

Alexandria/Arlington Waste-to-Energy Facility Fiscal Year 2021 Annual Report



Background

In 1984, an agreement was entered into between the Alexandria Sanitation Authority and the Arlington Solid Waste Authority to develop and construct a solid waste disposal facility having the capacity to handle 975 tons per day of waste from the City of Alexandria and Arlington County (the Jurisdictions). Waste-to-Energy was determined to be the most environmentally sustainable means of disposing of waste, after reduction, reuse, and recycling. The waste-to-energy facility (the Facility), located at 5301 Eisenhower Avenue, Alexandria, is operated by Covanta Alexandria/Arlington Inc. (Covanta), and has been in operation since 1988. Over the years, several enhancements and improvements have been made to the Facility primarily to meet the increasingly stringent air pollution requirements of the Clean Air Act, and the Facility has continued to reliably handle the waste from the Jurisdictions since it opened.

In 2012, both Jurisdictions entered into a new Waste Disposal Service Agreement, which became effective January 1, 2013, and in

December 2013 agreed to extend the site lease for the continued operation of the Facility by Covanta to the year 2038, and in return the Jurisdictions received a favorable rate for disposing of the Jurisdictional waste at the Facility. This Annual Report summarizes the operation of the Facility during Fiscal Year 2021 (FY21). For more information on the history of the Facility and details of its operation, go to: <https://www.alexandriava.gov/tes/info/default.aspx?id=82377>.

HDR Inc. (HDR) was engaged to monitor the Facility performance and to perform regular assessments of the Facility on behalf of the Jurisdiction's Facility Monitoring Group (FMG). On a quarterly basis, HDR meets with the management of the Facility to discuss operational and maintenance issues, to acquire data, to perform an independent visual inspection of the Facility, and issue a detailed report of quarterly performance. Covanta is ultimately responsible for the operation, maintenance, environmental performance, and safety issues at the Facility.

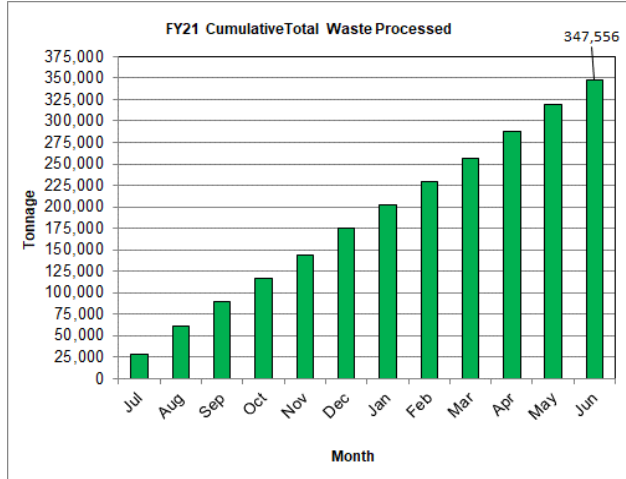
Facility Performance

The Process

Household waste that is collected by the two Jurisdictions is brought to the Facility and discharged into a large pit. Operators at the Facility screen the incoming material to keep inappropriate wastes out of the combustion process. The waste is then moved by cranes to the combustion chambers, where the waste is burned at high temperatures, heating water to create steam which drives turbine generators (T-Gs) to create electricity. The ash residue from the process is screened and ferrous metals

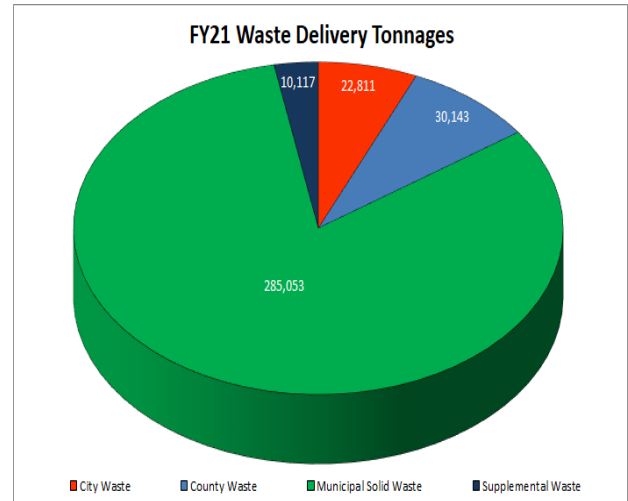
are extracted via a magnet and recycled. The remaining ash is then sent to an approved ash disposal facility.

