Report

Onondaga County
Resource Recovery Facility

NYSDEC Part 360 Permit ID No. 7-3142-00028/00011
Title V Air Permit ID No. 7-3142-00028/00009

Annual Report of Facility Operations
Operating Year 2006

Onondaga County
Resource Recovery Agency
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Contents

Contents
(Cont'd)

Appendix - Tables & Figures (Cont'd)

Section 1
Introduction

This report presents a summary of operations and environmental performance of the Onondaga County Resource Recovery Facility ("Facility"), located at 5801 Rock Cut Road (Town of Onondaga), Jamesville, New York for calendar year 2006. The Facility operates in accordance with NYSDEC Part 360 Permit ID No. 7-3142-00028/00011 (issued 11/16/01) and USEPA Title V Air Permit ID No. 7-3142-00028/00009 (issued 1/8/02). 2006 represents the 12^{th} full year of Facility operation since initial start-up on November 10, 1994; contractually, commercial operation began on February 25, 1995.

The Facility's operational and environmental performance data presented in this report were provided by Covanta Onondaga, L.P. ("Covanta") the Facility operator, in its monthly and annual operations and regulatory compliance reports. Also included in this report are charts and graphs highlighting long-term averages and trends in the operational and environmental performance observed after 12 years of continuous plant operation, as prepared by OCRRA.

Information on Facility operations, environmental performance relative to permitted air emissions and health risk assessment levels, ash residue characteristics, routine operating and maintenance costs, and energy and recovered ferrous revenue are presented in Sections 2 through 5. These 2006 operating and performance parameters are also compared to historical levels and with those observed at other similar waste-to-energy facilities. The tables and graphs presented illustrate observable trends in operating performance and environmental compliance.

2006 also represents the third full calendar year of Facility operation under a second amended service agreement between OCRRA and Covanta, as amended and restated in 2003. The second amended agreement, while modifying certain financial responsibilities of each party, maintained the same operating and performance thresholds and guarantees as the original agreement of May 9, 1990 and the first amended agreement of November 15, 1992.

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Section 2
Operating Performance

2.1 Refuse Handled

The WTE Facility received 349,084 tons of refuse during 2006 of which 32 tons, or less than 0.01% of the incoming waste stream, were rejected as non-processible waste. Based on the 349,052 tons of Acceptable Waste recorded across the Facility's weigh scales, and beginning and ending refuse pit inventory, 350,942 tons of solid waste were processed in 2006.

A total of 39,581 hauler refuse vehicles and OCRRA transfer trailers delivered solid waste to the Facility in 2006. Waste deliveries averaged 956 tons per calendar day. On a delivery day basis approximately 1,340 tons per day were brought to the Facility. Both the annual number of vehicles, 38,200, and the average amount of waste delivered per vehicle of 8.5 tons have remained consistent since commercial operations began in 1995.

Waste processed in 2006 was nearly 5,900 tons or 1.7% more than in 2005. (***See Figure 1***) Annual tonnage for the two principal waste streams being processed, municipal solid waste (MSW) and construction & demolition (C&D) debris, were up 1% and down 4%, respectively, from 2005 levels. The 350,942 tons processed in 2006 represented 97.1% of the Facility's permitted throughput limit of 361,350 tons, leaving 10,400 tons of unused processing capacity.

2.2 Steam Generated

Steam generated in 2006 amounted to 2,436,730 kilopounds (klb), representing an increase of 0.5% over 2005 levels. This resulted primarily from the additional waste processed, even though the 2006 average annual waste heating value was lower than in 2005. 12,621 klb of steam or 0.5% of the total was consumed for internal Facility needs, leaving 2,424,109 klb for electricity production via the plant's turbine-generator. Steam is used internally to preheat combustion air, to heat boiler feedwater, and to power one of two boiler feedwater pumps.

The 2006 annual average specific steam rate (one measure of boiler efficiency) of 3.47 lb steam per lb of refuse processed remained consistent with the Facility's 11-year average, and with that observed at other similar facilities. (personal communication, CDM, 2004) For two of Covanta's northeast WTE facilities, Bristol, CT and Lancaster, PA, the average specific steam rates have averaged 3.15 (10-yr period) and 3.29 (9-yr period), respectively. Covanta reported in 2007 that their domestic WTE plants have averaged a specific steam rate of 3.20 lb-steam per lb-refuse processed over the last two years.

The higher heating value (HHV) of waste processed in 2006 was 5,516 British thermal units per pound (Btu/lb). HHV is a measure of the amount of energy contained in the waste being combusted. If other boiler operating parameters remain the same, the net effect of a greater waste HHV is increased steam production and, in turn, increased electricity generation.

The average HHV of 5,516 Btu/lb, while 0.9% lower than in 2005 when the highest average annual HHV was observed, represented a 3.2% increase over the Facility's 11-year average (1995 through 2005) of 5,346 Btu/lb. (***See Figure 2***) The average and recent HHVs for the Onondaga facility are consistent with the two Covanta plants mentioned above, Bristol and Lancaster, whose average annual HHV over a 10-year and 9-year period, respectively, has been 5,378 Btu/lb and 5,480 Btu/lb. For all of their domestic WTE facilities, Covanta reported in 2007 an average HHV of 5,133 Btu/lb over the last two years.

Waste composition and moisture content mainly determine the heating value of combusted materials. The average annual waste HHV at the Onondaga facility has increased from 5,100 Btu/lb in 1995 to over 5,500 Btu/lb over the past several years. This trend, while partly attributable to varying waste composition and its moisture content, is also related to the increased percentage of non-recyclable C&D materials delivered to the Facility from OCRRA's Ley Creek Transfer Station. The general trend of increasing waste HHV over the past 5 to 10 years has also been observed at Covanta's two northeast facilities referenced above.

Boiler efficiency, in simplest terms, is the difference between the energy input (waste being combusted) and energy output (steam generated). Using monthly data, the 2006 overall boiler efficiency was 71.7%, a value consistent with historical levels and with reported literature values. Boiler efficiencies for the Bristol and Lancaster facilities have averaged 68%.

2.3 Electricity Production

Gross generator output for 2006 was 261,770 megawatt-hours (MWh). Of this amount, 229,734 MWh, or 87.8%, were sold to National Grid (formerly Niagara Mohawk) with the balance being used to operate the Facility. In-plant usage for WTE facilities typically varies between 11 and 13% of total generation. (personal communication, CDM, 2004) In-plant usage at two of Covanta's northeast plants, Bristol, CT and Lancaster, PA have averaged 15.4% (10-yr period) and 14.8% (9-yr period), respectively. Covanta reports (2007) that for all of their WTE facilities, in-plant electrical usage averaged 14.4% over the past two years.

As noted in Section 2.2, 0.5% of the steam generated was used internally; 12% of the electricity was used internally. This apparent discrepancy between the amount of electricity and the amount of steam used internally results from the greater electrical demand of the Facility's large horsepower fans and motors than the amount of steam used internally (as described above). Both the amount of electricity generated and sold in 2006 increased by 1.5% over 2005 levels, with the increase resulting from the greater amount of waste processed. (***See Figures 3 and 4)***

Covanta calculates monthly the amount and HHV of the waste combusted. Monthly HHV values are tonnage-averaged over the year to determine an average annual HHV, a value that establishes a contractual minimum net electricity production rate or Production Guarantee. If the rate is not achieved, liquidated damages may be imposed. For example, for an annual average HHV between 5,501 and 5,750 Btu/lb, the contractual minimum is 610 kWh. For 2006, a net electrical production rate of 655 kWh/ton was achieved, and thus, the Production Guarantee was met. This is further discussed in Sections 2.6 and 4.1.

Plant efficiency, in addition to steam rate and boiler efficiency, can be expressed as the ratio of quantity of steam produced to the amount of electricity generated. If steam is expressed in pounds (lb) and electrical energy in kilowatt-hours (kWh), WTE plants typically exhibit a ratio of 10 to 11. (personal communication, CDM, 2004). The lower the ratio, that is, the less steam generated per electricity generated, the more efficient the facility is in converting through combustion the energy inherent in the solid waste into usable electrical energy.

Data from the Bristol and Lancaster WTE facilities indicate similar steam to electricity ratios: 9.52 (10-yr period) for Bristol and 9.29 (9-yr period) for Lancaster. Covanta reports (2007) that for all their domestic WTE plants, the steam to electricity ratio averaged 10.9 over the past two years. For the Onondaga facility, the 2006 ratio of 9.31 lb/kWh as well as its 11-year (1995-2005) average ratio of 9.39 lb/kWh, demonstrate plant operational consistency and better than typical plant efficiency.

Overall plant efficiency can also be expressed as the ratio of net electrical energy (electricity exported from the Facility) to heat input (from waste combustion), accounting for natural gas used for the boiler's auxiliary burners. These auxiliary burners are used during boiler start-up/shutdown, and when the incoming waste is exceptionally wet. For 2006, the annual Facility efficiency was 20.2%. Typical WTE facility efficiency values are 20 to 25%. (personal communication, CDM, 2004) Plant efficiency has increased from 18.8% in 1995 to 20.2% in 2006. For comparative purposes, the long-term average plant efficiency for the Bristol and Lancaster facilities is 18%.

2.4 Residue Generation

For 2006, 92,488 tons of ash residue were generated and hauled by OCRRA to an out-of-county, state-approved sanitary landfill. ***(See Figure 5)*** This amount of ash residue represented 26.4% of the total refuse processed, a figure somewhat larger than that observed at most other WTE facilities that employ similar air pollution control technology and lime-based ash conditioning systems (personal communication, CDM, 2004). The two Covanta plants mentioned above, Bristol and Lancaster, have exhibited average annual ash ratios of 22.7% (10-yr period) and 23.4% (9-yr period), respectively.

The 2006 ash ratio of 26.4% was less than that for 2005 (27.0%). From 1995 through 2000 the ash ratio was 24.9%. From 2001 through 2005, the ash ratio increased from 25% to over 27% as different methods of ash conditioning were implemented. The increase was partly due to more incoming waste from OCRRA's Ley Creek Transfer Station. ***(See Figure 6)*** Much of the material received at Ley Creek is construction & demolition (C&D) debris; a large portion of which, after sorting, consists of non-recyclable, combustible materials and are sent to the WTE Facility. These materials, especially roofing, have a larger combustion ash content than that typically associated with municipal solid waste. During 2006, dolomitic lime use for ash conditioning was discontinued, which is likely largely responsible for the general decrease in the ash ratio from previous years.

For 2006, 9,332 tons of ferrous metal, or 2.66% of the refuse processed, were removed from the ash residue by the Facility's magnetic separation system, and sent to recycling markets.

(***See Figure 7***) The Bristol and Lancaster WTE plants have exhibited average annual recovered ferrous ratios of 2.92% (10-yr period) and 1.62% (9-yr period), respectively.

For the first five years of Facility operation, the average annual ratio of recovered ferrous steadily increased from 2.89% to a maximum of 3.72% in 1999. From 2000 to the present, this ratio has exhibited a steady decline reaching an annual low of 2.66% in 2006. The recovered ferrous ratio is dependent on the amount of ferrous materials in the incoming waste stream, and on the effectiveness of the Facility's magnetic separation and ferrous "cleaning" (removal of excess ash from the magnetically-separated ferrous by a rotating trommel) systems.

In an attempt to explain the decline in the recovered ferrous percentage, OCRRA reviewed its 2005 waste quantification & characterization study; no significant changes in the amount of ferrous in the waste stream were noted. OCRRA verified that the strength of the rotating magnet removing the ferrous from the ash residue does not markedly decrease over time. Furthermore, no material changes in the operation of the magnetic separation/ash residue conveyance system have been observed by OCRRA or its consultant during periodic site inspections. Based on these facts, OCRRA cannot definitively explain the decline in the recovered ferrous ratio since 2000. The Bristol and Lancaster WTE plants have not exhibited a similar pattern of a decreasing recovered ferrous ratio since 2000.

The Onondaga facility has consistently received favorable pricing for recovered ferrous materials, and has not experienced a period when it incurred a net cost to have the recovered ferrous materials removed. Beginning in late 2003, the economic marketability of recovered ferrous materials improved dramatically following a long period of consistent average pricing of $13 per ton. During 2006, monthly pricing ranged from $85 to $125 per ton; the annual average was $105 per ton. Other WTE plants have not always enjoyed such favorable recycling markets. (personal communication, CDM, 2004) Several other WTE facilities have indicated recent recovered ferrous pricing between $50 and $100. Given the high marketability of recovered ferrous which is expected to remain stable or grow, during 2006, installing a non-ferrous metals recovery system at the Onondaga facility was considered.

With an ash ratio of 26.4%, and no bypassed recovered ferrous, the 2006 combined Facility residue ratio remained below the contractual limit of 32%, as has been the case annually.

2.5   Combustion Unit/Turbine-Generator Availability

Boiler availability is defined as the percentage of total hours in a month that the boilers are on-line and combusting waste compared to total boiler downtime due to mechanical failure only. This is consistent with industry standards (personal communication, CDM, 2004, HDR, 2007). The definition assumes that sufficient waste is available to support the boiler being on-line and combusting waste. If sufficient waste is unavailable, then that corresponding time must be deducted to allow for a true snapshot of boiler availability, and a representative comparison among different facilities.

Facility boiler and turbine-generator availability are monitored and reviewed both monthly and annually. Based on Facility-reported operating, downtime, and stand-by hours, 2006 boiler availability for Units 1, 2, and 3 was 92.5%, 90.1%, and 91.9%, respectively; overall boiler availability was 91.4%. Turbine-generator (T-G) availability was 99.9+%. Boiler and T-G availability have historically annually averaged 90% and 99+%, respectively. Total operating hours, and total scheduled and unscheduled downtime for each boiler unit for 2006 are presented in the following chart: (values given in hours unless otherwise stated)

	Unit #1	**Unit #2**	**Unit #3**	**Turbine/Generator**
Total Operating	8,037	7,802	8,050	8,758
Total Scheduled Downtime	447	565	677	0
Total Unscheduled Downtime	215	305	32	0
Total Downtime	662	869	709	Total Boiler Downtime 2,240
Allowable Unit Downtime (Days)	**18.6**	**23.5**	**28.2**	

Allowable Unit Downtime, as defined contractually, that exceeds the specified threshold of 51.8 days per combustion unit per calendar year could affect total waste delivery credits and ultimately cause an annual throughput processing deficiency, which could in turn lead to throughput performance liquidated damages. Unit downtime in any year caused by scheduled maintenance other than in accordance with an Annual Operating Plan, a schedule of maintenance outages that Covanta must provide the Agency with at least 30 days prior to the commencement of each contract year, is not considered allowable unit downtime.

The maximum number of allowable unit downtime days is not a performance guarantee, but rather provides a mechanism by which the Facility operator could, at least theoretically, contractually limit the amount of waste accepted on a daily, weekly, and monthly basis. It is, however, in the operator's best interest to process as much waste as possible.

Individually, 68% of Unit 1 downtime was due to scheduled maintenance; while downtime related to scheduled outages was 65% and 96% for Units 2 and 3, respectively. (***See Figure 8***) Overall Facility 2006 availability was 91.4%. This value is higher than the Facility's 11-year (1995 through 2005) average of 89.7% and reflects the less downtime normally incurred for unscheduled repairs and equipment malfunctions.

Unscheduled downtime in 2005 resulted primarily from boiler tube leaks, most notably occurring in the superheater portion of the boilers, especially during the last quarter of 2005. The increased boiler availability in 2006 can be attributed to new superheater tubes installed in all three units during late 2005 and early 2006 outages, which reduced the number of unscheduled boiler shutdowns.

A WTE facility cannot realistically achieve 100% boiler availability because of routine and periodic boiler maintenance. Given sufficient waste and processing limits, well designed, operated, and maintained WTE facilities can typically achieve an average annual boiler availability of 90 to 92%. (personal communication, CDM, 2004; HDR, 2006)

For comparative purposes, the long-term average facility boiler availability for the Bristol and Lancaster plants is 92.2% and 92.0%, respectively. Covanta reports (2007) that their domestic WTE facilities have averaged 90.8%. These average boiler availabilities are approximately several percentage points higher than those observed at the Onondaga facility (prior to 2006). Turbine generator availability at the Onondaga facility has averaged 99%, a value consistent with the Bristol and Lancaster facilities.

When stand-by and scheduled downtime are considered, average annual Facility boiler availability has remained consistent, averaging between 88% and 92%. Table 7 presents annual boiler availability and a summary of historical scheduled and unscheduled downtime hours from 1995 through 2006. For the Onondaga facility, unscheduled and scheduled downtime for 2006 were 551 and 1,688 hours, respectively; total downtime being 8.5% of total annual hours. For comparative purposes, the Bristol facility in 2006 had 483 and 841 hours of unscheduled and scheduled downtime, respectively; total downtime being 7.6%. The Lancaster facility experienced 1,767 and 1,211 hours of unscheduled and scheduled downtime, respectively; total downtime being 11.3%.

The Facility has historically performed and continues to perform necessary boiler maintenance consistent with industry standards. Performing the necessary boiler maintenance remains critically important in prolonging the useful life of the boiler; replacing and repairing worn components prevent unscheduled boiler shutdowns, thereby increasing boiler availability.

2.6 Boiler Utilization & Steam Capacity

A term used to describe the combustion rate or boiler utilization is Maximum Combustion Rating or simply MCR. Typically expressed as a percentage, MCR is the ratio of actual steam generated to the maximum amount of steam which could theoretically be generated when the boilers are operating at full design load. The maximum design steam rating or MCR for the Onondaga Facility is 103,950 klb/hr per boiler. Thus, the Facility's MCR for all three boilers is 311,850 kilopounds of steam per hour.

For 2006, the average annual Facility MCR was 98.2%, a value consistent with previous years. Individually, the three boilers exhibited average annual MCRs of 98.8%, 98.9%, and 97.0%, respectively, indicating that while on-line, they operated at near full design levels. This operating scenario represents the most efficient mode of facility operation, and will maximize steam production and thus electrical energy generation. These MCR levels of 97% to 99% are consistent with historical levels observed at the Bristol and Lancaster facilities, and with values reported by Covanta at their other WTE plants.

