

Alexandria/Arlington Waste-to-Energy Facility Fiscal Year 2024 Annual Report



Photo: North side of Facility.

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 (WTE) facility (the Facility), located at 5301 Eisenhower Avenue, Alexandria, is operated by Reworld Alexandria/Arlington Inc. (RAAI), 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 RAAI to the year 2038. 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 2024 (FY24). 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 assessment of the Facility, and issue a detailed report of quarterly performance. RAAI is ultimately responsible for the operation, maintenance, environmental performance, and safety issues of the Facility.

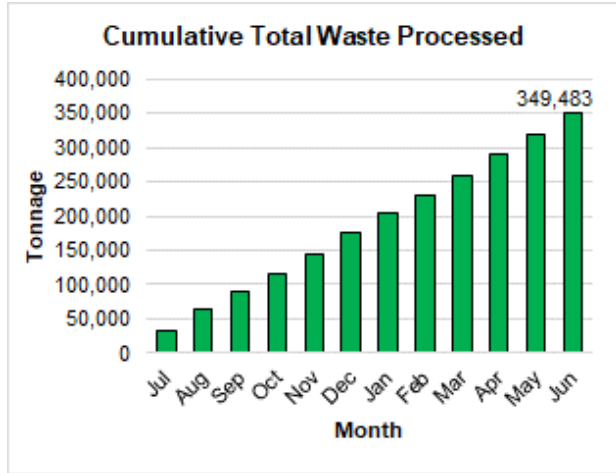
Facility Performance

The Process

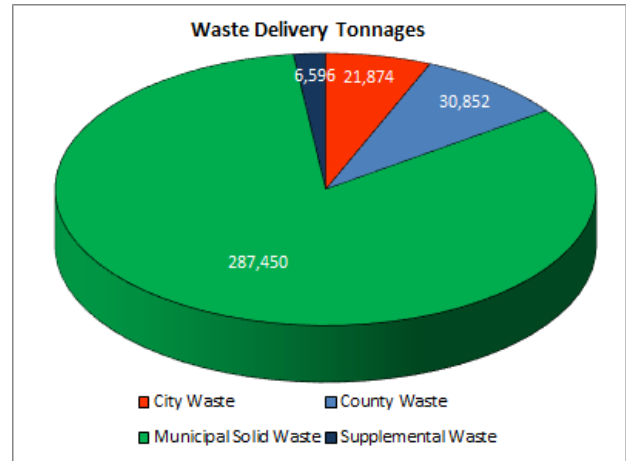
Household waste that is collected by the two Jurisdictions, commercial haulers, and third-party operators is brought to the Facility and discharged into a large refuse pit. Operators at the Facility screen the incoming material to keep unacceptable waste out of the combustion process. The waste is then moved by cranes to the combustion chambers, where the waste is burned at high temperatures, heating water to create steam which drives turbine generators (TGs) 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



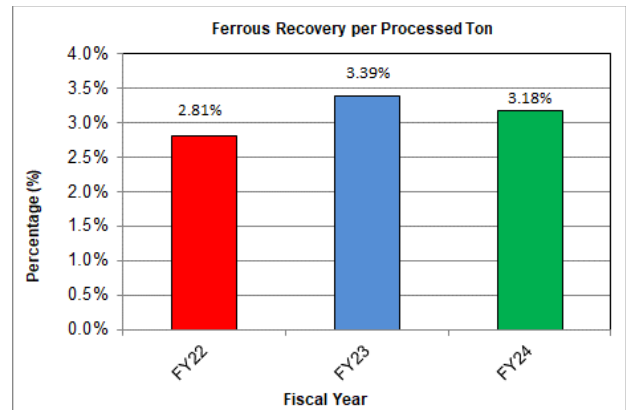
In FY24, the Facility processed a total of 349,483 tons of Municipal Solid Waste (MSW). The quantity of waste delivered by the Jurisdictions has remained fairly consistent over the past several years. In FY24, 21,874 tons were delivered by the City, which is 3.2% less than FY23. There were 30,852 tons delivered by the County, which is 8.1% more than FY23. In FY24, the City accounted for 6.3% of total waste deliveries, and the County accounted for 8.9% of total waste deliveries. The remainder of total deliveries to the Facility are classified as waste collected by commercial haulers within the two Jurisdictions (noted as Municipal Solid Waste in the following chart), accounting for 82.6% of total waste deliveries, and Supplemental Waste, which accounted for approximately 1.9% of total waste deliveries in FY24.



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 FY24 totaled 6,596 tons, which is 10.9% less than last year.

