiating process upgrades through method of improvement program and participation in the new (SHE) Employee Work Order Program which encourages the participation and support of all employees in their individual efforts to accomplish safety improvements at the facility.

The SHE Committee

The SHE (Safety, Health and Environmental) committee is composed of management and line employee representatives. It is the duty of this committee to perform inspections of various areas anywhere from weekly to quarterly depending on the associated hazards to be inspected. The committee also holds monthly safety meeting to discuss inspection findings, safety alerts, various training topics, wellness activities and near miss work orders. In addition, certain members of the committee are involved in accident investigations. Any and all results are then reviewed by the entire committee in order to provide better awareness of unsafe conditions to prevent future occurrences.

Contractor Program

The contractor program is managed at all levels of the facility. Those directly involved are responsible for the planning, execution and safe completion of each project. All contracted workers are required to attend documented site- specific safety briefings by facility management prior to working onsite. This meeting also allows facility management to personally inspect contractors for compliance with various guidelines. A preliminary review of the job is performed by the contractor prior to the commencement of any work. The supervising manager and the contractor will evaluate any safety concerns and discuss with all involved in the job.
Detailed Injury & Illness Rate Information

Covanta Fairfax facility total three-year average for the TCIR of 1.97, compared with a 2009 BLS national rate of 4.2 for this industry representing a TCIR 53% lower than the national average for our industry. The three-year average DART rate is 1.18 compared with 2.2 for the national average, indicating that the Fairfax facility is 46% below the national average for our industry.

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<th>Year</th>
<th>Hours</th>
<th>Total Cases</th>
<th>TCIR</th>
<th>Days Away, Restricted, or Transferred Cases</th>
<th>DART</th>
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<tbody>
<tr>
<td>2009</td>
<td>156,888</td>
<td>2</td>
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<tr>
<td>2010</td>
<td>168,817</td>
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<tr>
<td>2011</td>
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<tr>
<td>TOTAL</td>
<td>468,855</td>
<td>2</td>
<td>2</td>
<td>2</td>
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</tr>
</tbody>
</table>

Three Year Average Rates: 0.85 0.85

Most recently published **BLS rates: 4.2 3.5

Percent above / (below) BLS rate: -80% -76%

2012 YTD: 14,932 0 0.00 0 0.00
**ECONOMICS AND COST EFFECTIVENESS**

The Covanta Fairfax Energy-from-Waste facility, after two years of construction and a $190 million investment, began commercial operations in June of 1990. The Covanta Fairfax facility, at 3,000 tons per day of municipal solid waste, or almost 1.1 million tons per year, it is one of Covanta Energy’s largest facilities in the US. 80 full-time people work at this facility.

The municipal bonds for the facility were fully paid as of February, 2011. As a result of the operational management and the multiple revenue streams Covanta has developed over the years; the facility has always been a net financial contributor to Fairfax County. In 2011, Fairfax County received $26.8 million from Covanta Fairfax’s on-going operations.

The facility produces its own electricity and sells up to 80 MW daily to Dominion Virginia Power via a five year Power Purchase Agreement (PPA). Through the “power switchyard” at the facility, Covanta Fairfax distributes renewable electric power directly into the Dominion grid. The County continues to receive 90% of the net revenues from this operation.

The Covanta Fairfax facility processes municipal and commercial waste for Fairfax County. Fairfax is the largest county in Virginia with 1,081,726 in population. The facility has a ferrous recovery operation that recycles almost 28,000 tons annually. This tonnage represents about 7% of the total ferrous recovery operations of Covanta Energy, nationwide. In addition, the Fairfax facility was the company’s first non-ferrous metal recovery operation and is currently undergoing a $1.5 million expansion that will greatly increase the almost 2,000 tons of non-ferrous that the facility is presently processing.

Covanta Energy, whose facility assets include a number of different energy-from-waste burning technologies, manages and compares its operational standards and actual facility performance on a regional and national basis. In addition, Covanta Energy’s C4Recovery marketing group has developed a special line of safe and secure confidential document and material destruction services that have been very successful servicing defense companies and governmental agencies throughout the Washington, DC and Northern Virginia area.