Another term, steam capacity, is sometimes used to compare boiler efficiencies, and is generally defined as the ratio of actual steam generated to the maximum amount of steam that could be generated if the unit were running full time. The steam capacity of Units 1, 2, and 3 for 2006 was 90.6%, 87.9%, and 89.1%, respectively, with a Facility average of 89.2%. The

89.2 % Facility average for 2006 is a third greater than that for 1996 (67.5%). Steam capacity is generally considered a more representative measure of overall facility utilization than boiler availability. (personal communication, CDM, 2004)

In 2006, the Facility processed 350,942 tons of solid waste or 97.1% of its annual permitted processing (throughput) limit of 361,350 tons at an average steam capacity of 89.2%. This difference between throughput capacity and steam capacity is related to the actual HHV of the wastes being combusted. The Facility's combustion units were designed for a waste having a reference HHV of 6,000 Btu/lb and a throughput capacity of 330 tons per day each.

The average annual waste HHV was 5,516 Btu/lb or 8% lower than design. From a thermodynamic standpoint, as the average waste HHV decreases, the amount of throughput increases. Thus, without a permitted throughput limit, for an average annual waste HHV of 5,516 Btu/lb, the Facility could process from a combustion (thermodynamic) standpoint 393,000 tons per year (excluding downtime for maintenance).

NYSDEC permitted the Facility in 1992 on the basis of throughput and not on steam capacity. In fact, even though 330 tons per days per unit equates to 361,350 tons per year, the original annual throughput processing limit was initially set at 295,000 tons, or about 82% of theoretical throughput. In 1998, NYSDEC approved an increase in throughput capacity to 336,000, and subsequently to 361,350 tons per year in 2001. During the permitting phase of Facility development, some critics of the plant claimed that it was over-designed from a processing standpoint. Waste deliveries, however, have steadily grown over the years with plant throughput capacity currently averaging 97-98%.

For the Bristol and Lancaster WTE facilities, the quantity of waste delivered has increased by 12% and decreased by 10%, respectively over the past 10 years.

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Section 3
Pass-Through Costs

3.1 City Water & Sewer Service Costs

City water satisfies all potable and process needs of the Facility, with the majority being for process use. 29,410,000 gallons, representing 74% of the contractual maximum pass-through amount (for which the Agency is financially responsible) of 40 million gallons per year, were purchased in 2006. This annual water usage translates into 84 gallons (gal) per ton of waste combusted or 56 gal per minute (gpm) overall. 2006 water usage remained consistent with historical levels and design parameters following initial start-up. Total 2006 water costs were $41,148, or $1.40 per 1,000 gallons, a 6% increase from 2005.

The Facility is a zero discharge plant relative to process wastewater; meaning that only sanitary sewage is discharged off-site. An on-site pumping station conveys sanitary sewage along Rock Cut Road to a manhole near the intersection of Brighton Avenue and the entrance to Brighton Towers at which point it enters the City's sewer system and eventually treated at the County's Metropolitan Wastewater Treatment Plant. The cost of sanitary wastewater disposal is included in Covanta's Base O&M Fee, and is therefore not a Pass-Through Cost. Through an agreement between the City of Syracuse and OCRRA established prior to plant start-up, the cost of sanitary sewer service is based Facility-metered potable water usage.

3.2 Natural Gas Costs

Natural gas is the fuel used for boiler combustion start-up prior to actual refuse feed, and for maintaining minimum furnace temperatures following boiler shutdowns or for processing overly wet waste. 2006 natural gas usage was 113,231 therms (1 therm = 100,000 Btu and assumed 1,030 Btu per cubic foot). This was the least amount of gas used annually and was due to considerably fewer shutdowns and start-ups following boiler tube leaks or other equipment malfunctions. The contractual maximum Pass-Through amount for natural gas is 110,000 therms per year; Covanta being responsible for usage over 110,000 therms.

In 2006, natural gas was purchased from UGI Energy Services at an average cost of $1.18 per therm. A transportation charge from National Grid added an additional $0.09 per therm. Total natural gas costs were $144,066 with OCRRA's Pass-Through Cost totaling $140,344. Gas supply prices rose in 2005 from 2004 levels as a result of hurricane Katrina, but decreased and stabilized in 2006.

Based on the waste processed and its HHV, the percentage of heat input into the boilers from the auxiliary gas burners in 2006 was 0.26% of total heat input (down from 0.56% in 2005). One condition of remaining a qualifying facility relative to Federal Energy Regulatory Commission (FERC) regulations is to limit auxiliary heat input to a maximum of 10%.

3.3 Lime Costs

Except for 2001 through 2003, and after August 2006 to the present, two types of lime were used for normal Facility operations. To control the emissions of acid gases, namely sulfur dioxide (SO_2), hydrogen chloride (HCl), hydrogen fluoride (HF), and sulfuric acid (H_2SO_4), a calcium-based lime, referred to as pebble lime, is used in the spray-dry scrubbers. The cost of pebble lime for acid gas control was Covanta's responsibility. Based on delivered quantities of pebble lime and waste processed, the average usage rate, 1995 through 2000, was 22.9 lb of lime per ton of waste processed, and had remained stable over this time period (***See Figure 9***).

In addition to lime for acid gas control, dolomitic lime, a lime with a higher magnesium content than pebble lime, was added to the fly ash prior to combining with the bottom ash originating from the furnace combustion grates. Dolomitic lime was used to provide additional conditioning of the fly ash. In August 2006, the use of dolomitic lime was discontinued and the amount of scrubber lime increased above that level needed solely for acid gas control. Dolomitic lime usage for ash conditioning varied over time, ranging from 6 lb/ton to 13 lb/ton. When both limes were used, for acid gas control and ash conditioning, a total of 29 to 36 lb/ton of lime was introduced into the combined ash residue.

Prior to August 2006, the cost of pebble lime, purchased and delivered in bulk, was solely Covanta's responsibility. Since the cost of pebble lime was not a direct Pass-Through to OCRRA, actual prices were unavailable, but estimated at $90 per ton. The cost of dolomitic lime was the solely OCRRA's. From January through July, 2006, the unit cost for dolomitic lime, delivered to the Facility in 50-lb bags including fuel surcharges, averaged $166 per ton.

Starting in August 2006, the use of dolomitic lime was discontinued, and the pebble (scrubber) lime application rate was increased to 30-31 lb per ton of waste processed. While still providing satisfactory ash conditioning, this change was implemented to improve housekeeping conditions (bagged lime manually introduced into a volumetric feeder ended), to reduce OCRRA's overall ash conditioning costs since pebble lime is a third less costly than dolomitic lime, and to produce a drier, more manageable combined ash residue for disposal. Under the new system, OCRRA is responsible for the amount of pebble lime used in excess of 21 lb per ton of waste processed (with a maximum pass-through rate of 32 lb/ton).

For 2006, the following table presents lime usage rates and costs:

2006 Period	Waste Processed (tons)	Lime Usage Rates (lb/ton waste processed)		Overall Unit Costs (per ton processed)
		Pebble	Dolomitic	
Jan - Jul	200,089	22.6	12.1	$ 2.33 $ 1.03 (OCRRA's share)
Aug - Dec	150,853	28.7	-0-	$ 1.65 $ 0.65 (OCRRA's share)

Based on net electrical generation, the average 2006 annual cost for lime was $3.11 per MWh.

For comparative purposes, for 2006, the Bristol and Lancaster WTE facilities used 27.3 lb and 33.4 lb of total lime per ton of waste processed. This total accounts for both acid gas control and for ash conditioning purposes.

3.4 Ammonia Costs

To control nitrogen oxides emissions, or NO_x, anhydrous ammonia is injected into the combustion chamber of each boiler unit. The cost of the ammonia reagent represents a Pass-Through Cost. There are no contractual maximum levels for ammonia usage, so the Agency is solely responsible for all ammonia used. In 2006, the cost for ammonia reagent was $121,000, based on 270 tons of anhydrous ammonia at an average cost of $450/ton. Ammonia costs have risen 50% since 2002 and peaked to $590 per ton in 2005, before declining to $450 per ton in 2006. Pricing for ammonia is closely linked to the cost of natural gas which is used in the production of ammonia.

Given the 2006 waste tonnage processed, these figures translate into an application rate and unit cost rate for NO_x control of 1.54 lb and $0.34 per ton processed, respectively. These values are consistent with those of previous operating years; while the application rate remains consistent with design parameters (***See Figure 11***). Based on net electrical generation, the annual cost of anhydrous ammonia is $0.53 per MWh. For comparative purposes, to control NOx emissions, the Bristol and Lancaster WTE facilities use 1.23 and 1.48 lb of ammonia per ton of waste processed, respectively.

3.5 Standby Power Costs

During normal Facility operation all in-plant electrical demand is satisfied by the Facility's turbine-generator system, with the excess electricity being exported. During those times when the turbine-generator is off-line due to malfunction or maintenance, electricity is purchased from National Grid (NG) to operate the Facility and remain combusting the incoming municipal solid waste. Electricity purchased these periods is a Pass-Through Cost to the Agency. The contractual threshold levels beyond which Covanta is responsible for such costs are as follows:

Electrical Energy	3,348,000 kWh/rolling 3-year period (maximum)
Electrical Demand	4,400 kW (maximum per billing period)

In 2006, 10,000 kWh (10 MWh) of electricity were purchased from National Grid for in-plant needs, as turbine-generator availability was 99.98%. The amount of electricity purchased and the turbine-generator availability for 2006 are both generally consistent with their long-term averages. The only exception was in 2001 when a scheduled 11-day turbine-generator outage associated with the first major overhaul on this equipment since plant start-up in November 1994 was performed, a total of 677 MW were purchased.

There is one specific contractual threshold levels for turbine-generator availability other than the minimum net electricity production rate for a given average annual waste HHV, as discussed in Section 2.3 - Electricity Production. The number of turbine outage days cannot exceed 21 based on a 3-year rolling average basis. For 2006 this average was 3.2 days.

The 3-year rolling period total for 2006 was 130,285 kWh which is less than the contractual maximum amount stated above relative to the extent of Pass-Through Costs. For 2006, the maximum monthly metered electrical demand was 3,467 kW. National Grid costs for demand in excess of 4,400 kW are paid by Covanta.

The total cost of purchased power for 2006, including electrical usage and demand plus customer charges amounted to $74,824.

3.6 Mercury Control Costs

To control mercury emissions as well as dioxins and furans, powdered activated carbon is mixed into a slurry and injected into the spray-dry scrubbers through the same rotary atomizer as the pebble lime. The entire cost of operating the mercury control system was a Pass-Through Cost prior to the service agreement re-structuring.

These costs were comprised of two components: (1) an O&M Unit Cost Charge of $0.55 per ton of refuse processed which escalated in accordance with designated economic indices. The average unit charge for 2003 prior to re-structuring was $0.75 per ton of waste processed, and (2) an activated carbon reagent unit cost of $760 per ton. For this same time period, these figures translated into a unit cost and usage rate per ton of refuse processed for the mercury control system of $1.20 and 1.25 lb, respectively.

Following service agreement re-structuring, OCRRA is no longer responsible for the mercury control O&M charge. Operating the mercury control system except for reagent costs is part of the Facility’s Base O&M Fee. OCRRA is only responsible for the activated carbon reagent costs. Based on tons processed in 2006 and what the unit O&M cost would have been under the original agreement, elimination of the mercury O&M charge reduced the Agency’s total mercury control Pass-Through Cost by $280,000 or $1 off the Agency’s 2005 MSW tipping fee.

The unit reagent application rate for 2006 was 1.52 lb/ton, a rate generally consistent with both design and historical data. (***See Figure 12***). Total 2006 reagent cost for which the Agency was responsible as a Pass-Through Cost was $179,700. For 2006, unit costs on both a tonnage processed and per electricity sold averaged $0.51 per ton and $0.78 per MWh, respectively.

For comparative purposes, for 2006, the Covanta Bristol and Lancaster facilities used 1.03 and 0.91 lb of carbon per ton of waste processed, respectively, or approximately one-half to two-thirds less activated carbon than the Onondaga facility.

3.7 Other Costs

Contractually, OCRRA is responsible for a number of other Pass-Through Costs in addition to the ones discussed above. There are no maximum or threshold levels with these costs. Other 2006 Pass-Through and related OCRRA Costs included charges for:

- Insurance premiums for the contractually-required types and coverages
- System telecommunications between Facility and National Grid
- State and local sales taxes on purchases of certain goods and services necessary for operating and maintaining the Facility
- Regulatory operating permit renewal fees
- Host Community Agreement payments (the Agency to the Town of Onondaga)
- Special fire and water host community district tax assessments
- Excess waste processing fees
- O&M costs associated with the traffic signalization for the hauler entrance to the Facility (referred to as the "Jug-Handle" intersection)
- OCRRA-contracted consultant engineering services related to providing technical assistance and annual stack & ash testing on-site observations
- Other mutually agreed upon expenses not expressly covered by contract

The Pass-Through “Other Costs” for 2006 were consistent with those of previous years.

Contractually, the Agency is also responsible for paying an Excess Operation & Maintenance (O&M) Charge, commonly referred to as the Excess Waste Fee. This charge is payable in any Contract Year in which there is “Excess Throughput”, that is, when Annual Throughput (waste processed) exceeds an Annual Waste Delivery Commitment.

The original service agreement stipulated an Annual Waste Delivery Commitment of 295,000 tons and an Excess O&M Charge of $15.12 per ton, which escalated annually in accordance with certain economic indices. Subsequent amendments changed the Annual Waste Delivery Commitment to 310,000 tons and the Excess O&M Charge to $14.00 per ton. In addition, the Excess Throughput would be reduced by the quantity of certain supplemental wastes processed at the Facility.

By 2002, the Excess O&M Charge had escalated to over $22 per ton. With the 2003 service agreement re-structuring, the base Excess O&M Charge was reset at $18 per ton, subject to annual escalation; the Annual Waste Delivery Commitment at 310,000 tons. For 2006, the Excess O&M Charge was $20.08 per ton per ton of Excess Throughput. Based on the Annual Throughput of 350,942 tons and 35 tons of Supplemental Waste, OCRRA paid an Excess Waste Fee of $821,414.

For 2006, O&M Charges, including the Excess Waste Fee, and Pass-Through Costs paid to Covanta totaled $10.58 million and $1.24 million, respectively. Covanta also received 10% of electricity revenues and 50% of recovered ferrous revenues.

While an Excess Waste Fee is is paid for waste processed in excess of 310,000 tons per year, OCRRA derives net revenues for Excess Throughput at the Facility, both in terms of direct payments related to tipping fees and electricity and ferrous revenues, as well as not having to pay for handling and hauling costs that would have been otherwise incurred by having to landfill Excess Throughput had the waste not be processed at the plant.

Terms of the re-structured service agreement stipulates that the Excess Waste Fee be paid directly to the Trustee and held in an “escrow account”. Payments are no longer made directly to Covanta. Covanta can, upon request and approval, draw from this account to pay for designated and allowable major Facility repairs and maintenance.

Section 4
Energy Revenues

4.1 Electricity

The total amount of electricity sold to National Grid during 2006 was 229,734 MWh. Based on the OCRRA/National Grid (formerly Niagara Mohawk) contract, payment by National Grid to the Agency shall be calculated using the greater of $0.06 per kWh or National Grid's reported "Avoided Cost". For 2006, the minimum floor pricing of $0.06 per kWh applied, resulting in overall energy revenues of $13,784,040 with OCRRA's 90% share being $12,405,636. The minimum rate of $0.06 per kWh is in effect until 2009 at the earliest.

Second only to MSW tipping fee revenue are electricity sales and thus they represent a major component of OCRRA's total overall annual operating budget. For 2006 the Agency's share of the electricity revenue represented 36% of its operating budget.

Increased waste processed, higher waste HHV, and consistently high system efficiency have contributed to a 39% increase in electricity sold from 1996 (***See Figure 13***). Based on electricity unit revenue and the amount electricity sold, OCRRA received over $35 in energy revenue for every ton of waste processed in 2006. In addition, the net electrical energy (the amount of electricity sold) derived from each ton of waste processed was 0.655 MWh. This net energy production rate has increased by over 14% from 1996 (***See Figure 14***).

For comparative purposes, the net electricity per ton of waste processed for Covanta's Bristol and Lancaster WTE plants has averaged 560 kWh/ton (10-yr period) and 602 kWh/ton (9-yr period), respectively.

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Section 5
Facility Inspections

5.1 Annual & Routine Inspections

In accordance with NYSDEC Part 360 regulations, an annual general facility inspection must be undertaken to determine the operating condition of the safety, emergency, security, process, and control equipment. Covanta must have this inspection performed under the direction of a New York State licensed professional engineer. With the approval of the NYSDEC, Covanta had the required Facility annual inspection performed in mid-January 2007.

The summary report was prepared through discussions with plant personnel during a 3-day site review and inspection. *Covanta's Consultant concluded: "Based upon the above inspections and information, the safety, emergency, security, process and control equipment at the Onondaga County Resource Recovery Facility operated by Covanta Onondaga at 5801 Rock Cut Road, Jamesville, NY 13078 are considered to be in acceptable operating condition".* This annual inspection report was submitted to the NYSDEC on February 22, 2007 as part of the Facility's 2006, 4th Quarter & Annual Solid Waste Report.

In 2006 OCRRA had its independent consultant, HDR Engineering, Inc. (HDR) conduct three (3) comprehensive 2-day site inspections. These visits focused on all various aspects of plant operations and maintenance. The February site visit coincided with the Unit #3 Spring boiler outage, which based on the extent of maintenance performed, represented the Facility's major annual outage. The July site inspection coincided with a summer outage for Boiler Unit #2 and the September site inspection was conducted during the Fall Unit #3 outage.

