

Alexandria/Arlington Waste-to-Energy Facility Fiscal Year 2020 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, a number of 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 2020 (FY20). 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.

COVID-19 Pandemic Impact

On March 12, 2020, the State of Virginia declared a State of Emergency due to the COVID-19 Pandemic. Covanta implemented a protocol to ensure the safety of the Facility personnel and continued operation during the Pandemic.

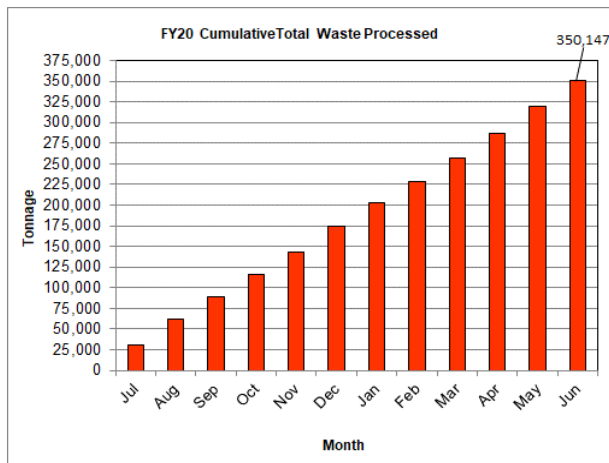
The Jurisdictions' waste deliveries and the total amount of MSW and Supplemental Waste received by the Facility in March through June were down slightly from the average from the previous few fiscal years.

Facility Performance

The Process

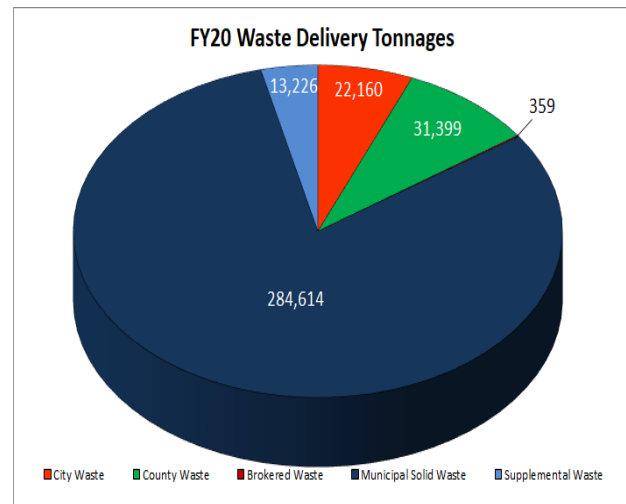
Household waste that is collected by the two Jurisdictions is brought to the Facility and discharged into a large pit. Operators at the Facility screen the incoming material to keep inappropriate wastes out of the combustion process. The waste is then moved by cranes to the combustion chambers, where 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 FY20, the Facility processed a total of 350,147 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 6.3% of total waste deliveries, while quantities of waste brought in from the County accounted for 8.9% of total waste deliveries. In FY20, 22,160 tons were delivered by the City, which is 1.1% less than the prior year, and an additional 31,399 tons were delivered by the County, which is an increase of 1.0% over FY19. The remainder of capacity at the Facility was filled with waste

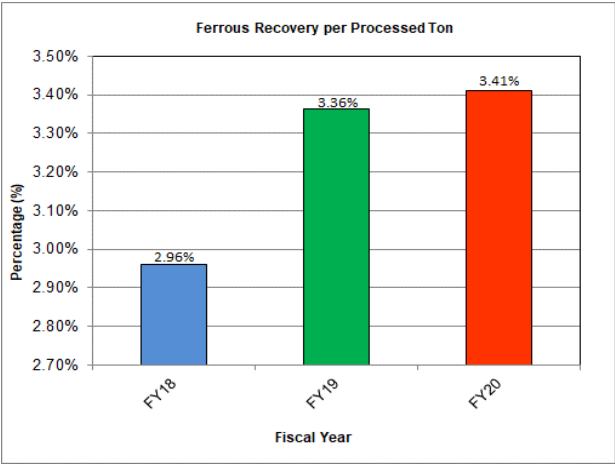
collected by commercial haulers within the two Jurisdictions, and with Supplemental Waste, which constitutes about 3.8% of the total amount.