Net revenues from the ferrous, non-ferrous and C4Recovery operations are split with Fairfax County based on an individual waste stream revenue analysis.
Utilization of Equipment/Systems and Technologies

The I-95 Energy / Resource Recovery Facility (RRF) processes 3000 tons per day of municipal, residential and commercial solid waste. Four parallel grate systems, utilize the Martin Reverse-Reciprocating Stoker technology that consistently produces ash averaging slightly better than 75 percent reduction by weight of the process tonnage. Four Zurn Industries Inc. boilers complete the combustion trains generating 20 million pounds of steam per day to drive two ABB turbine generator sets. Annual boiler availability over the life of the facility ranges from 88 to 95 percent with total boiler availability (average availability of all 4 boilers combined) averaging 92 percent.

Natural gas burners are used for start up and shut downs, flue gas paths are maintained with lance and stationary rotary soot blowers. Three fans on each unit work together to draw the flue gas through the units provide combustion air, excess air for temperature and CO control while maintaining a negative pressure. Steam from turbine generator sets supply medium and low pressure steam headers and main condensers that condense the steam for use as boiler feed water after non condensable gases are removed. The rated capacity of each generator is 64 MW. At 100 percent design conditions the facility generates up to 90 MW gross depending on whether air pre-heaters and steam driven boiler feed pumps are running. Should the turbine generator sets be unable to accept the steam from the boilers, the bypass condenser is capable of condensing 100 percent of the steam generated. Turbine generator availability typically averages around 98 percent. Flue gases from each boiler flows through air pollution control equipment designed to remove metals, acid gasses, nitrous oxides, and particulate material prior to the gases being exhausted to the stack. Thermal DeNOx system uses aqueous ammonia to remove nitrous oxides without ammonia slip. Last year 1.5 pounds of aqueous ammonia was used per ton of waste processed. The spray dryer absorber uses lime slurry to remove acid gasses such as sulfur dioxide and hydrogen chloride. According to stack testing data, SO2 removal efficiencies are typically in the mid-90 percent removal. A carbon injection system removes mercury vapors, dioxins, and furans. According to stack testing data; mercury removal efficiencies range from 89 to 98 percent. The end of the air pollution control equipment, 12 baghouse cells for each unit remove particulate matter in the flue gas. The PPS fabric filter bags remove over 99.9 percent of the particulates, and the opacity readings have been less than 1 percent, compared to the permit limit of 10 percent. Fly ash and bottom ash from all four units are combined on the residue belts. Ferrous and Non-ferrous larger than 8 inches is removed by the grizzly scalper; a pile is periodically removed with the loader bucket for sorting and recycling. The permanent rare earth magnet removes the smaller ferrous to be shipped out for recycling. Non-ferrous and ash material are separated by a vibrating screen and an eddy current magnet. Ferrous recovery from the waste was 2.6 percent by weight and Non-ferrous is .12 percent by weight last year.
Public Acceptance, Appearance and Aesthetics

Although privately owned and operated by CFI the Fairfax facility takes exceptional pride in its efforts to maintain a clean, litter and debris free facility that can processes in excess of 3,000 tons per day of municipal solid waste, or almost 1.1 million tons per year; and handle almost 80,000 solid waste collection and transfer vehicles annually.

The 23 acre Fairfax facility is strategically located next to a 2,300 acre undeveloped park area called, Laurel Hill Park, that hosts walking, biking, nature and equestrian trails.

In addition, the facility also abuts the historic “Workhouse Arts Center”, which is a restored Reformatory, built in 1912 at the request of President Theodore Roosevelt. The Reformatory, which consists of 80 acres, once held 168 incarcerated Suffragists, arrested after protesting in front of the White House when Woodrow Wilson was president! The brick colonial Williamsburg architecture now houses over 150 of the region’s most professional and emerging artist’s, within studios in 15 restored colonial style buildings that formerly housed open-barrack style, cell blocks. Two guard watch towers, a baseball diamond and a former cafeteria are scheduled for restoration. The former cell blocks are now light and airy artists’ studios, where over 130 art classes are held year-round. Almost 100,000 visitors annually tour and shop at the Workhouse. Often, many of these visitors will call Covanta Fairfax to request a tour, since our facility is highly visible from the Workhouse Arts Center. Covanta Fairfax has initiated discussions with the Workhouse Arts Center parent, the non-profit, Lorton Arts Foundation, to determine the appropriate means to support and showcase Covanta Fairfax’s renewable energy production and support the Workhouse community activities.
**Odor and litter control**

Through the installation of reverse induction fans along the rear wall of the 500 foot long tipping floor, air is drawn into the fans from the floor, and blown into the four boilers. Therefore, neither air nor odors emanate from the 8-bay, 15,000 ton, municipal solid waste, storage bunkers or tipping floor.