Based on observations made during these site inspections, review on other reported operating data and information, and their experience at other WTE facilities, it was HDR's opinion that the Facility is being well maintained and is in overall good operating condition. The routine preventative maintenance and major repairs performed during the (Fall) outage were consistent with the type and level of repairs observed by HDR at other waste-to-energy facilities. The majority of the Facility systems and equipment appeared to be operating properly. The level of daily repair and preventative maintenance observed at the Facility was considered normal for facilities of the same type and age.

During the required annual air emissions testing, conducted in May 2006, OCRRA had HDR on-site for the entire 5 days of stack testing. Test results received in September 2006, as submitted to DEC, indicated that all measured constituents were found to be below regulatory-permitted levels (***See Table 8***).

In addition to annual stack testing, the Facility is also required to conduct semi-annual ash residue testing to determine whether or not the ash residue exhibits hazardous characteristics. The Agency also had HDR for a portion of each of the two 5-day sampling events. All tested constituents were found to be below regulatory levels (***See Table 9***).

Periodic site inspections were also conducted by local regulatory and code enforcement personnel to test various components of the facility such as the fire protection systems, or simply to review the records of the Facility for regulatory compliance with environmental standards and permit conditions. Covanta complied with timely submitting the required status and operating reports to the regulatory agencies.

Relative to the Facility's NYSDEC Solid Waste Permit, an annual inspection must be performed by DEC to determine compliance with appropriate Part 360 regulations. As a result of that inspection which was performed in mid-December, the NYSDEC determined that the Facility is in compliance with Part 360 regulations and its Part 360 Permit to Operate.

Section 6
Summary of Operations

Based on 2006 operating data, overall Facility operations continued at high levels for the 11th year of continuous operation. Individual boiler unit availability ranged from 91+% to 93+% with an overall Facility boiler availability of 92.7%. Turbine-generator availability was 99.9+%. Boiler utilization values indicated that while on-line and combusting solid waste, all three boilers were operated at their design operating level or steam load (average annual Facility maximum combustion rating, or MCR, of 101%). In 2006, the Facility again demonstrated full regulatory compliance with all air, solid waste, and ash residue permit requirements and complied with the following contractual guarantees and thresholds:

Parameter	**Contract/Guarantee Thresholds**	**Operating Year 2006**
Annual Throughput (Processing Capacity)	310,000 ton/yr (1) 361,350 ton/yr (2)	350,942 ton
Annual Waste Delivery Commitment	310,000 ton (minimum)	349,052 ton
Allowable Unit Downtime	51.8 days/unit/yr	18.6, 23.5, 28.2 days (Units 1, 2, & 3, respectively)
Electricity Production (3)	610 kWh/ton	655 kWh/ton
Water Consumption* (4)	40,000,000 gal/yr	29,410,000 gal
Natural Gas Use* (4)	110,000 therms	113,231 therms
Electricity Power* (4)	3,348 MWh (electricity purchased) (3-yr rolling average)	10 MWh
	4,400 kW (electrical demand) (monthly maximum)	3,467 kW
Environmental (5)		
Air Emissions	NYSDEC Permit (annual stack test)	Passed Full Compliance
Ash Residue	Quality - TCLP Testing (2 per year)	Passed (non-hazardous)
	Quantity - 32% of waste processed (ash plus any by-passed recovered ferrous)	26.4%

Notes:

(1) Contract maximum given reported average annual average waste heating value of 5,516 Btu/lb
(2) Maximum throughput limit per calendar year in accordance with DEC Part 360 Permit
(3) Based on calculated average annual waste heating value of 5,516 Btu/lb
(4) Purchased electricity in excess of stated 3-yr rolling period is Covanta's cost responsibility; similarly, water consumption and natural gas usage in excess of the stated maximum amounts are Covanta's cost responsibility
(5) For air emissions exceeding either Permitted or Contractual levels, and for the total percentage of ash residue and recovered ferrous that must be landfill disposed exceeding 32%

* Represents usage thresholds, not actual contractual guarantees

Figures 16 through 22 illustrate the excellent environmental performance of the Facility as documented by stack test results. Shown are the average Facility stack test results relative to their respective emission permit limits for 13 rounds of stack testing, 1995 through 2006 for seven common pollutants. These include fine particulate matter (PM-10), hydrogen chloride, dioxins/furans, lead, mercury, ammonia, and cadmium. As shown, the measured levels have consistently been well below regulatory limits. The table below presents the results for these seven constituents as expressed as a percentage of their respective permit limits.

Figure 23 presents a comparison of the 2006 stack test results for the same seven pollutants identified above with their respective 11-year averages (1995 through 2005). Not only have these levels been well below the permit limits, but after 12 years of continuous plant operation, the levels remain low, and for many constituents actually show a downward trend: a clear indication that the Facility's air pollution control system continues to operate effectively, and OCRRA's efforts in screening the incoming waste continue to be effective.

Environmental performance can also be assessed by comparing the total amount of pollutants emitted annually from the Facility to those amounts used in the Facility's original Health Risk Assessment (HRA). The HRA amounts were evaluated by experts to cause no unacceptable health risks during one's lifetime exposure to projected maximum Facility stack emissions. Three pollutants, sulfur dioxide, nitrogen oxides (NOx), and carbon monoxide, are gases which are monitored continuously by the Facility's continuous emissions monitoring system (CEMS).

The annual quantity emitted for these three constituents is easily determined. The annual amount of other pollutants, those pollutants whose emissions are measured during annual stack testing, are estimated by multiplying the number of boiler operating hours for each individual combustion unit by its respective air emission rates measured during annual stack testing.

The table below presents the percentage of the HRA level associated with each of the seven pollutants identified above for the past 12 years (1995 through 2006). As shown, the total amount of these pollutants emitted annually represents a small percentage of their respective HRA amounts.

Pollutant	Average Facility % of Permit Limit*	% of HRA
Fine Particulate Matter (PM-10)	8	7
Hydrogen Chloride	26	21
Dioxins/Furans (TEQ)	5	2
Lead	5	2
Mercury	16	1
Ammonia	6	6
Cadmium	6	1

* Based on 13 rounds of stack test results, 1995 through 2006

For the three pollutants noted above which are measured continuously by the Facility's CEMS, Figures 24 through 26 highlight the long-term performance trend of the Facility's air pollution control system for removing acid gases and overall combustion efficiency. Figure 24 shows average annual levels of sulfur dioxide to be 11% of the HRA level for 12 years of operation.

Figure 25 show annual levels of NOx near the HRA amount, they remain consistently below it. These apparent higher levels are necessary to ensure that excess ammonia emissions do not result. To control NOx emissions anhydrous ammonia is injected into the combustion zone of the Facility's boilers. Sufficient anhydrous ammonia must be introduced to control NOx emissions only to the extent that excess ammonia emissions (known as ammonia slip) do not result. While more ammonia may lower NOx emissions, optimization testing during initial Facility start-up in 1994 demonstrated the optimum ammonia injection levels to control NOx and prevent ammonia slip.

Figure 26 shows the measured annual levels of carbon monoxide relative to both the Facility's mass emission permit limit as well as that used in the HRA. The amount of carbon monoxide is an indicator of the level of combustion of the incoming municipal solid waste. Complete combustion of wastes containing carbon results in the formation of carbon dioxide and water. Incomplete burning results in the formation of carbon monoxide. The more efficient or complete combustion is, the less carbon monoxide is produced. Efficient combustion not only limits carbon monoxide emissions, but also ensures that emissions of other pollutants, especially various organic compounds, are minimized.

To illustrate how efficient combustion limits emissions of organic compounds, a brief discussion of the level of dioxins and furans as measured during annual stack tests is presented. It is acknowledged that dioxin and furan emissions constitute considerable environmental concern. While Figure 18 shows the excellent environmental performance track record for these emissions, the 2006 percentages for dioxin/furan (TEQ) emissions are 2.7 % and 1.2 % of permit limit and HRA, respectively. These levels are exceedingly small and are indicative of Facility operation incinerator with excellent combustion and effective air pollution controls. The amount of dioxins/furans (TEQ) emitted during 2006 was estimated to be 0.00008 pounds (8 one hundred thousandths of a pound): an inconceivably small amount; an amount equivalent to the weight of $8/100^{ths}$ of a standard paper clip.

In 1990, the contribution of atmospheric mercury from coal-fired power plants and waste-to-energy facilities were similar and substantial. During the following decade because of the emission standards imposed on municipal waste combustors (MWCs), the contribution to atmospheric mercury from MWCs relative to coal-fired power plants dropped dramatically. While coal-fired plants still contribute over 40% of all domestic human-caused mercury emissions in the U.S., according to the USEPA, mercury emissions from WTE plants have decreased to about 4% of the total.

Recently enacted federal legislation has targeted the coal-fired power plant industry but the expected overall mercury reductions that should result from new air pollution control systems for these plants will not be realized for many years to come, perhaps not until as late as 2015.

In contrast to mercury emissions from other sectors of the electric power industry, Figure 27 shows the effectiveness of the Facility’s mercury control system. Figure 27 shows both the inlet and outlet (stack) average mercury concentrations, and control effectiveness for the period 1995 through 2006. Inlet concentrations indicate the level of mercury in the incoming waste stream. As shown, inlet mercury levels since 1995 have exhibited a dramatic decrease, which resulted from restrictions in the mercury content of many products, most notably, batteries.

More importantly ate the mercury emissions measured during annual stack testing, which, as shown, are generally less than 10 % of the Facility’s current permit limits of 28 micrograms per dry standard cubic meter. The effectiveness of the Facility’s carbon injection air pollution control system for removing mercury over this same period has averaged 98+ %.

The WTE Facility is also environmentally friendly from the greenhouse gas emission reductions realized through combustion relative to those emissions resulting from the landfill disposal of the non-recyclable municipal solid waste. Many scientists attribute greenhouse gases (GHGs) from increased human activities, especially the combustion of fossil fuels and transportation, are primarily responsible for overall global warming. According to studies by the Waste-to-Energy Research & Technology Council (WTERT) at Columbia University, NYC, greenhouse gas emissions from waste-to-energy facilities on a ton per ton carbon-equivalent basis, are 1/5 of those from landfills without methane recovery.

For 2006, using this relationship, 70,000 tons of net GHG emissions (carbon equivalents) resulted through combustion relative to landfilling the same amount of waste. Based on USEPA estimates, about 1.3 tons of carbon dioxide emissions are avoided per ton of waste through combustion. Figure 28 shows the avoided greenhouse gas emission (CO_2 equivalents) through combustion rather than landfilling, 1995 through 2006. For 2006, 350,000 tons of waste processed at the Facility avoided 455,000 tons of carbon dioxide (CO_2) over landfilling the same waste.

A joint study of the Columbia Schools of Engineering and Public Policy for the City of New York (“Life After Fresh Kills”, the NYC mega-landfill that was recently ordered closed by the USEPA) showed that landfilling should be limited only to non-recyclable and non-combustible materials due to:

- Greenhouse gas emissions
- Volatile organic and heavy metal emissions
- Aqueous emissions (the reason that both Long Island and Florida have adopted Waste-to-Energy)

In several European countries and many U.S. states, waste-to-energy (or EfW, energy from waste, as it is referred in Europe), is considered a renewable energy source. The Facility can export an average of 650 kilowatts of electricity for every ton of waste combusted. To produce an equivalent amount of electricity would require about 1.2 barrels of oil or 0.3 tons of coal. For 2006, the WTE Facility by combusting non-recyclable solid waste produced enough energy to displace the equivalent of 420,000 barrels of oil or 105,000 tons of coal, while producing enough electricity to satisfy the needs of 30,000 homes in OCRRA's service area.

To illustrate this, Figures 29 shows the equivalent number of barrels of oil displaced annually by the WTE Facility for the 12-year period 1995 through 2006 to produce the same amount of electricity.

Another comparison can be made relative to the savings in landfill space by disposing of Onondaga County's solid waste at the WTE Facility. To have otherwise landfilled the 350,000 tons of waste processed in 2006 would have required nearly 1.5 million cubic yards of landfill air space. If compacted to a 20-foot height, the landfilled waste would consume 28 acres of land.

In summary, the USEPA in a February 2003 letter to the Integrated Waste Services Association (IWSA), a nationally-recognized solid waste management organization, assessed Waste-to-Energy as "…clean, reliable, renewable power…" and on a national basis that "These plants produce 2,800 megawatts of electricity with less environmental impact than almost any other source of electricity." The Onondaga County Resource Recovery Facility is leading the way in providing an environmentally sound and cost-effective method of solid waste disposal while partially providing the energy needs of a community of 450,000 people.

Since beginning commercial operation in early 1995 through 2006, the WTE Facility has processed over **3.9 million** tons of municipal solid waste while generating almost **2.5 billion** kilowatt-hours of electricity for Central New York. To have produced an equivalent amount of electricity would have required **1.1 million** tons of coal or **4.7 million** barrels of oil. Over the past decade the Facility has been well operated and maintained by Covanta Onondaga. While operating under one of the strictest waste-to-energy air permits in the country, results of the Facility's annual air emissions and ash residue test results have and continue to demonstrate its exemplary environmental performance.

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Section 7
Executive Summary

2006 Facility Operations & Performance

- Waste processed amounted to 97.1 % of permitted throughput capacity; steam capacity amounted to 89.2 % of rated combustion capability; Facility is Permit throughput-limited at 361,350 tons per year.

- Average annual net electricity production was 655 kilowatt-hours of per ton of waste processed; one of the highest annual rates achieved to date.

- Markets for recovered ferrous materials remained strong throughout the year, yielding greater than anticipated recovered ferrous revenues.

- OCRRA's outside consultant, HDR, based on site inspections and review of operational and performance data, concluded that the WTE Facility is being well maintained and that preventative maintenance programs remain consistent with past practices and industry standards.

- Results of annual air emissions testing (stack tests) are consistent with historical data and in many instances, measured emissions were less than their respective 11-year average values.

- Annual emissions of continuously monitored pollutants and those based on boiler operating hours and measured stack test results remained below those levels associated with the Facility's original Health Risk Assessment (HRA).

- Based on annual stack testing, mercury levels associated with waste processed continue to decrease, the Facility continues to demonstrate high mercury removal efficiency, and the level of mercury emissions is less than for coal burning power plants.

- Results of annual stack testing show that dioxin emissions remain almost non-existent and several orders of magnitude less than those released by backyard burn-barrels. Based on a 1997 USEPA study, ***800*** households disposing of their typical weekly trash in a burn-barrel for ***one*** week would release into the environment the amount of dioxins/furans (TEQ) as the WTE Facility emitted in 2006 by combusting nearly 351,000 tons of municipal solid waste.

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APPENDICES

Tables
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Figures

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TABLES

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TABLE 1

Summary of Operating Data (1)
Operating Year 2006

Refuse Handled	
Received (ton)	349,084
Processed (ton)	350,942
Rejected (ton) (2)	32
HHV (Btu/lb) (3)	5,516
Steam Production	
Total Steam (Klb)	2,436,730
Steam Capacity (%) (4)	89.2
Electrical Generation	
Gross Power Generated (MWh)	261,770
Electricity Sold (MWh)	229,734
Total Power Purchased (MWh)	10
Total In-Plant Usage (MWh)	32,046
Gross Unit Production Rate (kWh/ton)	746
Net Unit Power Exported (kWh/ton)	655
In-Plant Usage Rate (kWh/ton)	91
Residue Generation	
Ash Removed (ton)	92,489
Ferrous Materials Recovered (ton)	9,335
Total Residue (ton)	101,824
Total Ash Residue (% of Waste Processed)	26.4
Total Ferrous Residue (% of Waste Processed)	2.7
Total Residue (% of Waste processed)	29.1

TABLE 1 (Cont'd)
Summary of Operating Data (1)
Operating Year 2006

Boiler/Turbine-Generator Operating Time (5,6,7,8)

Boiler No.1 (hr)	8,037
Availability (%)	92.5
Total Downtime (%)	7.5
Boiler No.2 (hr)	7,802
Availability (%)	90.1
Total Downtime (%)	9.9
Boiler No.3 (hr)	8,050
Availability (%)	91.9
Total Downtime (%)	8.1
Overall Facility (3 boilers)	
Availability (%)	91.5
Turbine-Generator (hr)	8,758
Availability (%)	99.98
Total Downtime (%)	0.02

Reagent Use *(units are pounds of reagent, as delivered, per ton of waste processed)*

Scrubber Lime (for Acid Gas Removal & Ash Conditioning)	25.2
Dolomitic Lime (for Ash Conditioning prior to 3/01)	7.0
Carbon (Mercury Removal)	1.52
Ammonia (NO_x Removal)	1.54

Notes:

(1) Based on Covanta's Monthly/Annual Operations & Solid Waste Reports
(2) Non-Processible Waste sent to Landfill
(3) Average of monthly HHV calculations, tonnage adjusted
(4) Based on design steam flow, MCR of 103,950 lb/hr/boiler and total hours in year
(5) Total number of hours equipment was in operation
(6) Total hours per year = 8,760 per boiler
(7) Availability defined as % of potential boiler operating hours per year relative to total hours in year, unadjusted for standby hours (unavailable waste); calculated as (total hours less downtime) divided by total hours x 100
(8) Total Downtime defined as % of total scheduled and unscheduled downtime hours relative to total hours in year