Quantities of Waste



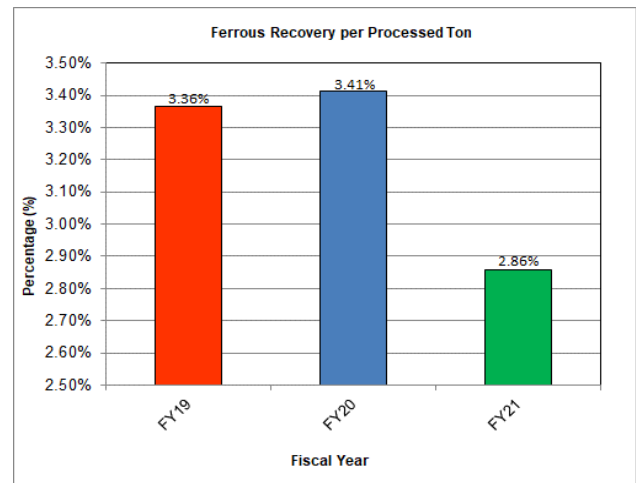
In FY21, the Facility processed a total of 347,556 tons of Municipal Solid Waste (MSW). The quantity of waste brought in by the City over the past several years, has remained fairly steady, and was 6.6% of total waste deliveries, while quantities of waste brought in from the County accounted for 8.7% of total waste deliveries. In FY21, 22,811 tons were delivered by the City, which is 2.9% more than the prior year, and an additional 30,143 tons were delivered by the County, which is a decrease of 4.0% over FY20. The remainder of capacity at the Facility was filled with waste collected by commercial haulers within the two Jurisdictions, and with Supplemental Waste, which constitutes about 2.9% of the total amount.

Supplemental Waste is primarily confidential documents, pharmaceuticals and similar non-hazardous materials which require secure destruction. The amount of Supplemental Waste received at the Facility in FY21 totaled 10,117 tons, which is 23.5% less than last year.



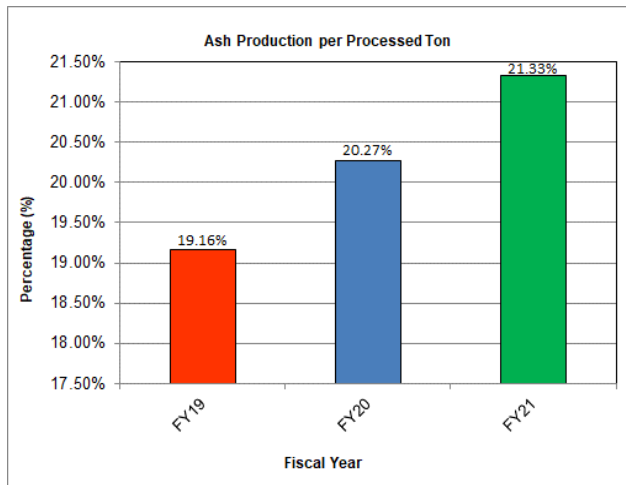
Ferrous Metal Recycled

In FY21, 9,908 tons of ferrous metals were recovered from the ash and recycled. This is a decrease of approximately 17.2% from the amount recovered in FY20. In February 2020, Covanta began cleaning the recovered metals of excess ash residue prior to sending it to the vendor, which explains the significant decrease. The impacts of cleaning the material prior to shipping will increase the revenue but will decrease the tonnage shipped. Additionally, ferrous recovery in May and June 2021 was negatively impacted by a ferrous magnet failure and replacement with a temporary less efficient magnet.



Ash Disposed

In FY21, 74,135 tons of ash generated at the Facility were disposed which is a 4.5% increase from FY20. The ash production rate, i.e. the tons of ash produced per ton of waste processed was 21.3%, and has remained in the range of 20 to 22 percent for a number of years, which is excellent compared to other facilities. However, the cleaning ash prior to shipping the metals will increase the ash production.



Steam

The Facility is regulated by its Title V permit with the Virginia DEQ (VADEQ), which has set an annual facility steam production limit of 1,170,400 tons, which is based upon an assumption that each pound of waste processed generates 3.34 pounds of steam. The Facility was in compliance with this permit limit during all of FY21. In order to compare boiler performance on a year-to-year basis, when the actual waste content varies, steam production is also analyzed by converting raw waste tonnages to a “reference ton basis”. This metric in FY21 was 2.80 tons of steam per reference ton of waste, which is identical to the rate in FY20. The T-G performance is evaluated in terms of the quantity of steam that it takes to generate one kWhr of electricity, where a lower steam rate indicates better performance. In FY21, this metric was slightly lower (0.6%), which indicates a slight improvement in performance. It is worth noting

that TG No. 2 requires some repair work to restore its original capacity and improve its efficiency (last overhaul in 2013).