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 FY20 totaled 13,226 tons, which is 12.3% more than last year.

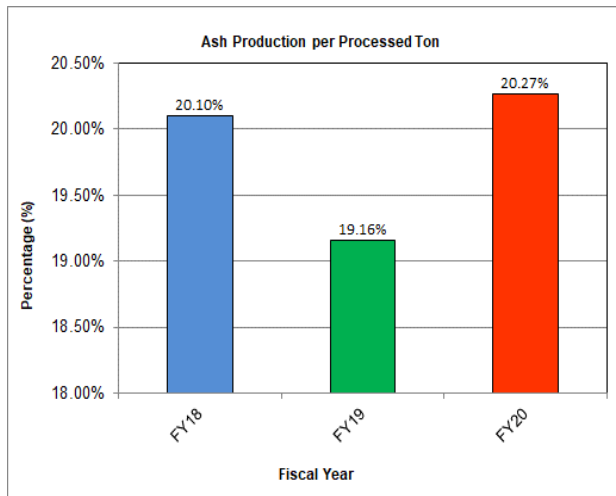
Ferrous Metal Recycled

In FY20, 11,966 tons of ferrous metals were recovered from the ash and recycled. This is an increase of approximately 1.8% from the amount recovered in FY19. In February, Covanta began cleaning the recovered metals of excess ash residue prior to sending it to the vendor. This will increase the revenue of the material but will decrease the tonnage shipped.



Ash Disposed

In FY20, 70,964 tons of ash generated at the Facility were disposed. The ash production rate, i.e. the tons of ash produced per ton of waste processed was 20.3%, and has remained in the range of about 20 percent for a number of years, which is excellent compared to other facilities. However, the cleaning ash off of 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 FY20. 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 FY20 was 2.80 tons of steam per reference ton of waste, which is identical to the rate in FY19. 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 FY20, this metric was slightly higher (0.6%), which indicates a slight decline in performance.

It is worth noting that T-G 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 FY20, with each of the three boilers and two T-Gs experiencing downtime for the completion of various maintenance items including a major overhaul on T-G no. 1. 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 94.8%, and the average availability of the T-G was 96.0% during FY20. This is considered to be excellent and comparable to that of mature, well-run waste to energy facilities. The slight decrease in T-G performance will be a focus in early FY21 (steam leaks and T-G no. 2 condition).

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 FY20, 10 deficiencies were reported by HDR and 6 new and existing deficiencies were addressed by Covanta. At

the end of FY20, 13 items remained on the list requiring attention.

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.