TABLE 2

Comparison of Historical Operating Data (1)
Operating Years 1996 through 2006

Parameter	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Refuse Handled											
Received (ton)	289,626	295,162	320,169	326,227	335,068	343,999	338,638	349,646	355,609	345,210	349,084
Processed (ton)	288,309	294,837	320,299	326,155	335,139	344,592	338,732	349,040	354,523	345,069	350,942
Rejected (ton) (2)	383	144	80	72	84	36	46	54	35	26	32
HHV (Btu/lb)	5,086	5,223	5,268	5,397	5,366	5,427	5,492	5,311	5,428	5,567	5,516
Steam Production											
Total Steam (Klb)	1,850,365	1,983,844	2,169,981	2 ,255,349	2,263,281	2,352,370	2,333,802	2,378,585	2,444,936	2,423,846	2,436,730
Capacity (%) (4)	67.5	72.6	79.4	2.6	82.6	86.1	85.4	87.1	89.3	88.7	89.2
Electrical Generation											
Generated (MWh)	194,006	209,238	229,448	240,432	245,131	251,733	252,695	255,338	264,477	257,741	261,770
Sold (MWh)	165,461	180,271	199,336	210,666	214,294	220,778	221,538	224,036	232,415	226,347	229,734
Purchased (MWh)	113	155	9	181	7	677	86	135	0	121	10
In-Plant Usage (MWh)	28,658	29,122	30,121	29,947	30,844	31,632	31,243	31,437	32,062	31,515	32,046
Production (kWh/ton)	673	710	716	737	731	730	746	732	746	747	746
Power Sold (kWh/ton)	574	611	622	646	639	641	654	642	656	656	655
In-Plant Rate (kWh/ton)	99	99	94	92	92	91	92	90	90	91	91
Residue Generation											
Ash Removed (ton)	70,367	74,960	80,634	83,033	84,679	94,114	88,091	91,065	96,278	93,292	92,489
Ash (% of Wp)	24.4	25.4	25.2	25.5	25.3	27.3	26.0	26.1	27.2	27.0	26.4
Ferrous Recovered (ton)	8,857	8,725	10,043	12,128	11,163	11,450	10,258	10,857	9,801	9,479	9,335
Total Residue (ton)	79,224	83,685	90,677	95,161	95,842	105,564	98,349	101,922	106,079	102,771	101,824
Total Residue (% of Wp)	27.5	28.4	28.3	29.2	28.6	30.6	29.0	29.2	30.0	29.8	29.1

TABLE 2 (Cont'd)

Comparison of Historical Operating Data (1)

Operating Years 1996 through 2006

Parameter	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Boiler/T-G											
Operating Time (5,6)											
Boiler No.1	5,910	6,804	6,629	7,271	7,629	7,856	7,604	7,306	7,774	7,427	8,037
Availability	85.6	86.9	91.1	89.5	91.1	95.0	89.6	88.3	89.6	84.8	92.5
Boiler No.2	6,846	7,582	6,514	7,134	6,518	7,234	7,354	7,754	7,664	7,885	7,802
Availability	92.4	90.7	89.6	87.9	86.0	89.7	89.1	91.3	88.3	90.0	90.1
Boiler No.3	5,466	5,643	7,702	7,249	7,721	7,809	7,907	7,771	8,004	7,803	8,050
Availability	90.1	86.2	94.5	86.5	92.1	89.2	93.0	90.9	91.2	89.1	91.9
Turbine-Generator	8,653	8,685	8,657	8,660	8,872	8,480	8,735	8,694	8,784	8,685	8,758
Availability	98.51	99.14	98.82	98.86	99.98	96.80	99.71	99.25	100.00	99.14	99.98
Reagent Use *(represents pounds of reagent, as delivered, per ton of waste processed)*											
Pebble Lime	17.5	24.1	23.0	22.7	24.5	31.9 (7)	31.0	26.1	25.3	24.7	25.2
Dolomitic Lime	13.1	10.8	8.6	8.6	6.1	0.8 (8)	0.0	4.2	7.7	9.9	7.0
Carbon	0.95	1.20	1.25	1.35	1.19	1.53	1.29	1.40	1.38	1.36	1.52
Ammonia	1.24	1.74	1.62	1.62	1.70	1.60	1.36	1.51	1.65	1.54	1.54

Notes:

(1) Based on Covanta's Monthly/Annual Operations & Solid Waste Reports
(2) Non-Processible Waste sent to Landfill
(3) Average of monthly HHV calculations, tonnage adjusted
(4) Based on design steam flow, MCR of 103,950 lb/hr/boiler and total hours in year
(5) Total number of hours equipment was in operation
(6) Hour per year = 8,760 hr for non-leap years; 8,784 hr for leap years
(7) Acid gas removal and ash conditioning starting 3/01
(8) Ash conditioning prior to DustMaster permanent conditioning system

TABLE 3

Comparison of Historical Pass-Through Costs
Operating Years 1996 through 2006
(in dollars)

Pass-Through Cost Component	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Insurance	432,899	373,176	333,135	319,086	336,423	365,168	606,072	644,791	537,223	489,113
Water	21,807	22,760	24,878	25,957	26,995	29,666	42,093	35,504	38,126	39,704
Utilities (Gas & Electric)	109,859	80,418	94,950	106,027	108,685	177,690	163,338	196,652	172,439	202,998
Sales Taxes	84,393	42,555	(55,399)*	34,714	31,614	47,462	53,411	28,647	35,712	41,480
Permits/Fees	7,443	38,683	39,231	36,908	35,908	23,786	40,145	36,680	38,630	26,975
Mercury Control	278,835	368,079	363,334	390,576	388,195	441,022	424,700	359,035	194,050	159,647
Ammonia	54,202	77,752	68,538	66,654	71,800	84,332	87,390	104,128	121,191	131,596
Ash Conditioning	291,681	297,337	229,172	246,172	198,217	210,355	186,027	186,292	211,575	281,596
Delivery Shortfall	19,729	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Excess Waste Fee	-0-	-0-	366,630**	460,110	821,055	739,331	637,609	702,612	831,652	677,781
Other Costs*** (As agreed upon)	-0-	-0-	46,507	-0- 10,032	-0-	-0-	-0-	-0-	-0-	20,450

TABLE 3 (Cont'd)

Comparison of Historical Pass-Through Costs
Operating Years 1996 through 2006
(in dollars)

Pass-Through Cost Component	2006
Insurance	364,916
Water	41,148
Utilities (Gas & Electric)	109,859
Sales Taxes	84,393
Permits/Fees	7,443
Mercury Control	278,835
Ammonia	54,202
Ash Conditioning	291,681
Delivery Shortfall	- 0 -
Excess Waste Fee	821,414
Other Costs*** (as agreed upon)	- 0 -

* Reflects a refund from the NYS Department of Finance for previously paid but non-applicable sales taxes

** Amount includes 25 % credit applicable for 1998 and 1999

*** Reflects legal fees for Permit amendment, engineering costs for ammonia tank sprinkler system, radioactive waste removal, additional air/ash testing, and extra scale house operating hours

Decrease in Excess Waste Fee for 2001/2002 due to change in tonnage threshold (295,000 to 310,000 tpy) in 2001; throughput limit increased (DEC approved) 336,000 to 361,350 tpy

TABLE 4

Comparison of Historical Utility Consumption
Operating Years 1996 through 2006

Parameter	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Water Consumption (million gal)	24.5	24.0	26.4	27.5	28.2	30.3	28.1	29.9	31.5	30.0	29.4
(gal per ton waste processed)	84.9	81.4	82.3	84.3	84.0	88.0	83.0	85.6	89.0	86.9	83.8
Natural Gas Consumption (1000 cu ft)	22,026	21,504	5,053	33,199	17,914	14,772	15,723	18,591	12,954	20,908	10,922
Electricity Purchased (MWh)	113	155	9	181	7	677	86	135	0	121	10

TABLE 5

Summary of Monthly Energy and Recovered Ferrous Revenues
for Operating Year 2006

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	**Year**
Electricity Exported													
(MWh)	15,632	12,679	19,720	20,485	21,198	20,585	19,558	19,407	18,092	23,251	20,408	18,719	229,734
($)*	844,128	684,666	1,064,880	1,106,190	1,144,692	1,111,590	1,056,132	1,047,978	976,968	1,255,554	1,102,032	1,010,826	12,405,636*
Ferrous													
(ton)	715	623	953	686	682	950	844	860	727	876	812	605	9,333
($) *	30,556	32,469	49,666	38,329	40,686	59,520	52,857	36,760	38,442	42,365	37,744	28,801	488,195
Steam													
(Klb)	175,322	146,812	214,405	211,968	219,430	214,714	209,242	208,474	192,137	233,912	209,939	200,375	2,436,730

Note: * OCRRA's share of total revenue at 90% for electrical energy sold and at 50% for marketed recovered ferrous materials
OCRRA pays 100% of any expenses required to recycle/dispose of recovered ferrous materials when markets dip below $0 per ton

TABLE 6

Comparison of Historical Energy and Recovered Ferrous Revenues*
Operating Years 1996 through 2006

Parameter	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Electricity Revenue (mil $)	8.93	9.73	10.76	11.36	11.57	11.92	11.96	12.1	12.6	14.1	12.4
Recovered Ferrous Revenue (1000 $)	70.6	83.0	79.9	74.4	61.1	15.0	50.7	91.1	457.5	333.6	488.2

Note: * OCRRA's share of total revenues received; 90 % for electrical energy and 50 % for recovered ferrous materials if unit revenue is greater than $0 per ton; otherwise OCRRA pays 100% of cost to remove recovered ferrous materials

TABLE 7

Comparison of Historical Operating Data
Scheduled & Unscheduled Facility (3 Boilers) Downtime
Operating Years 1996 through 2006

Year	**Scheduled Downtime** (hr)	**Unscheduled Downtime** (hr)	**Total Downtime** (hr)	**Total Downtime*** (%)
1996	1,964	196	2,160	8.2
1997	2,124	586	2,710	10.3
1998	1,262	588	1,850	7.0
1999	1,873	1,101	2,974	11.3
2000	1,728	745	2,473	9.4
2001	1,991	338	2,329	8.9
2002	1,998	383	2,381	9.1
2003	1,958	714	2,672	10.2
2004	1,954	738	2,692	10.1
2005	2,373	790	3,163	12.4
2006	1,688	551	2,239	8.5

Note: Total Downtime computed as a percentage of total scheduled and unscheduled downtime relative to total number of hours in calendar year.

TABLE 8

2006 ANNUAL STACK TEST RESULTS

(Regulatory Title V Compliance)

Constituent	Average Measured Emissions Unit 1	Unit 2	Unit 3	Permit Limit (1)	% of Limit (2) Facilty Ave	Pass/ Fail? (P/F)
Total Particulates (gr/cf)	0.000852	0.000980	0.000958	**0.010**	9.3	**P**
Sulfur Dioxide (ppm)	18.5	0.57	16.4	**30**	39.4	**P**
Sulfur Dioxide (lb/hr)	7.56	0.22	6.35	**16.2**	29.1	**P**
Nitrogen Oxides (ppm)	165	161	160	**180**	90.0	**P**
Nitrogen Oxides (lb/hr)	48.3	46.6	44.9	**58**	80.3	**P**
Carbon Monoxide (ppm)	3.6	5.7	4.3	**45**	10.1	**P**
Carbon Monoxide (lb/hr)	1.2	1.4	2.0	**8.04**	19.1	**P**
Polychlorinated Dibenzo-p-Dioxins and Furans						
(ng/cm) - Total	1.65	1.86	1.26	**30**	5.3	**P**
(ug/cm) - NY TEQ	0.0000329	0.0000275	0.0000121	**0.0004**	6.0	**P**
(lb/hr) - NY TEQ	4.79E-09	3.70E-09	1.85E-09	**1.29E-07**	2.7	**P**
Hydrogen Chloride (ppm)	4.88	4.89	5.92	**25**	20.9	**P**
Hydrogen Chloride (lb/hr)	1.10	1.12	1.38	**5.24**	22.9	**P**
HCl Removal Efficiency (%)	99.2	99.0	99.0	**95 (min)**		**P**
Ammonia (ppm)	0.86	1.09	0.65	**50**	1.7	**P**
Ammonia (lb/hr)	0.09	0.12	0.07	**4.88**	1.9	**P**
Cadmium (mg/cm)	0.00044	0.00043	0.00041	**0.04**	1.1	**P**
Cadmium (lb/hr)	6.47E-05	6.41E-05	6.46E-05	**1.90E-03**	3.4	**P**
Lead (mg/cm)	0.00637	0.00377	0.00410	**0.44**	1.1	**P**
Lead (lb/hr)	9.43E-04	5.57E-04	6.45E-04	**3.81E-02**	1.9	**P**
Mercury (ug/cm)	1.90	4.63	1.65	**28**	9.7	**P**
Mercury (lb/hr)	0.000280	0.000682	0.000257	**0.012**	3.4	**P**
Mercury Removal Efficiency (%)	98.0	96.9	97.8	**85 (min)**		**P**
PM-10 (gr/cf)	0.000852	0.000980	0.000958	**0.010**	9.3	**P**
PM-10 (lb/hr)	0.26	0.33	0.32	**3.16**	9.6	**P**

Notes:

(1) Facility Permit limits as established by the New York State Department of Environmental Conservation
U.S.E.P.A. Title V Permit Number 7-3142-00028/00009, issued 1/8/2002, as modified effective 3/24/2003
Values obtained from Air Emissions Test Report submitted by Covanta Onondaga

(2) Calculated as average of each unit test result (each unit test result is average of three replicate test runs per unit) over the Permit Limit expressed as a percent

(3) All concentrations expressed at 7% oxygen (O_2) dry standard volume

(4) PM-10 is particulate matter less than 10 microns in diameter; for compliance purposes, all TP was considered PM-10

Units:

gr/cf	= pollutant concentration expressed in grains per cubic foot
ppm	= pollutant concentration expressed in parts per million
lb/hr	= pollutant emission rate expressed in pounds per hour
ng/cm	= pollutant concentration expressed in nanograms (billionth's of a gram) per cubic meter
ug/cm	= pollutant concentration expressed in micrograms (millionth's of a gram) per cubic meter
mg/cm	= pollutant concentration expressed in milligrams (thousandth's of a gram) per cubic meter
Pass/Fail	= pollutant stack test result measured at levels below (Pass) or above (Fail) regulatory limit
min	= minimum percent (%) reduction between pre-air pollution control (APC) system and post-APC system or pollutant levels leaving Facility stack (represents measure of APC effectiveness)
TEQ	= NYSDEC - Toxic Equivalents (toxicity of various dioxins/furans expressed on common basis)

TABLE 9

Ash Residue Characterization Semi-Annual Test Results

Onondaga County Resource Recovery Facility

>>>>> 1st Semi-Annual Test: April 2006 <<<<<

Comparison of Statistical Test Results and Regulatory Threshold Limit for Metal Analytes

Test Sample Metal Analyte	**Statistical Test Parameter** (milligrams per liter)	**Regulatory Threshold (Permit Limit)** (milligrams per liter)	**Compliance Status (% of Limit)**
Cadmium	0.05	1.0	Acceptable (5%)
Lead	0.25	5.0	Acceptable (5%)

>>>>> 2nd Semi-Annual Test: August 2006 <<<<<

Comparison of Statistical Test Results and Regulatory Threshold Limit for Metal Analytes

Test Sample Metal Analyte	**Statistical Test Parameter** (milligrams per liter)	**Regulatory Threshold Permit Limit** (milligrams per liter)	**Compliance Status (% of Limit)**
Cadmium	0.38	1.0	Acceptable (38%)
Lead	0.57	5.0	Acceptable (11%)

Notes:

Statistical test parameter is the 90% Upper Confidence Limit as a single-tailed normal distribution (equivalent to 80% Upper Confidence Interval as a two-tailed distribution) per procedures set forth by the USEPA

For cadmium and lead test value results below laboratory detection limits, statistical analysis performed using the value of ½ the detection limit for each analyte

CONCLUSION:

Compliance Status of "Acceptable" means that the ash residue as tested in accordance with the established regulatory analytical and statistical procedures (TCLP leaching procedure) does **not** exhibit a hazardous characteristic and can be managed as a non-hazardous solid waste

FIGURES

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Figure 1. Annual Waste Processed