A facility owned street sweeper operates under an early morning, 7 day per week schedule, cleaning the access road, the facility roads and the parking areas. Over the years, by adding asphalt curbing to the roadways, the street sweeper is more effective and the yellow-painted curbs provide a safe and attractive border appreciated by the commercial drivers. In addition, a *Litter Patrol*, usually of three or more employees, walks the property fence line, the roadways, the parking areas and those areas between the facility’s buildings, on a five day per week basis, collecting litter and debris.

**Landscaping Modifications**

In recognition of the fact that the facility’s groundwater drains into the Chesapeake Bay basin, Covanta Fairfax has instituted a number of environmentally sensitive landscaping features. For example, fiber-filled drainage sacks front all of the facility’s storm water drains. In fact, the company designed a system whereby the fiber drainage sacks are weighed on a quarterly basis. This process, for the first time, gives the US EPA a statistical method to track debris not going into the Chesapeake Bay basin. A process they have embraced, and a measurement standard, that heretofore, they did not possess. Given that the facility is built in a valley and receives water run-off from a number of Fairfax County solid waste management operations, rip-rap has also been placed in a number of swale areas to increase water turbulence. Thereby, depositing dirt and minute debris prior to their exiting the property and entering the County storm water collection system. There also have been horticultural enhancements designed to promote native vegetation and trees.

**Community Outreach Activities**

The facility management has significantly expanded its community outreach in recent years. On a monthly basis, senior management meets with representatives of the Fairfax County Division of Solid Waste Disposal & Resource Recovery, to discuss operational issues at the Covanta Fairfax facility. Also, on a monthly basis, senior management attend a monthly meeting of the local South County Federation, which is a community organization that monitors commercial and public projects being proposed in the southeast sector of Fairfax County. In addition, management is active in the two local Chambers of Commerce, the Fairfax County and the Mt. Vernon-Lee; and a major non-profit that services low income families, many of which have educational and/or language limitations. And significantly some of which are current Army personnel at nearby Ft. Belvoir. To promote the environmentalism of renewable energy, produced from municipal solid waste, tours are hosted on an as-needed basis to the community, foreign power plant visitors to the US, local educational groups and military based personnel from the near-by Ft. Belvoir Army post.
Innovation and Creativity

While the facility has always supported the County’s mercury collection, compact florescent light and drug-take back programs over the years. For 2012, the “Call2Recycle” rechargeable battery collection program will be Covanta Energy’s signature environmental program. The Facility’s management has personally placed 19 collection boxes into the field, to date. With more expected to be distributed by year-end.

The Facility’s management has also supported financially, and has lobbied for, the local South County Little League in their efforts to install electric power to their five ball fields and construct a major concession facility for the ball park. Recent news has confirmed that power will be installed at this ballpark in 2012.

Since late 2011 and into 2012, Covanta Fairfax has initiated communication to enhance Fairfax County efforts to collect mercury thermometers, compact florescent lights, and expired prescription drugs. Those discussions have been focused on ideas to expand the Covanta “Mercury Bounty” program in 2012. This is where Covanta gives individuals a $5 gift card for each old style mercury thermometer they bring to our facility for proper disposal. Outreach efforts with the largest hospital in Fairfax County are underway to enhance the expired drug collection, through Covanta’s Rx4Safety (Prescriptions for Safety) program.

Covanta Fairfax Innovation Program

Employees use innovative thinking to create an idea for the facility that offers a new product, process or concept, or enhances an existing process which has a positive impact. Individual employees use the forms located at the “Innovation Station” to document the concept, process, product or improvement. The Innovation Station is placed strategically in a high traffic area to promote participation from all employees. The flow diagram of the internal process is shown below.