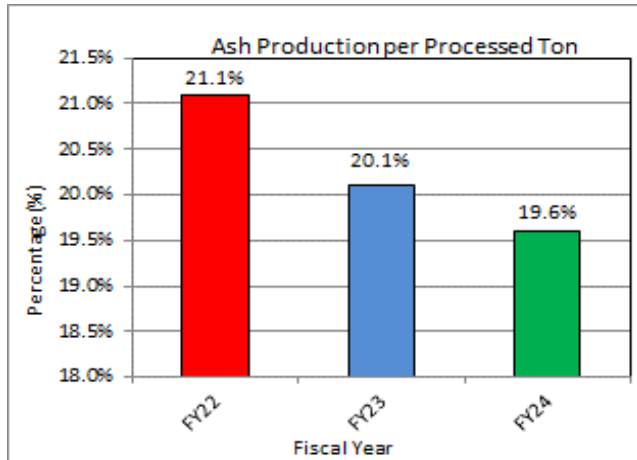
Ferrous Metal Recycled

In FY24, 11,118 tons of ferrous metals were recovered from the ash and recycled. This is comparable to the total recovered in FY23 (11,874 tons).



Ash Disposed

In FY24, 68,523 tons of ash generated at the Facility were disposed of, which represents a decrease of 2.6% compared to FY23. The ash production rate, i.e. the tons of ash produced per ton of waste processed, was 19.6%, and has dropped below the industry standard range of 20 to 22 percent. This is favorable compared to other well-operated, mature WTE facilities.



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 and is based upon an assumption that each pound of waste processed generates 3.34 pounds of steam. The Facility complied with this permit limit throughout FY24. 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 FY24 was 2.82 tons of steam per reference ton of waste, which is lower (1.5%) than the rate in FY23 and represents a decline in boiler operations. The Turbine Generator performance is evaluated in terms of the quantity of steam that it takes to generate one gross kWhr of electricity, where a lower steam rate indicates better performance. In FY24, this metric was 14.8 lbs of steam per gross kWhr, was lower (2.2%) than FY23; which is indicative of an increase in performance after the turbine overhaul in FY23.

Facility Maintenance

Significant and routine maintenance was performed at the Facility throughout FY24, 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 RAAI continues to implement an effective maintenance regimen and is performing routine and preventative maintenance and selected equipment replacements in a timely manner.

Facility Enhancements

During FY24, RAAI replaced the feed chutes on Boiler Nos. 2 and 3 during their respective major outage. Boiler No. 1 feed chute is scheduled for replacement in FY25.



Photo: New feed chute on Boiler No. 2.

Operational Performance

The boilers experienced 1,520 hours of downtime (scheduled, unscheduled and standby) in FY24, and had an overall availability of 94.6%, which compares favorably to mature, well-operated, WTE Facilities. The turbine generators experienced 611.2 hours of downtime (scheduled, unscheduled, and standby) and had an overall availability of 99.4%, which is excellent.

Overall, it is the opinion of HDR that RAAI is performing needed repairs and replacements of equipment as required, to overcome wear, tear,

obsolescence, and equipment that has reached end of life. These efforts will need to continue in order for the Facility to operate reliably, efficiently, and safely for the next twenty years.

Housekeeping

Routine assessments have shown that RAAI 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 assessments performed by HDR. HDR also identifies deficiencies during its assessments and maintains a running list of the deficiencies, which is updated as corrective actions are taken. In general, the deficiencies identified have been minor and do not require immediate attention. Throughout FY24, 14 new deficiencies were reported by HDR, and three new or existing deficiencies were addressed by RAAI. At the end of FY24, 25 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 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. The 90 ppmvd NO_x annual average limit is contained in the Stationary Source Permit to Operate, Registration No. 71895 issued by VDEQ and effective February 8, 2019. All Units were under the annual average limit. Throughout FY24, the air pollution control equipment-maintained emission concentrations well within the established regulations, and the Facility experienced no permit deviations. As of

the end of FY24, the Facility operated a total of 670 days without a permit deviation. Annual stack testing was conducted in March 2024 and results demonstrate compliance well within the permit limits for all parameters.