Onondaga County Resource Recovery Facility

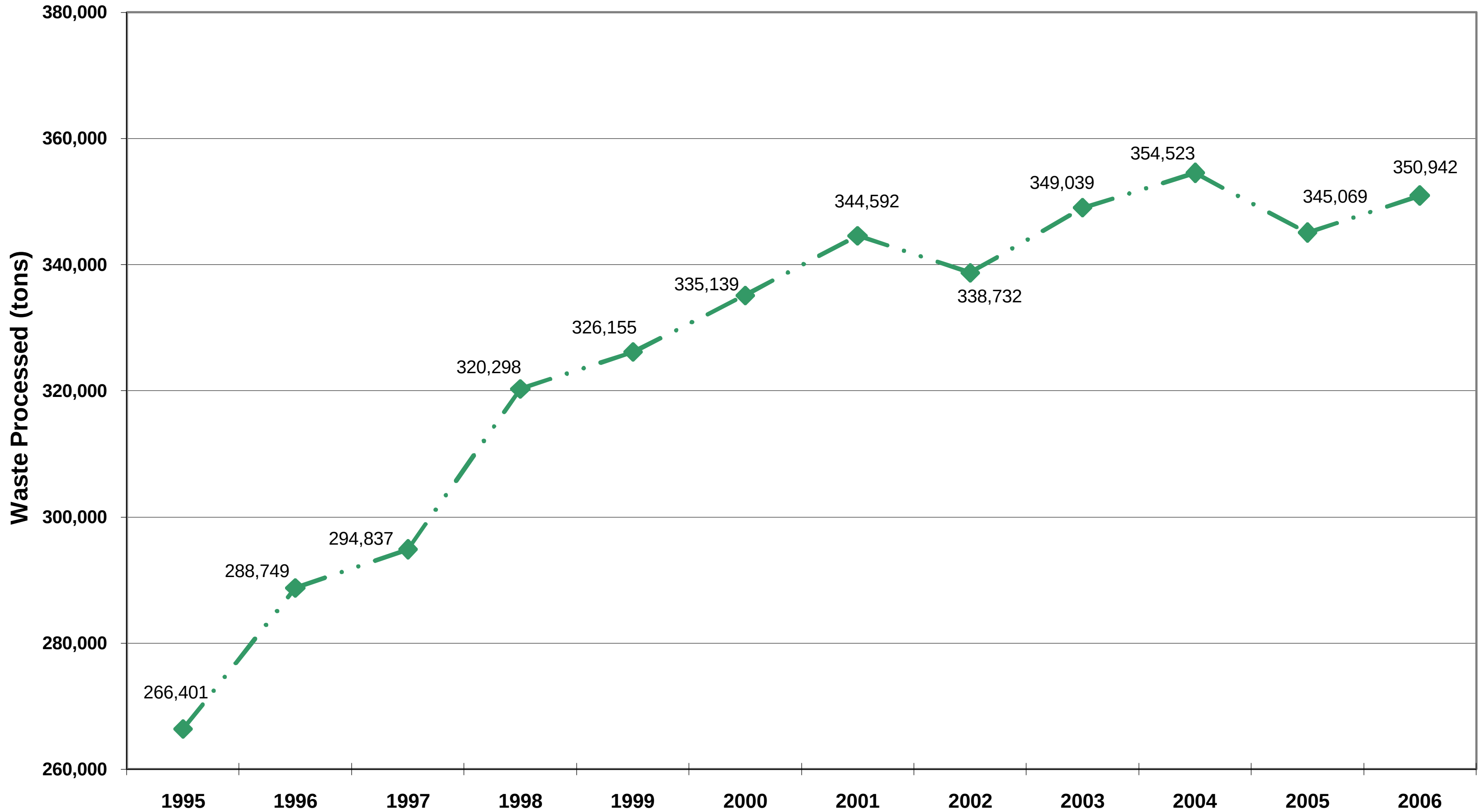


Figure 2. Average Annual Waste Higher Heating Value

Onondaga County Resource Recovery Facility

Figure 3. Annual Electrical Energy Generated & Sold

Onondaga County Resource Recovery Facility

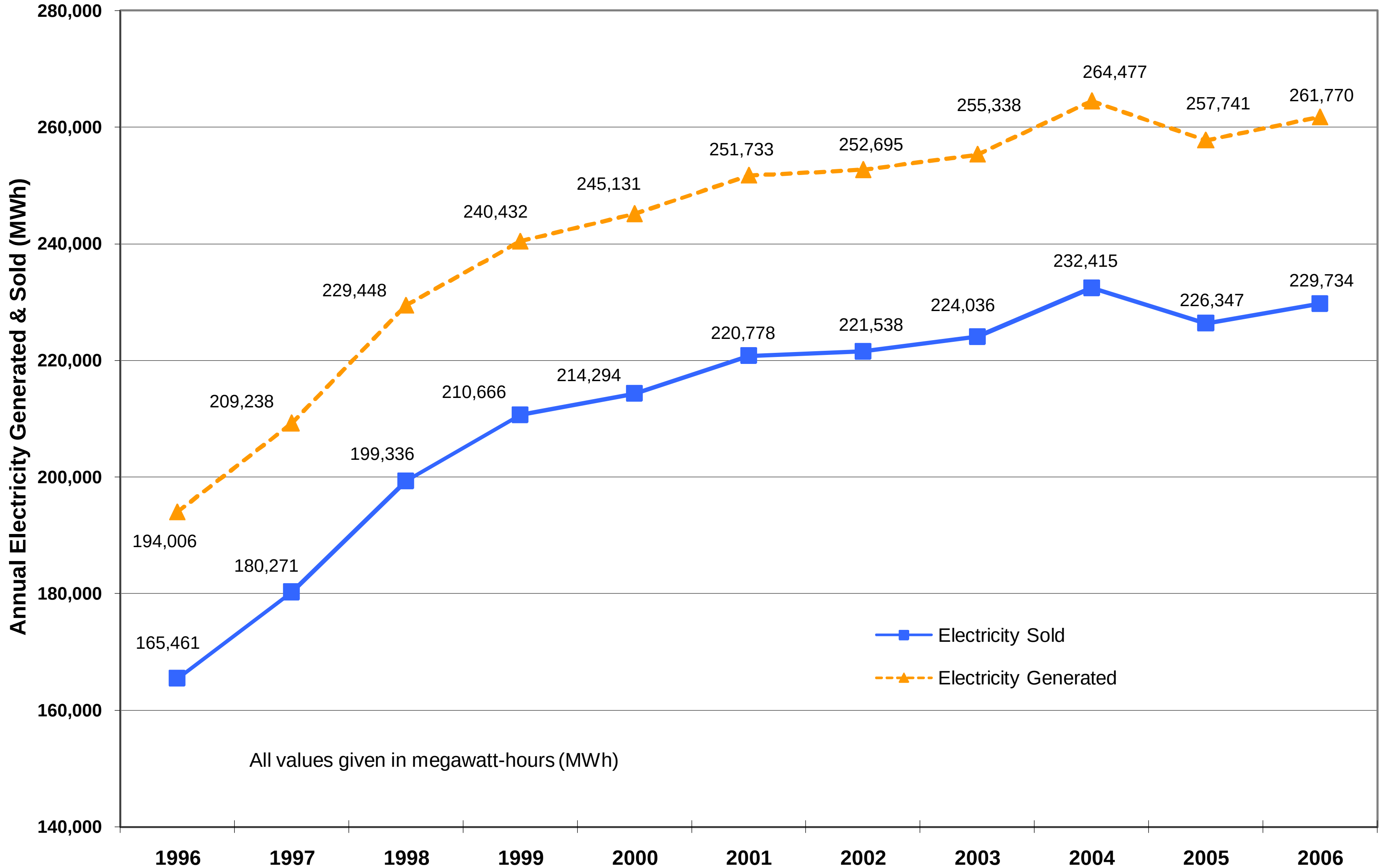


Figure 4. Average Annual Net Electricity Production Rate

Onondaga County Resource Recovery Facility

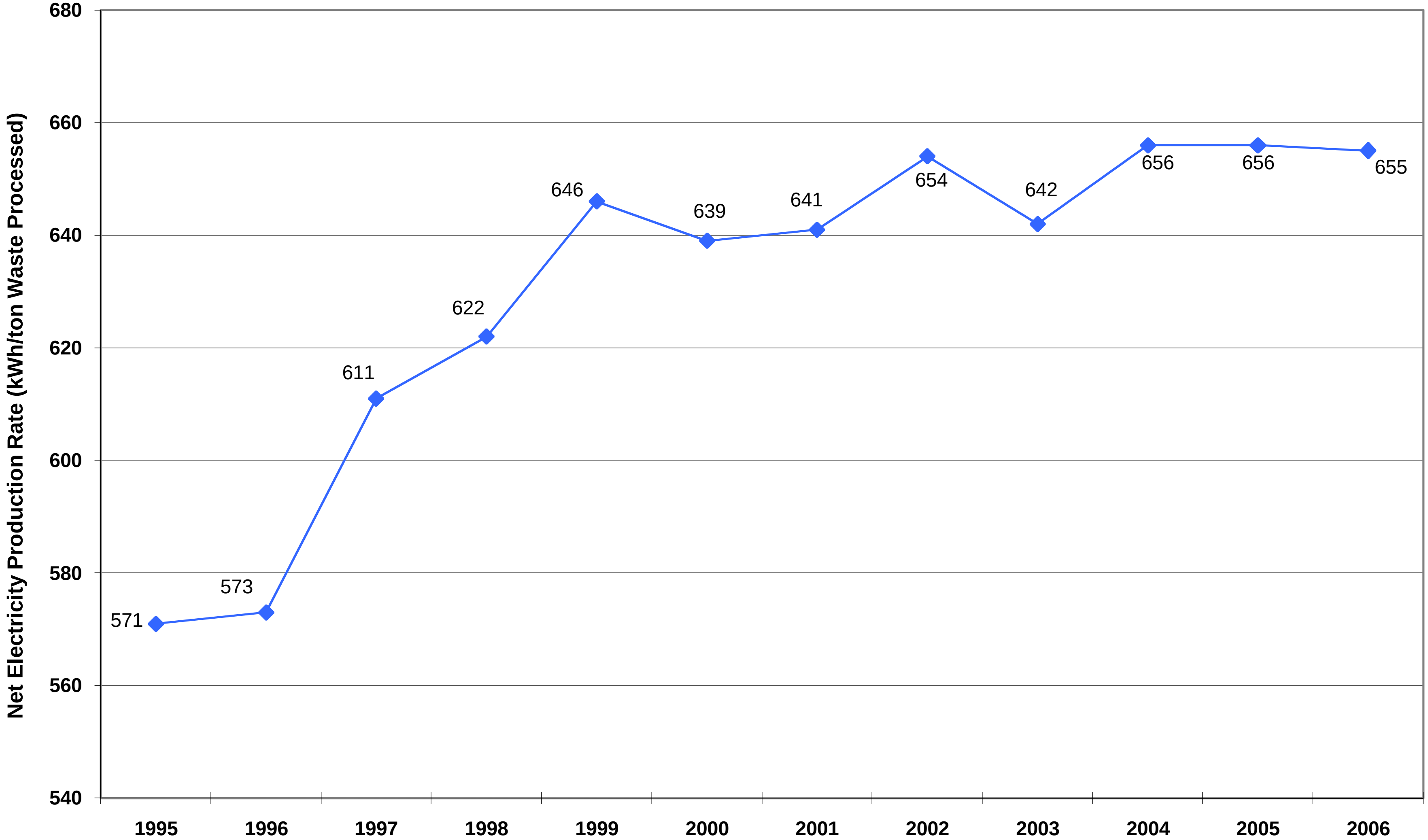


Figure 5. Annual Average Ash Ratio as Percent of Throughput

Onondaga County Resource Recovery Facility

Figure 6. Ley Creek Deliveries as Percentage of WTE Deliveries

Onondaga County Resource Recovery Facility

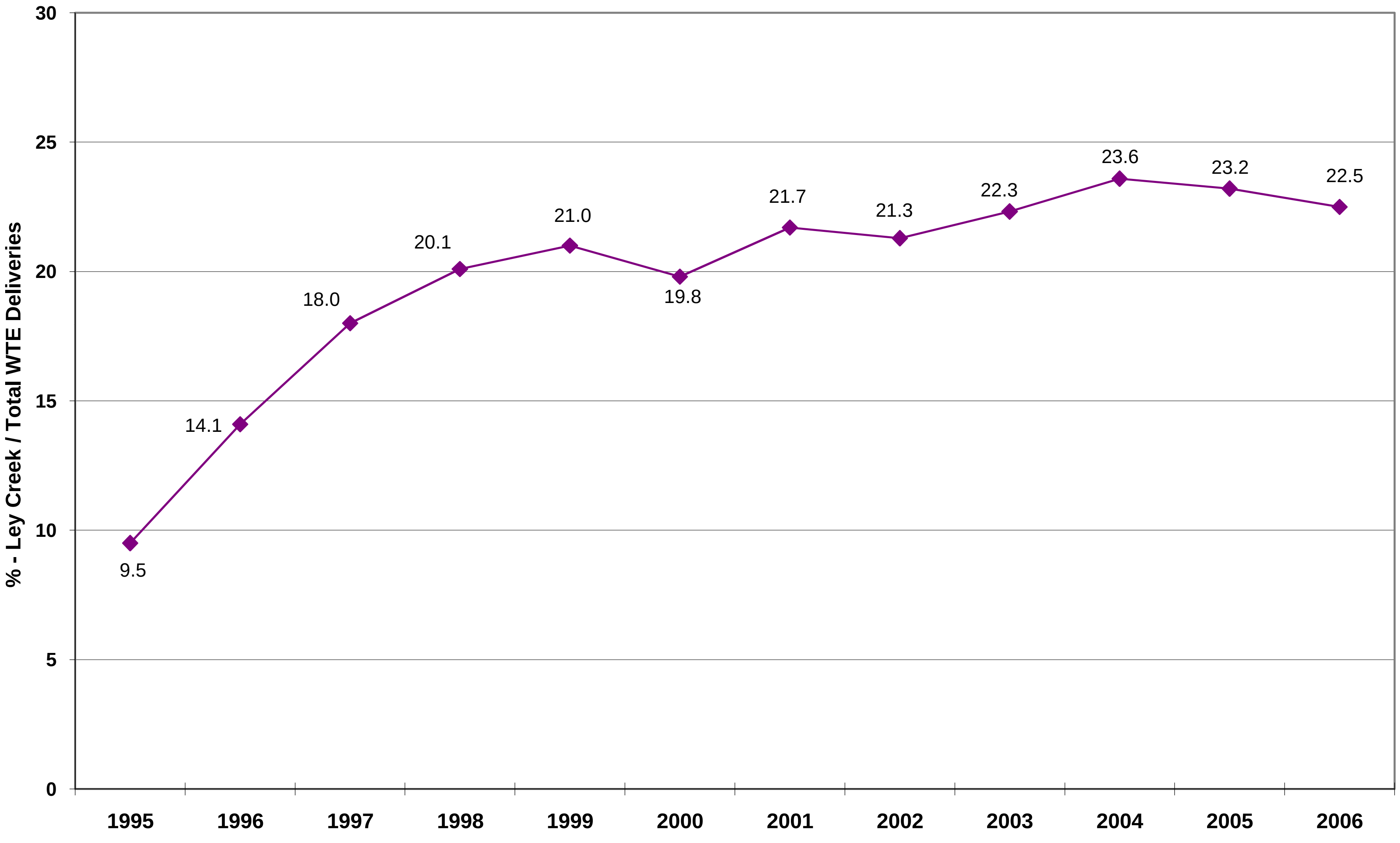