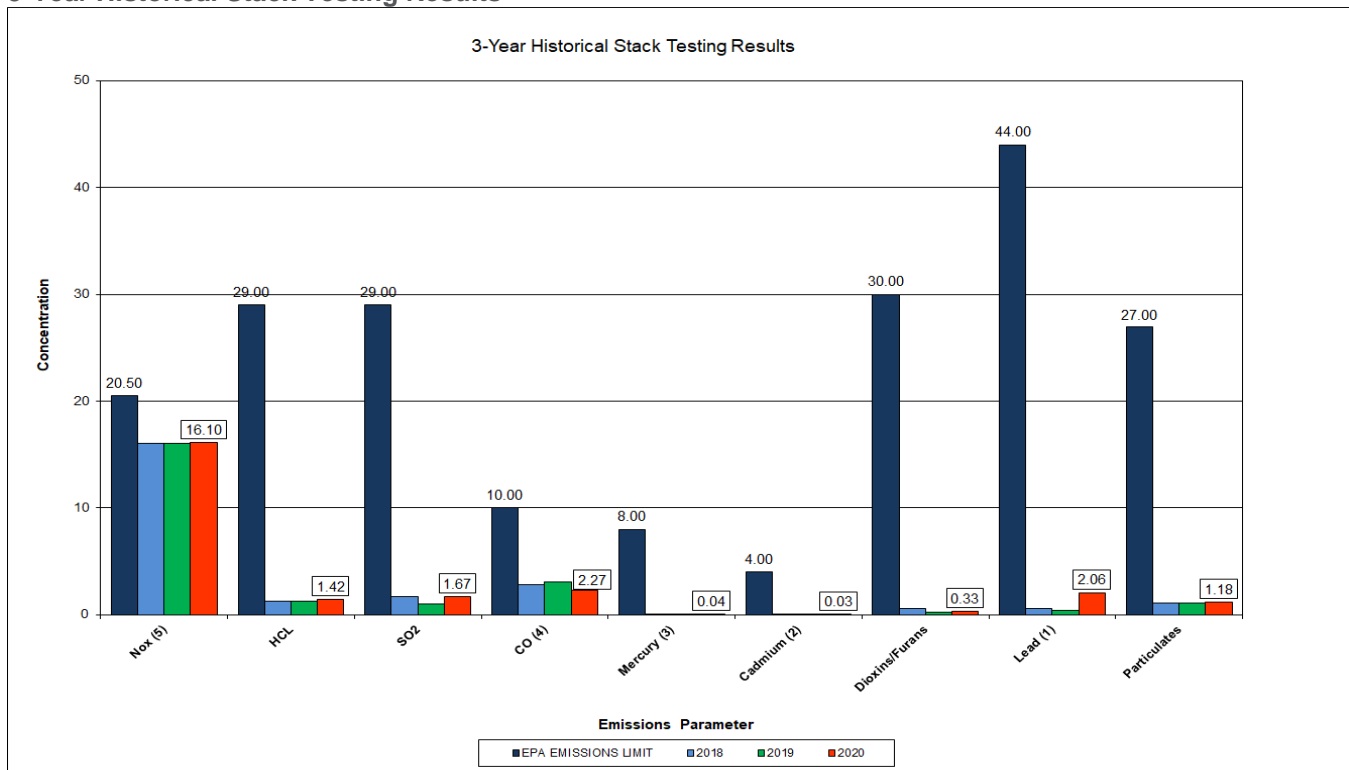
Throughout FY20, the air pollution control equipment maintained emission concentrations well within the established regulations, and the Facility experienced one (1) permit deviation. This deviation occurred on December 7, 2019

when the Boiler No. 3 4-hour Carbon Monoxide (CO) average reached 151 ppm (100 ppm limit). This permit deviation was reported to VADEQ and was considered exempt under startup/shutdown/malfunction rules. As of the end of FY20, the Facility had operated a total of 206 days without a permit deviation. Annual stack testing is conducted, generally in March of each year, and the 2020 results demonstrate compliance well within the permit limits for all parameters.

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 2019 and May 2020 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.

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

Photo: Baghouse Hopper Aisle

Safety & Environmental Training

The Facility did not have any OSHA recordable accidents in FY20 and as of June 30, 2020, has operated 827 days without an OSHA recordable accident. Each month, Covanta conducts training for its employees covering a number of varying safety and environmental issues, including confined space entry and rescue, ladder safety and accident prevention.



Photo: Turbine Generator No. 1 Major Overhaul in Progress – November 2019

Outreach

Facility Tours

In FY20, Covanta provided tours of the Facility to over 150 individuals representing numerous educational and civic groups and professionals from other countries. Tours were curtailed after March due to the COVID-19 Pandemic.



Facility Enhancements

The VADEQ has issued final permits for the installation and operation of LN™ Technology at the Facility. During November 2019, Boiler No. 2 was retrofitted with LN™ Technology, including the installation of all associated ductwork, nozzles, and controls. On June 28, 2020, the Boiler No. 2 Low NOx System testing and optimization period concluded and indicated that Boiler No. 2 is 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 Nos. 1 and 3 during the next two fiscal years.



Photo: New Nozzle Installation in Upper Elevation of Boiler No. 2 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 32 year old Facility is to continue to operate reliably, efficiently, and safely for the next twenty years.