Facility Maintenance

Significant and routine maintenance was performed at the Facility throughout FY21, with each of the three boilers and two turbine generators experiencing downtime for the completion of various maintenance items. It is the opinion of HDR that Covanta has been implementing an effective maintenance regimen and is performing routine and preventative maintenance and selected equipment replacements in a timely manner.

Operational Performance

As a result of routine maintenance activities, the average availability of the boilers was 94.6%, and the average availability of the T-G was 98.9% during FY21. This is excellent and comparable to that of mature, well-run waste to energy facilities.



Photo: Deaerator

Housekeeping

Routine inspections have shown that Covanta is performing facility housekeeping and maintaining plant cleanliness in accordance with acceptable industry practices. Housekeeping ratings for each major area of the facility, both internally and externally, have been found to be acceptable during each of the quarterly inspections. HDR also identifies

deficiencies during its inspections and maintains a running list of the deficiencies and removes them from the list as they are corrected. In general, the deficiencies identified have been minor and don't require immediate attention. Throughout FY21, 15 deficiencies were reported by HDR and 12 new and existing deficiencies were addressed by Covanta. At the end of FY21, 17 items remained on the list requiring attention.



Photo: Firing Aisle

Environmental Performance

Air Emissions

Emissions from the facility are controlled by the combination of good combustion practices, and by use of gas scrubbers and fabric filter baghouses. Ammonia injection and activated carbon systems are also used to control oxides of nitrogen and mercury emissions, respectively. Key emissions variables are continuously monitored with state of the art emissions monitoring equipment, supplemented by annual stack testing.

Throughout FY21, the air pollution control equipment maintained emission concentrations well within the established regulations, and the Facility experienced two (2) permit deviations. The first deviation occurred on August 3, 2020 when the Boiler No. 1 4-hour Carbon Monoxide (CO) average reached 109 ppm (100 ppm limit).

The second deviation occurred on August 4, 2020 when the Boiler No. 3 4-hour Carbon Monoxide (CO) average reached 119 ppm (100 ppm limit). These permit deviations were reported to VADEQ and were considered non-exempt. As of the end of FY21, the Facility had operated a total of 330 days without a permit deviation. Annual stack testing was conducted in March 2021 and results demonstrate compliance well within the permit limits for all parameters, which can be seen in the 3-year Historical Stack Testing Results Graph shown below .

In September 2021, Covanta announced that emissions data for the Facility are now available to the public online¹. Both the City of Alexandria and Arlington County commend Covanta for its transparency and action to keep residents informed.



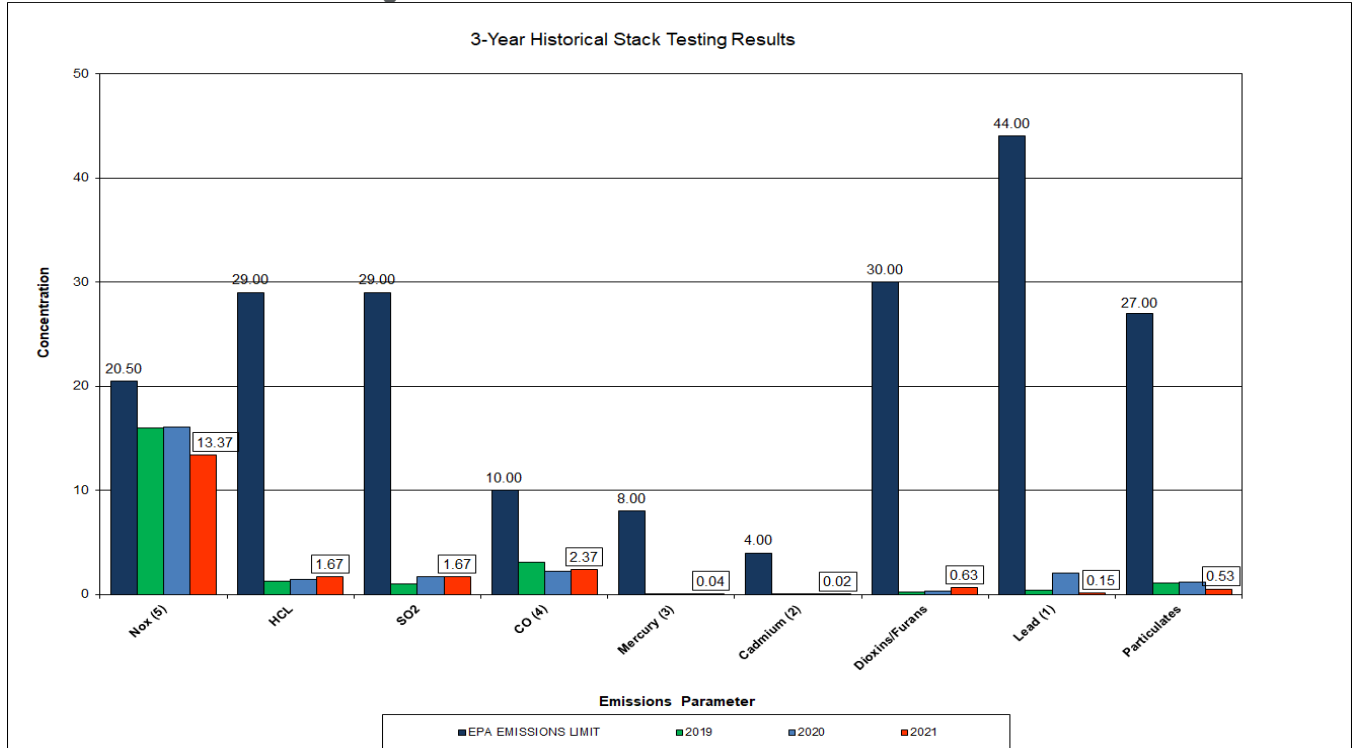
Photo: New Ammonia Nozzles on Boiler No. 1 as part of the Low NOx Technology Installation