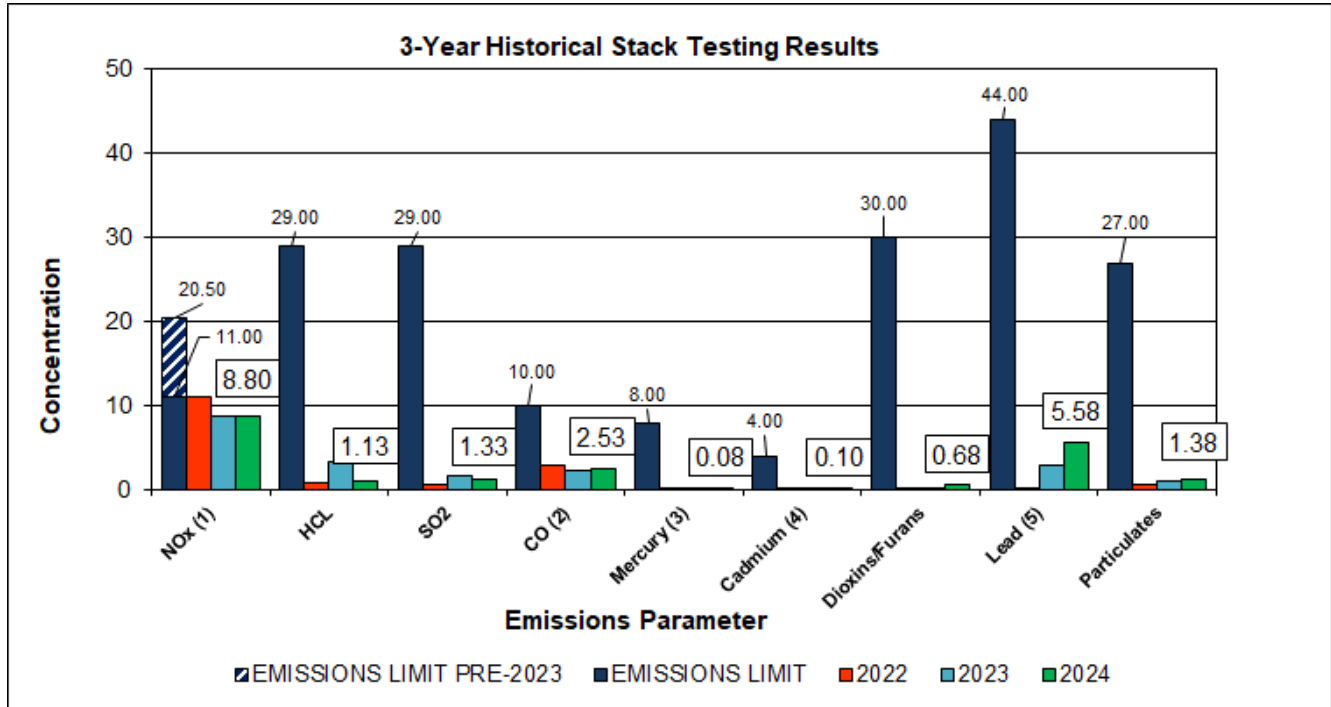
New Emissions Guidelines

On December 20, 2023, USEPA signed a proposed update to the Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources for Large Municipal Waste Combustors (MWCs). These rules are commonly referred to as the Maximum Achievable Control Technology (MACT) Rules for Large MWCs. The stack emissions addressed under the MACT rules include particulate, sulfur dioxide, hydrogen chloride, nitrogen oxide, carbon monoxide, lead, cadmium, mercury and dioxins and furans. The proposed revisions would significantly reduce all emissions from current limits except for carbon monoxide for most facilities. Additionally, other changes would be implemented such as removal of startup/shutdown/malfunction provisions, removal of alternative percent reduction allowances for acid gases and mercury emissions and revise continuous emission monitoring system reporting and reliability requirements. The EPA is currently reviewing the many comments submitted regarding the proposed rules and is expected to issue the final rules yet this year. The rules will then be available for state agencies to adapt, and facilities would then be required to comply based upon an established implementation schedule. It is anticipated that the Facility will meet the newly proposed limits.

Ash Conditioning

The ash is periodically sampled and tested for its potential to leach toxic compounds, using ash toxicity (TCLP) procedures. Testing occurred in October 2023 and March 2024 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): NOx emissions have been decreased by a factor of 10 for trending purposes. The limit is based on the daily 24-hour limit.

Note (2): CO emissions have been decreased by a factor of 10 for trending purposes

Note (3): Mercury emissions have been increased by a factor of 100 for trending purposes

Note (4): Cadmium emissions have been increased by a factor of 100 for trending purposes

Note (5): Lead emissions have been increased by a factor of 100 for trending purposes

Safety & Environmental Training

The Facility experienced no OSHA recordable accidents in FY24, RAAI has operated a total of 572 days without an OSHA recordable accident as of the end of the fiscal year. RAAI conducts training for its employees covering a number of varying safety and environmental issues, including hearing conservation, hand and power tools, fall protection and respiratory protection.



Photo: Scales entering the Facility.

Outreach

Facility Tours

RAAI provides tours of the Facility to groups and individuals representing educational and civic groups. During FY24, RAAI provided 20 tours to (but not limited to) Alexandria High School, the City of Alexandria Fire, and Joint Base Anacostia, and many other groups.

Community Engagement

During FY24, RAAI hosted multiple events for community outreach and engagement. Some major events included the WAA wreath disposal, Alexandria Alive Food Hub, and the Shredding and Battery collection event. RAAI continues to engage in the community monthly in an effort to maintain positive public relationships.