Figure 7. Recovered Ferrous Materials as Percent of Throughput

Onondaga County Resource Recovery Facility

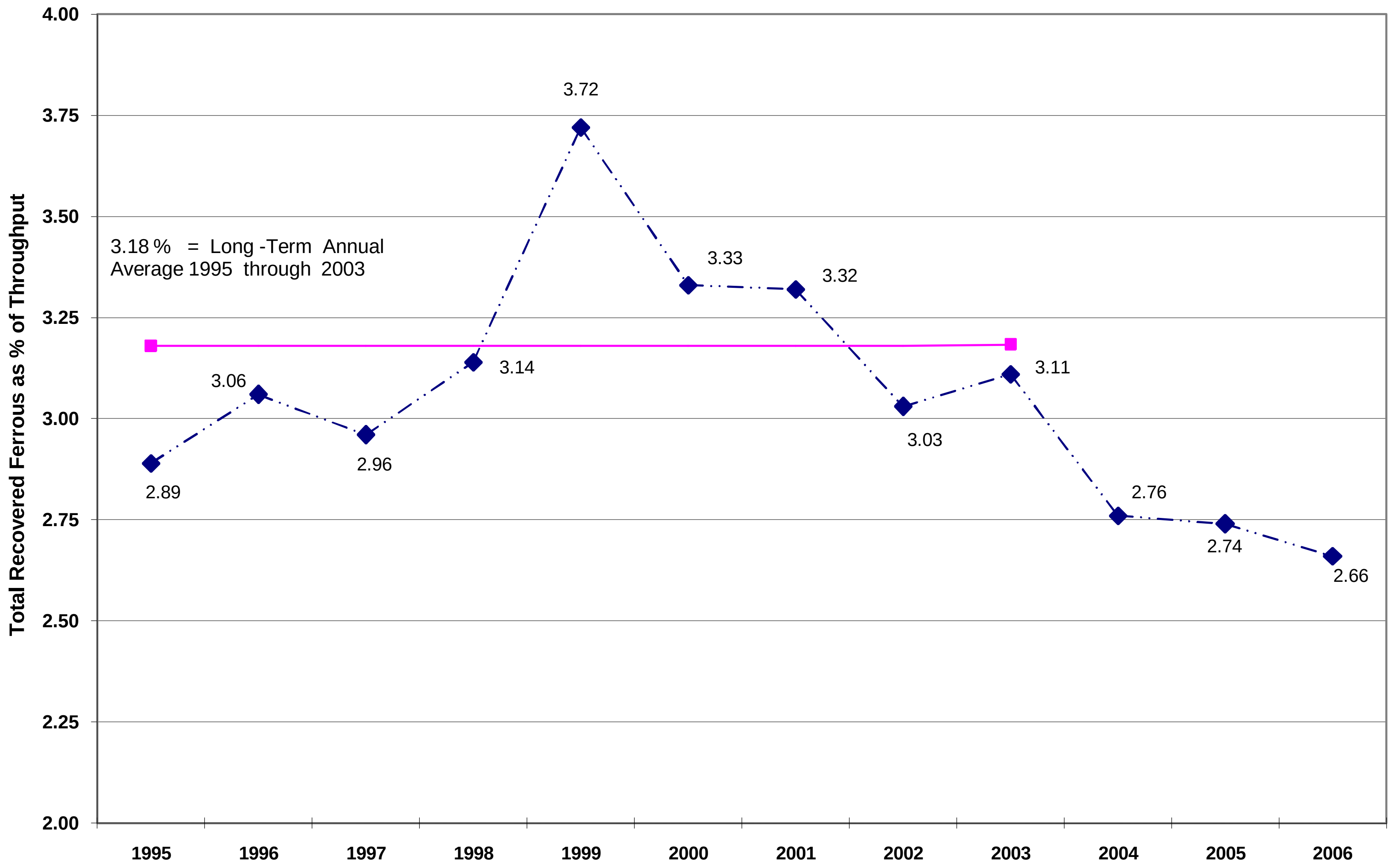


Figure 8. Boiler Availability & Steam Capacity

Onondaga County Resource Recovery Facility

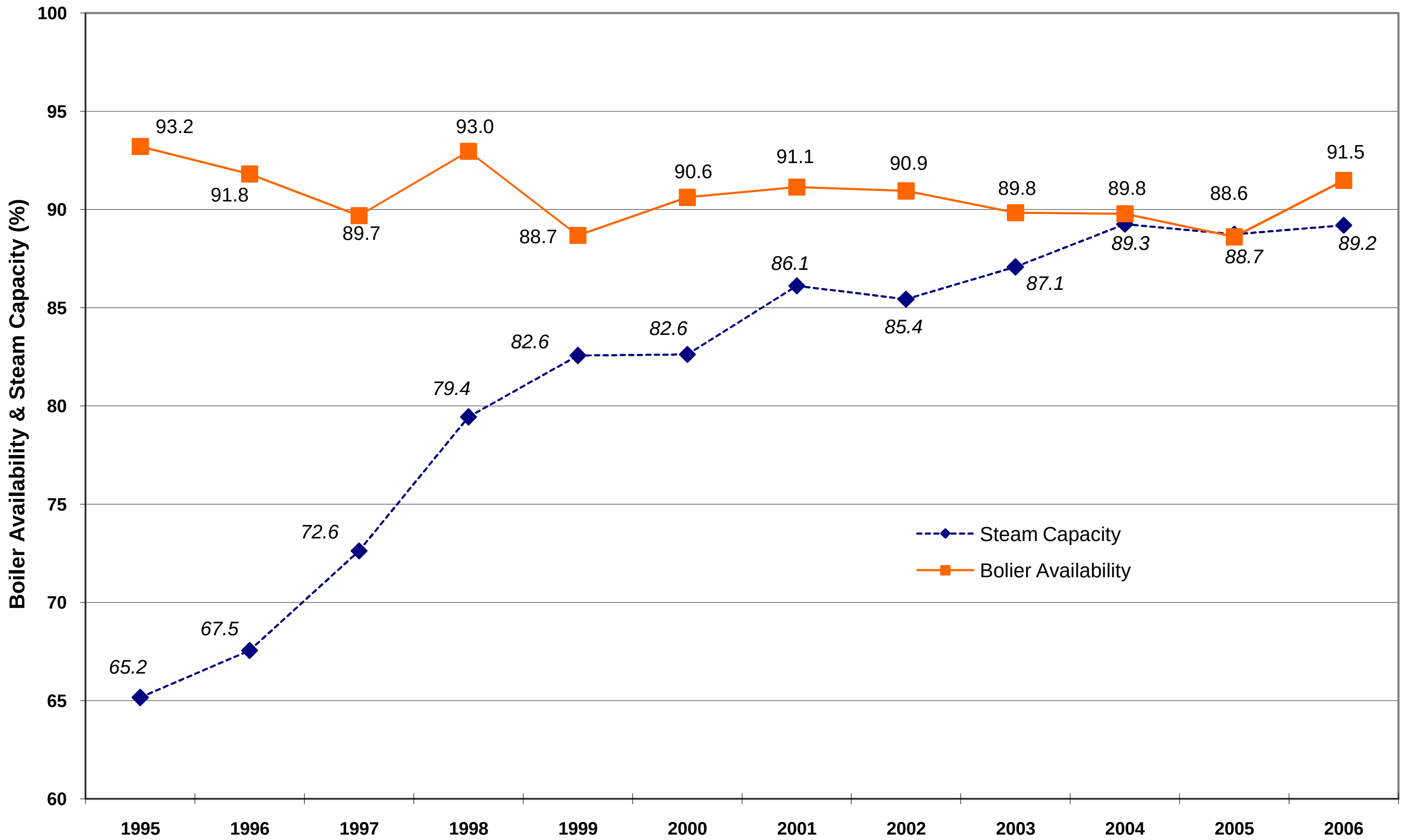


Figure 9. Scrubber Lime Use for Acid Gas Control

Onondaga County Resource Recovery Facility

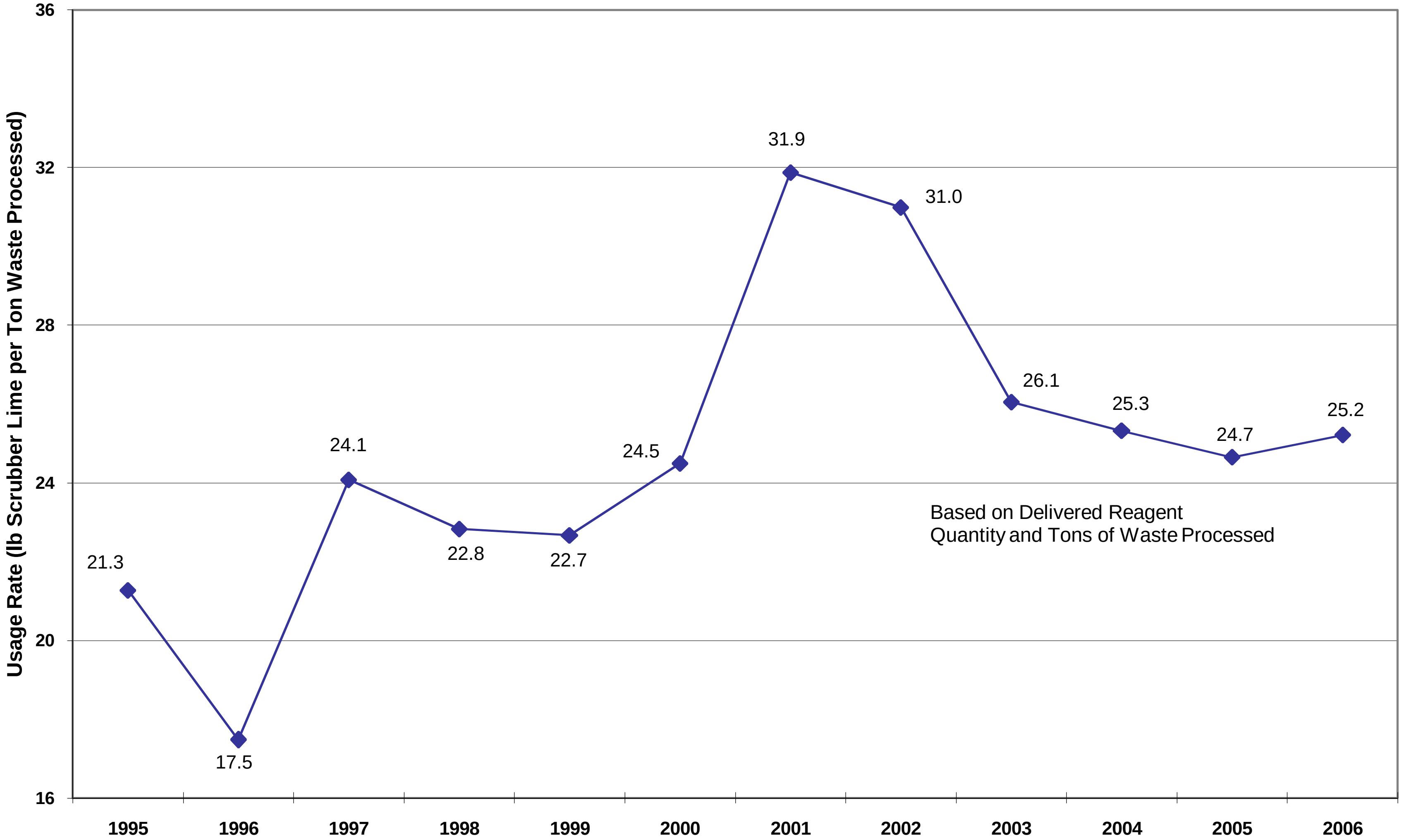


Figure 10. Dolomitic Lime Usage for Ash Conditioning

Onondaga County Resource Recovery Facility

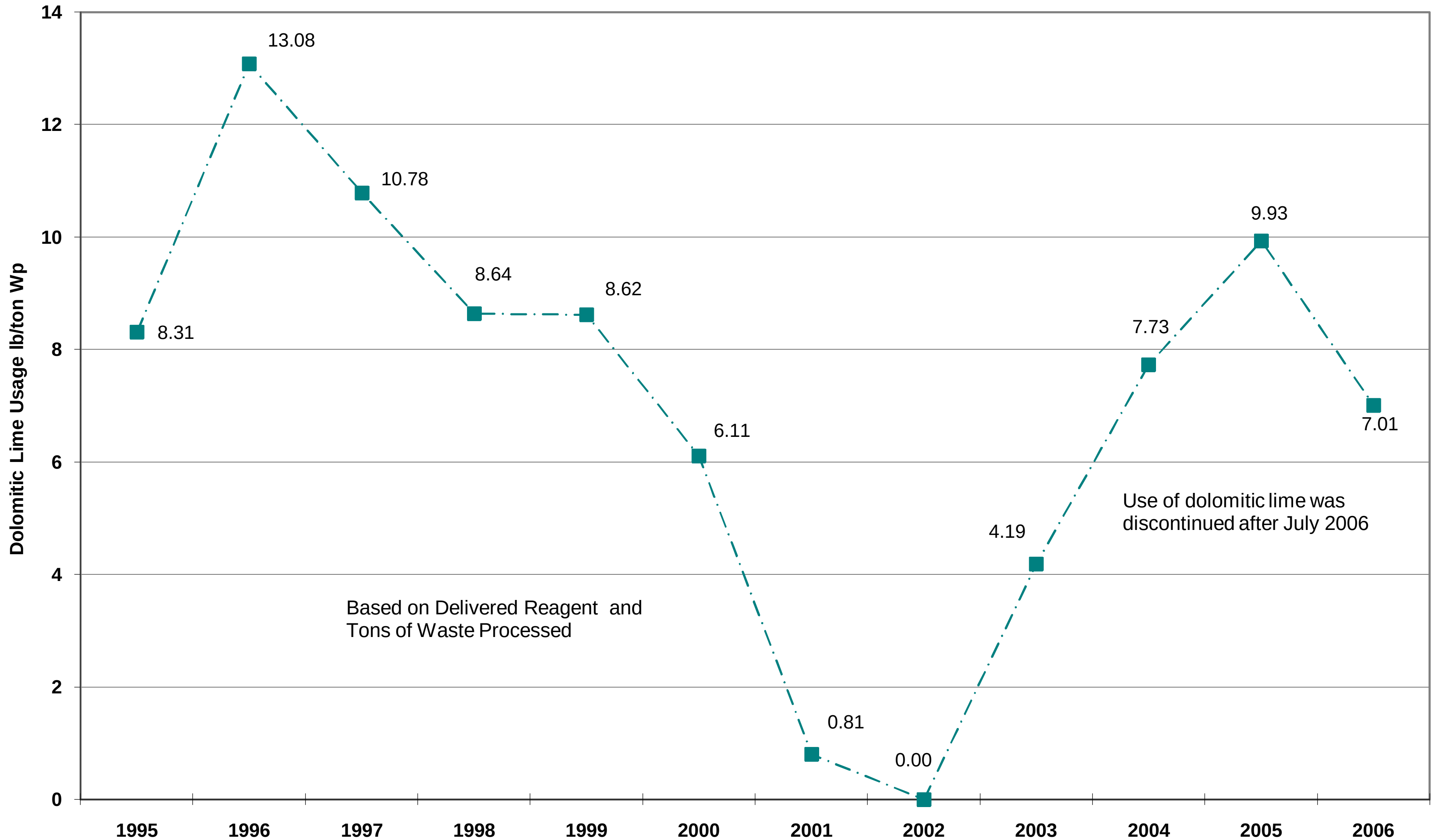


Figure 11. Anhydrous Ammonia Usage for Nitrogen Oxides Control

Onondaga County Resource Recovery Facility

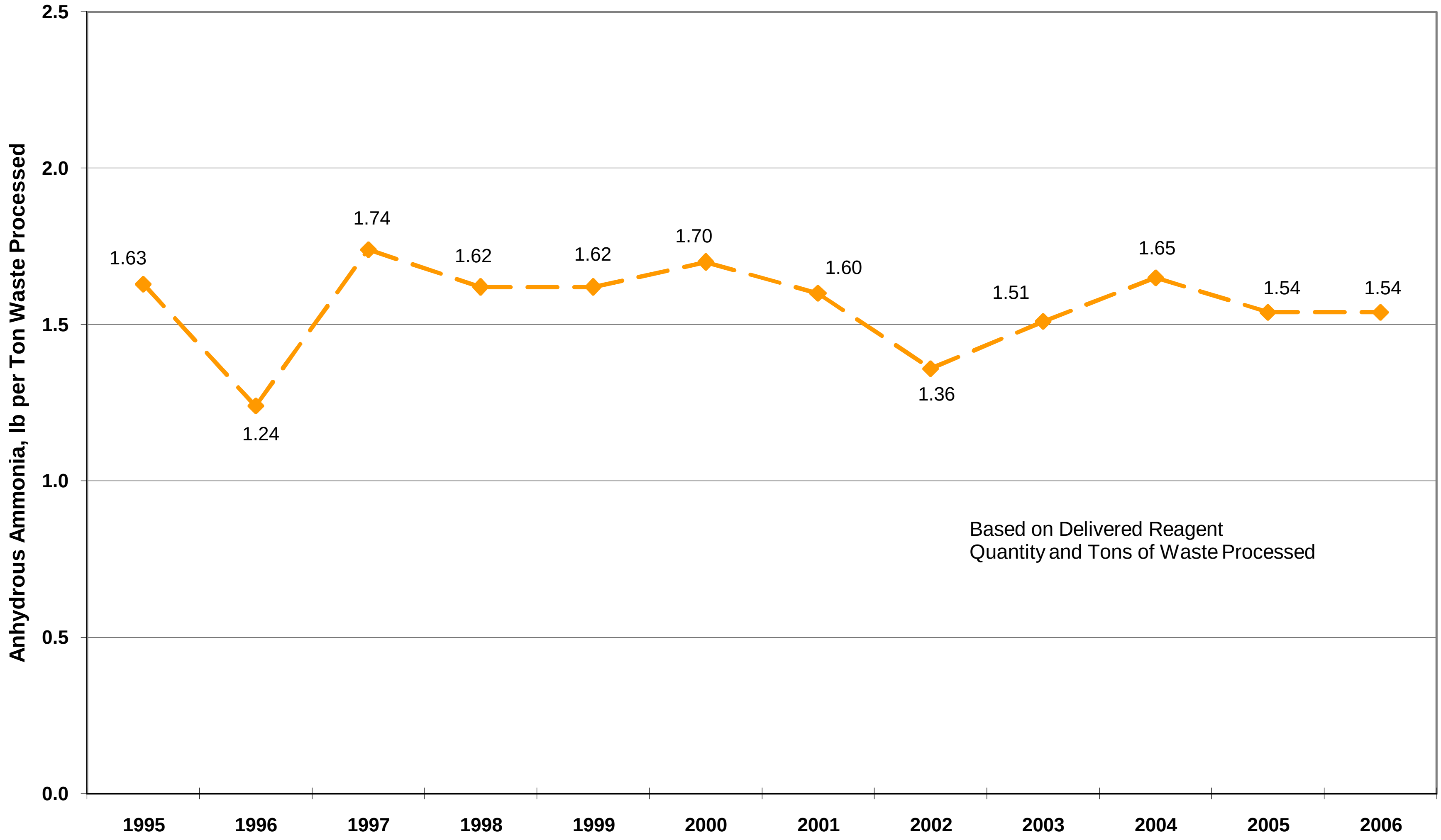
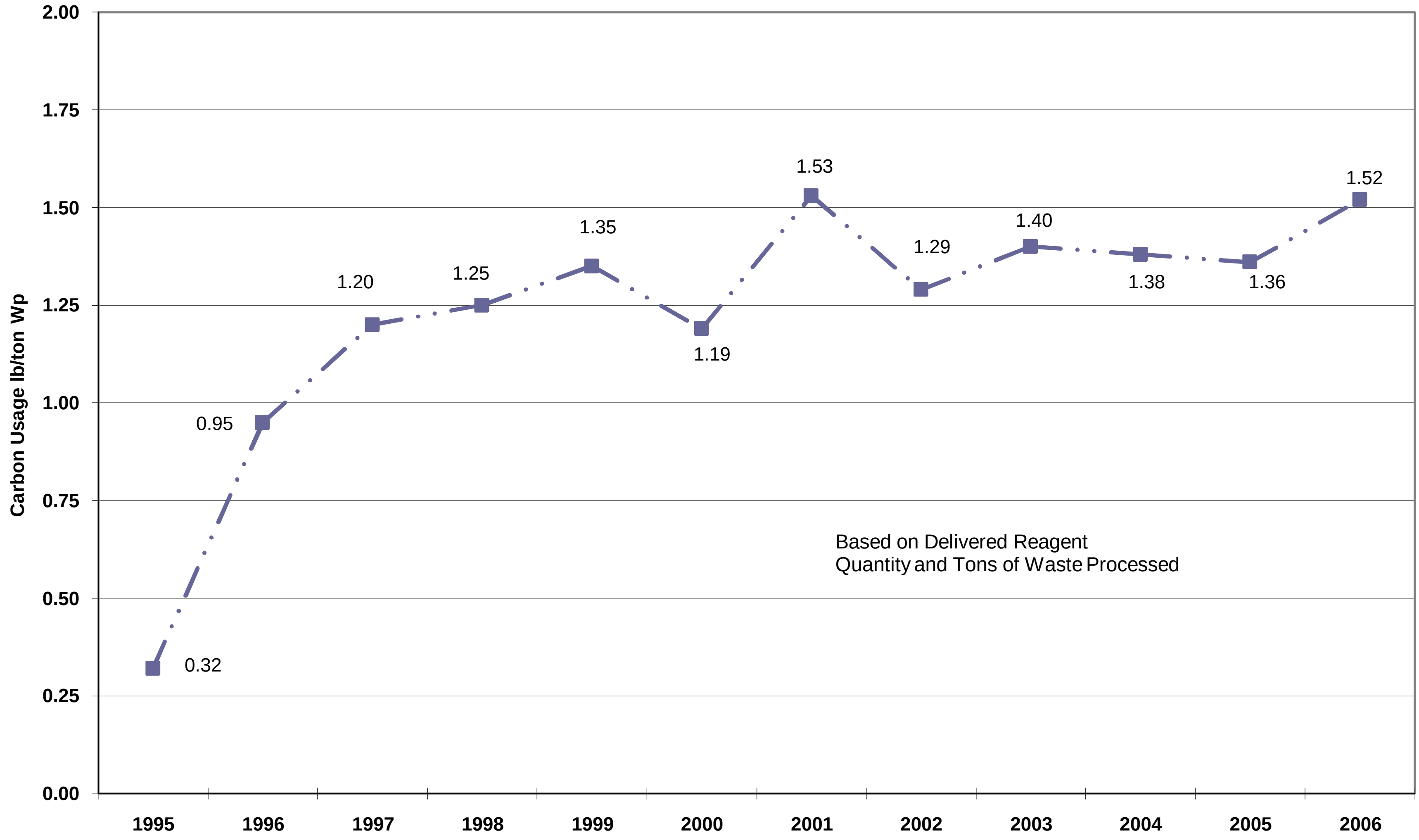