Ash Conditioning

The ash is periodically sampled and tested for its potential to leach toxic compounds, using ash toxicity (TCLP) procedures. This testing, which occurred in October 2020 and April 2021 showed that the TCLP results were well below the regulatory threshold. The Facility uses pebble lime to control Sulfur Dioxide (SO₂) emissions in the flue gas and residual lime in the ash helps balance the pH.

¹ <https://www.covanta.com/where-we-are/our-facilities/alexandria>

3-Year Historical Stack Testing Results



Note (1): Lead emissions have been decreased by a factor of 10 for trending purposes
 Note (2): Mercury emissions have been decreased by a factor of 10 for trending purposes
 Note (3): CO emissions have been decreased by a factor of 10 for trending purposes
 Note (4): NOx emissions have been decreased by a factor of 10 for trending purposes

Facility Enhancements

The VADEQ has issued final permits for the installation and operation of LN™ Technology at the Facility. During November 2020, Boiler No. 1 was retrofitted with LN™ Technology, including the installation of all associated ductwork, nozzles, and controls. As of the end of FY21, the Boiler No. 1 Low NOx System testing, and optimization period concluded, and Boiler No. 1 and Boiler No. 2 (retrofitted in November 2019) are currently operating under the lower NOx limits of 110 ppm (24 hr) and 90 ppm (annual rolling average). Plans are in place to install LN™ Technology on Boiler No. 3 in the FY22.



Photo: New Over Fire Air Fan on Boiler No. 1 as part of the Low NOx Technology Installation.

Overall, Covanta is performing needed repairs and replacements of equipment as required, to overcome wear, tear, obsolescence, and end of life of equipment and materials. These efforts will need to continue and even accelerate going forward if the 33 year old Facility is to continue to operate reliably, efficiently, and safely for the next twenty years.



Photo: Turbine-Generator

Safety & Environmental Training

The Facility did not have any OSHA recordable accidents in FY21 and as of June 30, 2021, has operated 1,192 days without an OSHA recordable accident. Each month, Covanta conducts training for its employees covering several varying safety and environmental issues, including confined space entry and rescue, ladder safety and accident prevention.



Photo: Cooling Tower

Outreach

Covanta typically provides tours of the Facility to groups or individuals representing numerous educational and civic groups, as well as professionals from other countries. Tours were curtailed during the fiscal year due to the COVID-19 Pandemic. Covanta plans to host limited tours in FY22.

Covanta's outreach also included providing no charge disposal for wreaths collected by Wreaths Across America from Arlington

National and ensuring the destruction of drugs collected during Virginia Drug Take Back Days. Covanta is active with Volunteer Alexandria helping with food distribution, funds for COVID relief, and the Child Holiday Fund. Covanta continues to provide scholarships to Alexandria High School students via the Scholarship Fund of Alexandria. Other activities included Covanta employees celebrating Earth Day with clean ups of Cameron Park, Ben Brenman Park and along Eisenhower Ave near Covanta and the Van Dorn Station.