Figure 12. Carbon Usage for Mercury Control

Onondaga County Resource Recovery Facility



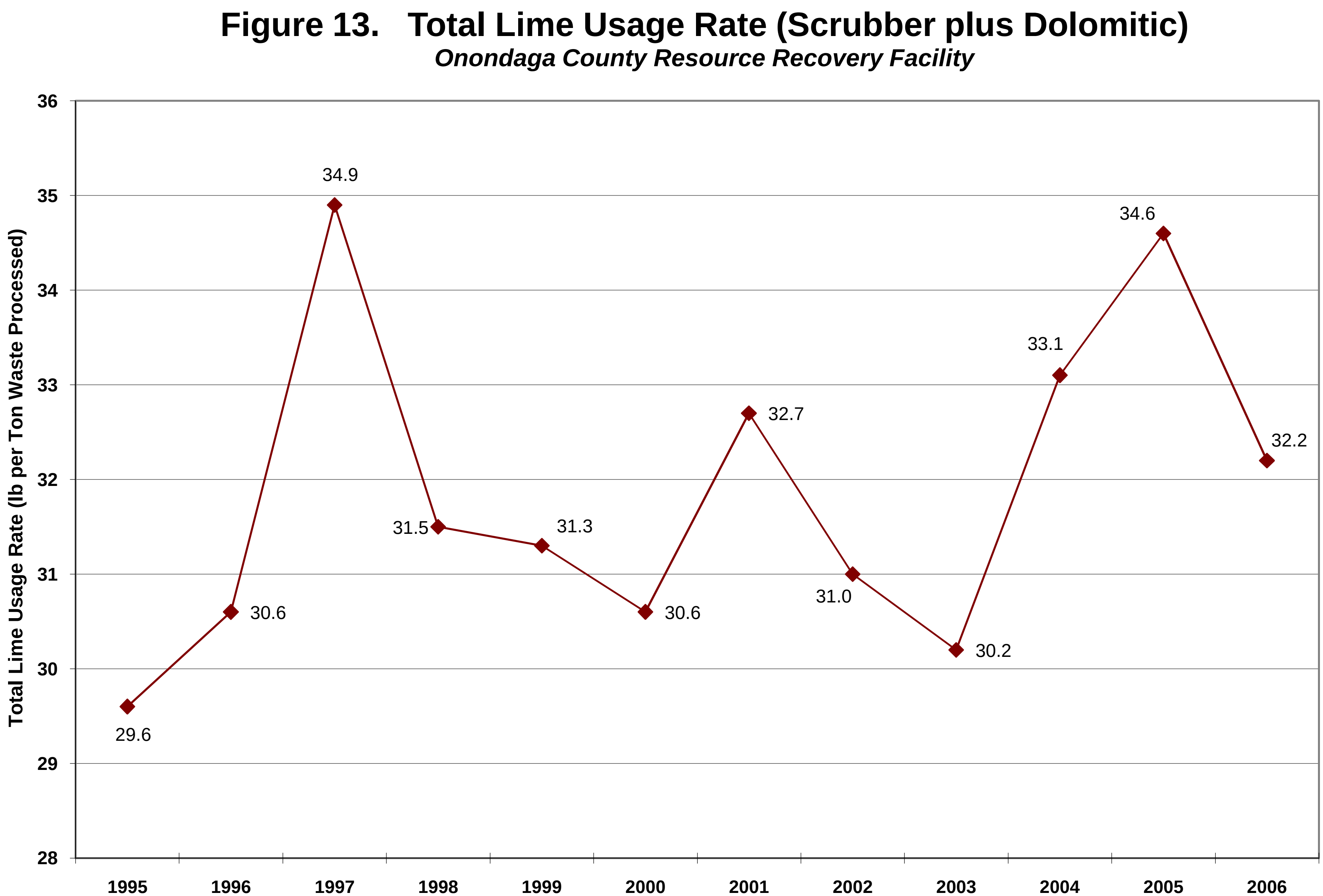


Figure 13. Total Lime Usage Rate (Scrubber plus Dolomitic)
Onondaga County Resource Recovery Facility
Total Lime Usage Rate (lb per Ton Waste Processed)
36
35
34
33
32
31
30
29
28
34.9
34.6
33.1
32.7
32.2
31.5
31.3
30.6
30.6
31.0
30.2
29.6
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006

Figure 14. Annual Electricity Sales (Megawatt-Hours per Year)

Onondaga County Resource Recovery Facility

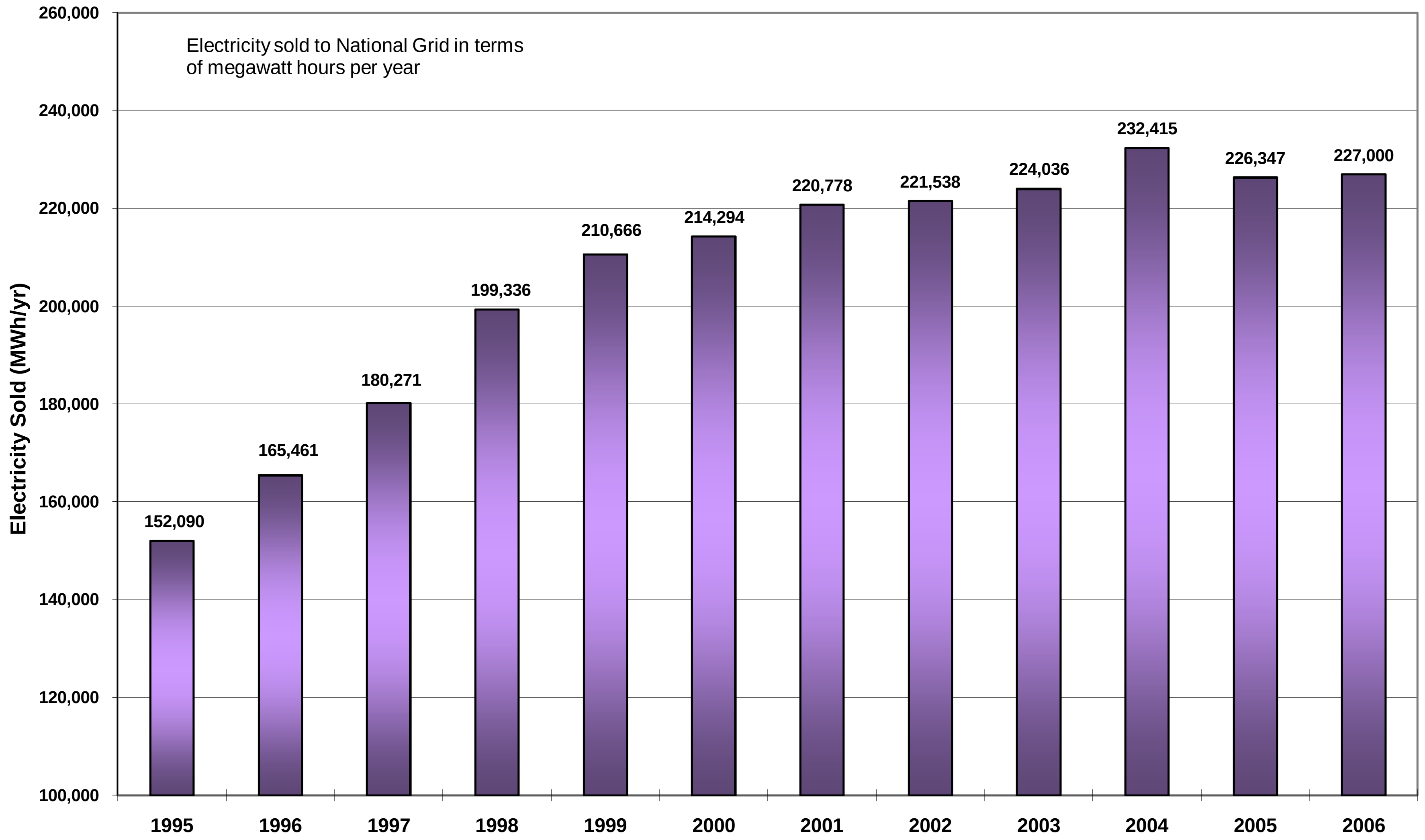


Figure 15. Net Electricity Production per Ton Waste Processed

Onondaga County Resource Recovery Facility

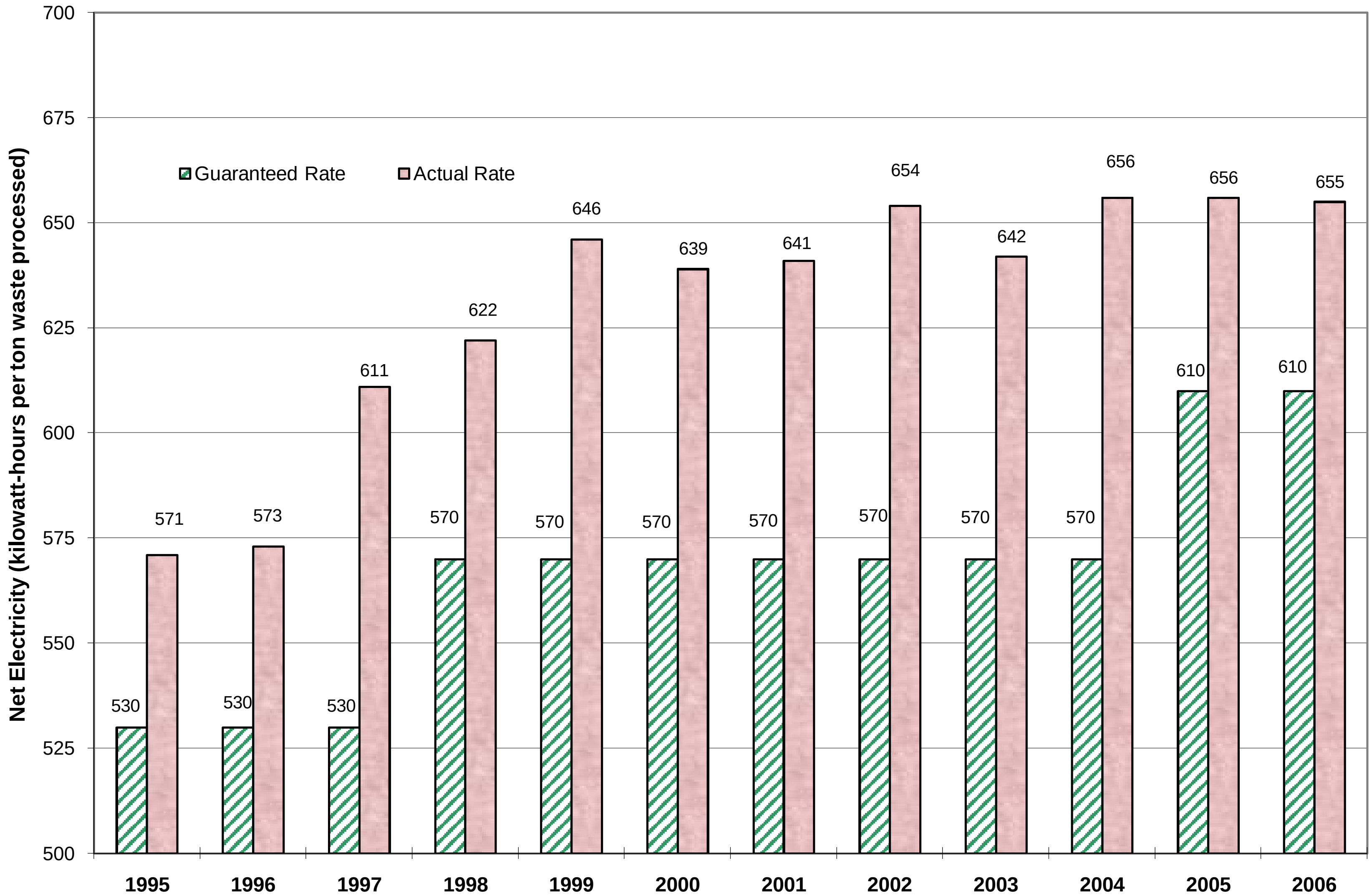


Figure 16. Facility Average Fine Particulate Matter (PM-10) Emissions
Onondaga County Resource Recovery Facility

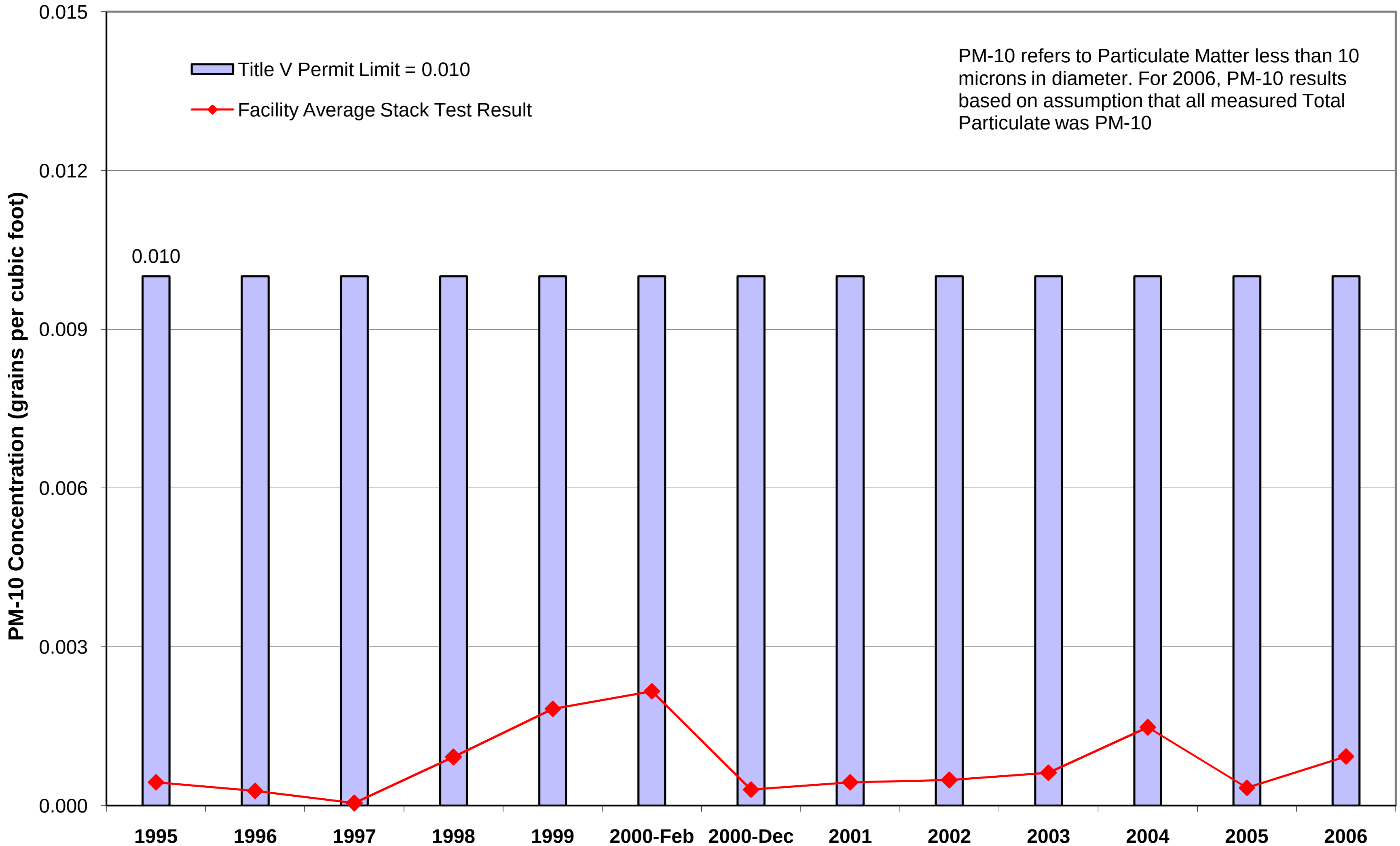


Figure 17.   Facility Average Hydrogen Chloride (HCl) Emissions

Onondaga County Resource Recovery Facility

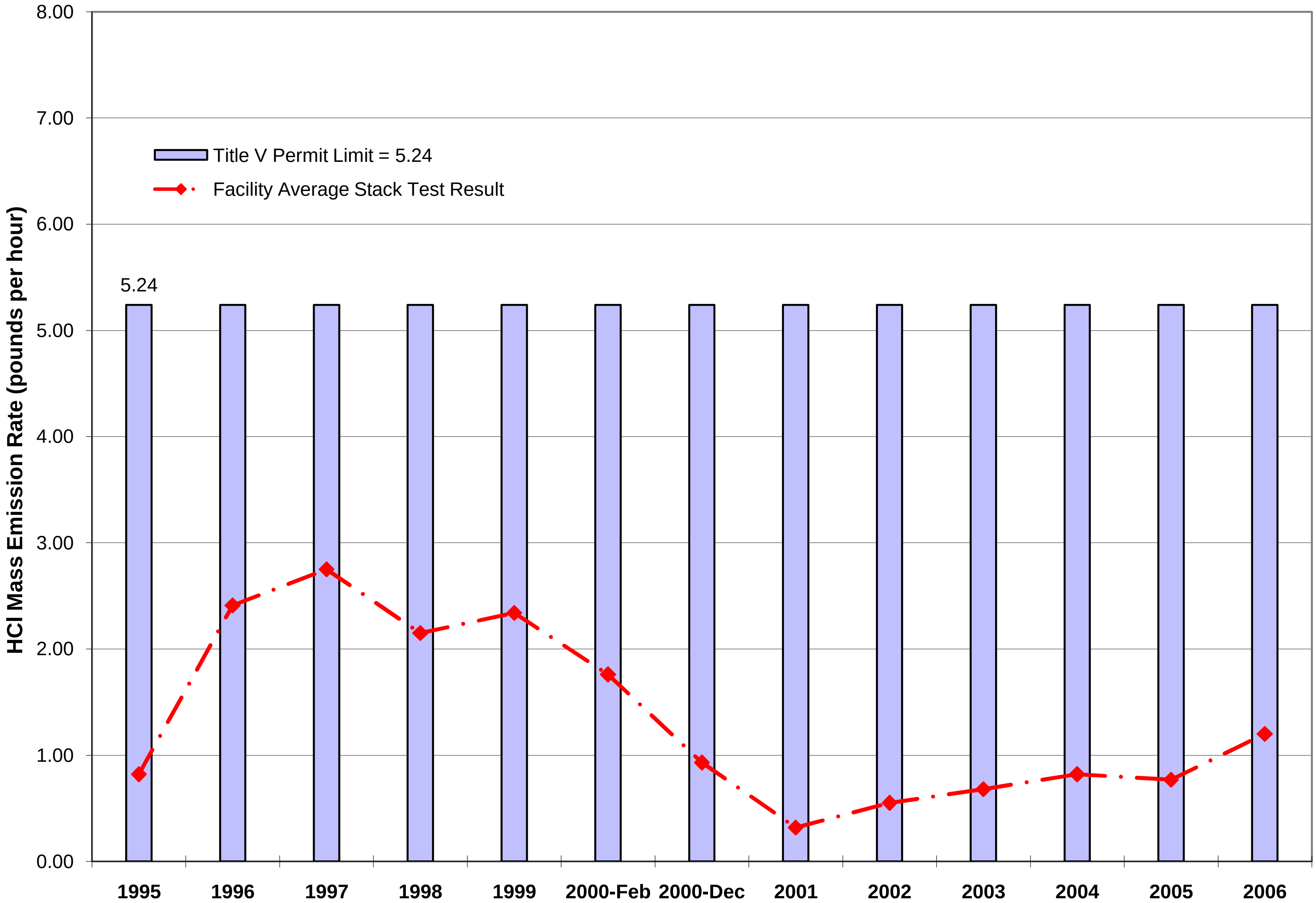


Figure 18. Facility Average Dioxins/Furans (TEQ) Emissions
Onondaga County Resource Recovery Facility

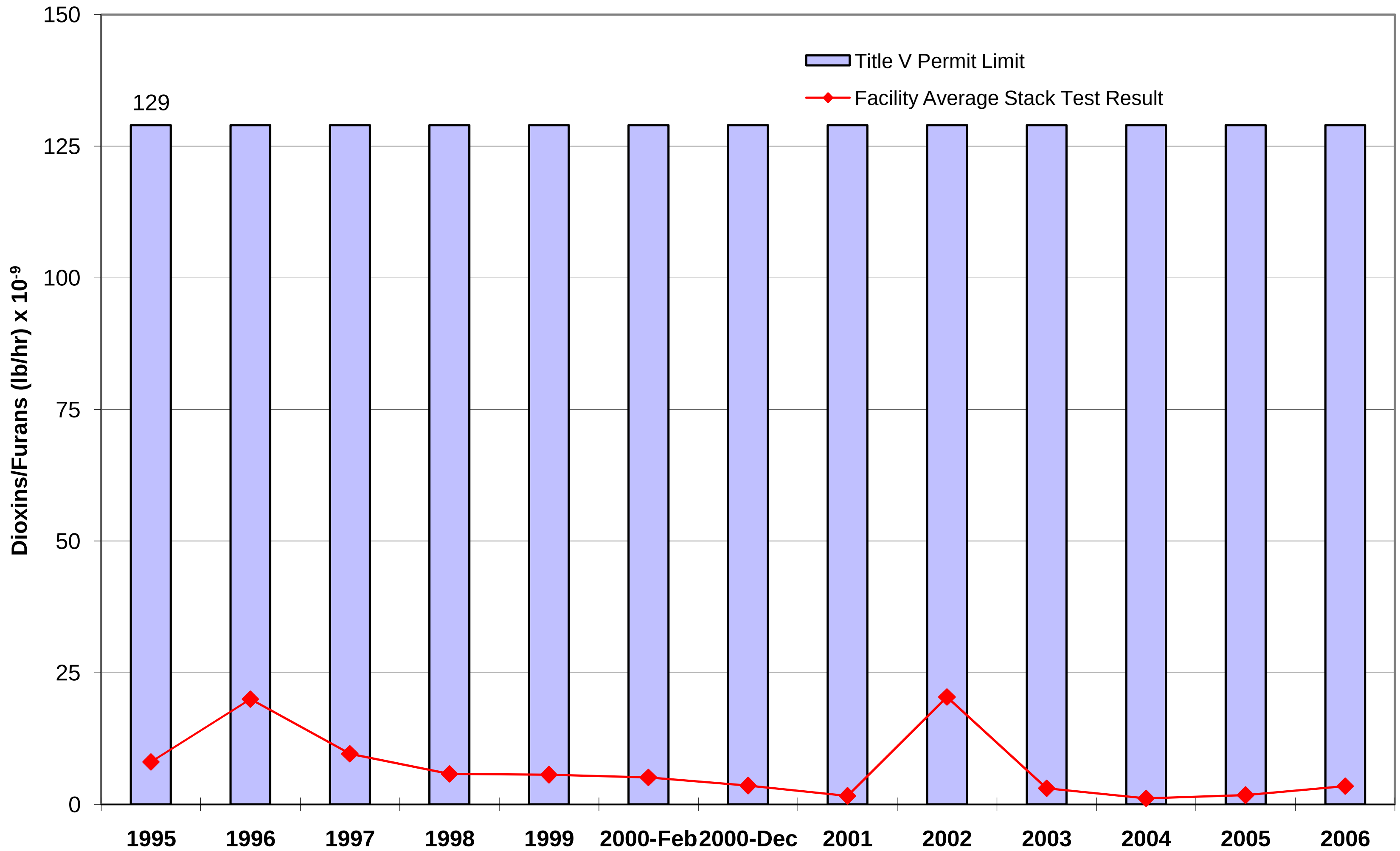


Figure 19. Facility Average Lead (Pb) Emissions

Onondaga County Resource Recovery Facility

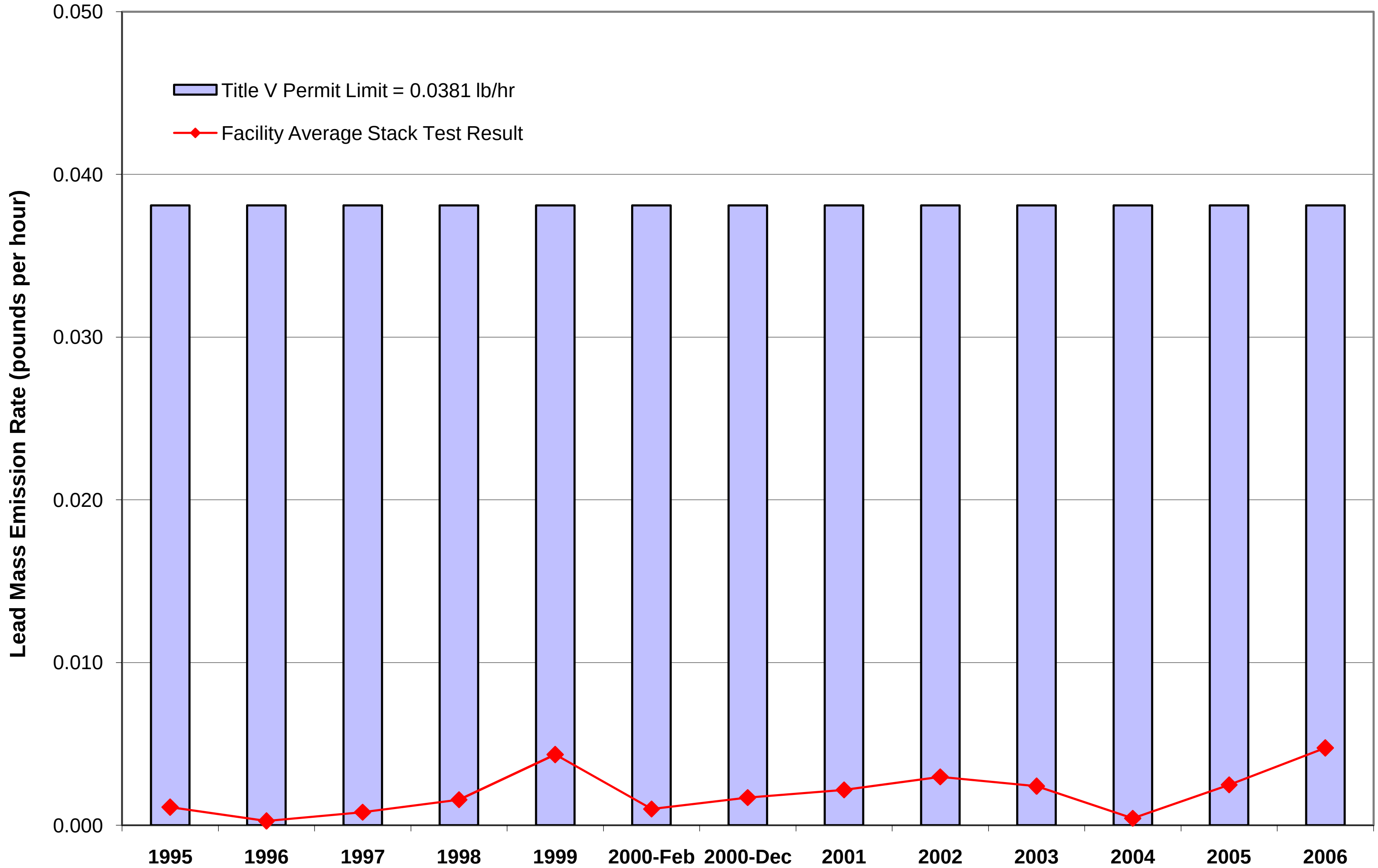


Figure 20. Facility Average Mercury (Hg) Emissions

Onondaga County Resource Recovery Facility

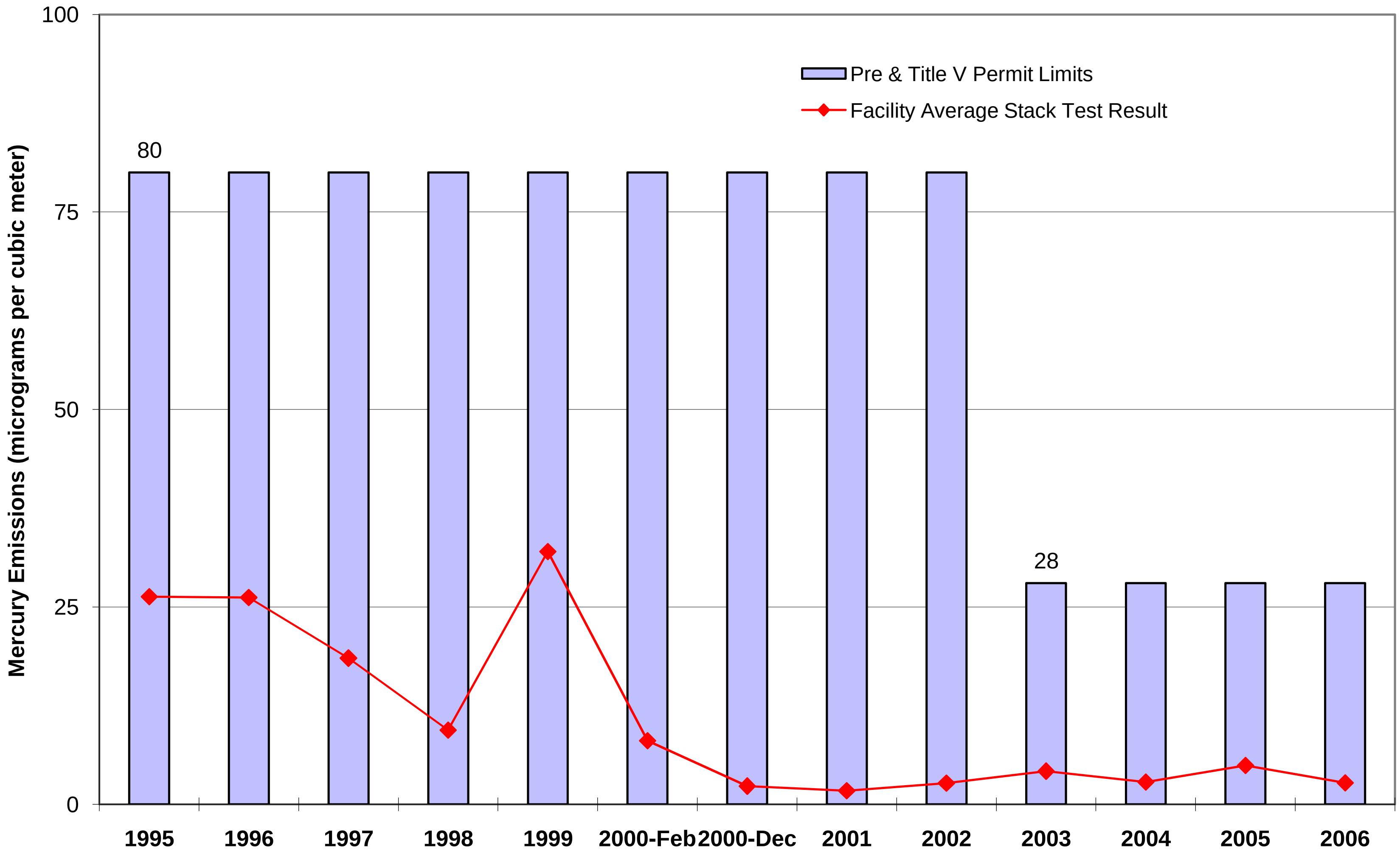


Figure 21. Facility Average Ammonia (NH_3) Emissions
Onondaga County Resource Recovery Facility

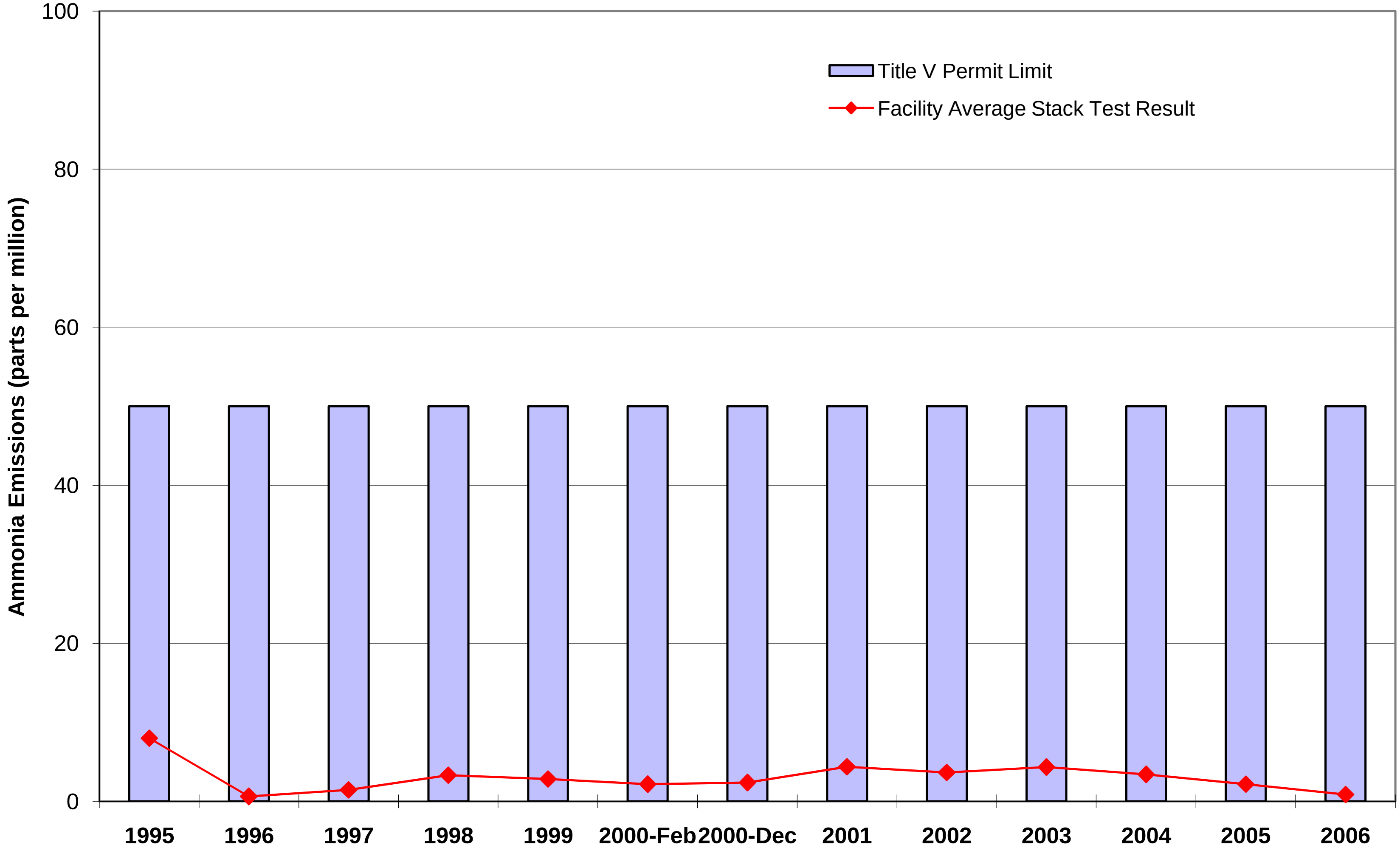


Figure 22. Facility Average Cadmium (Cd) Emissions

Onondaga County Resource Recovery Facility

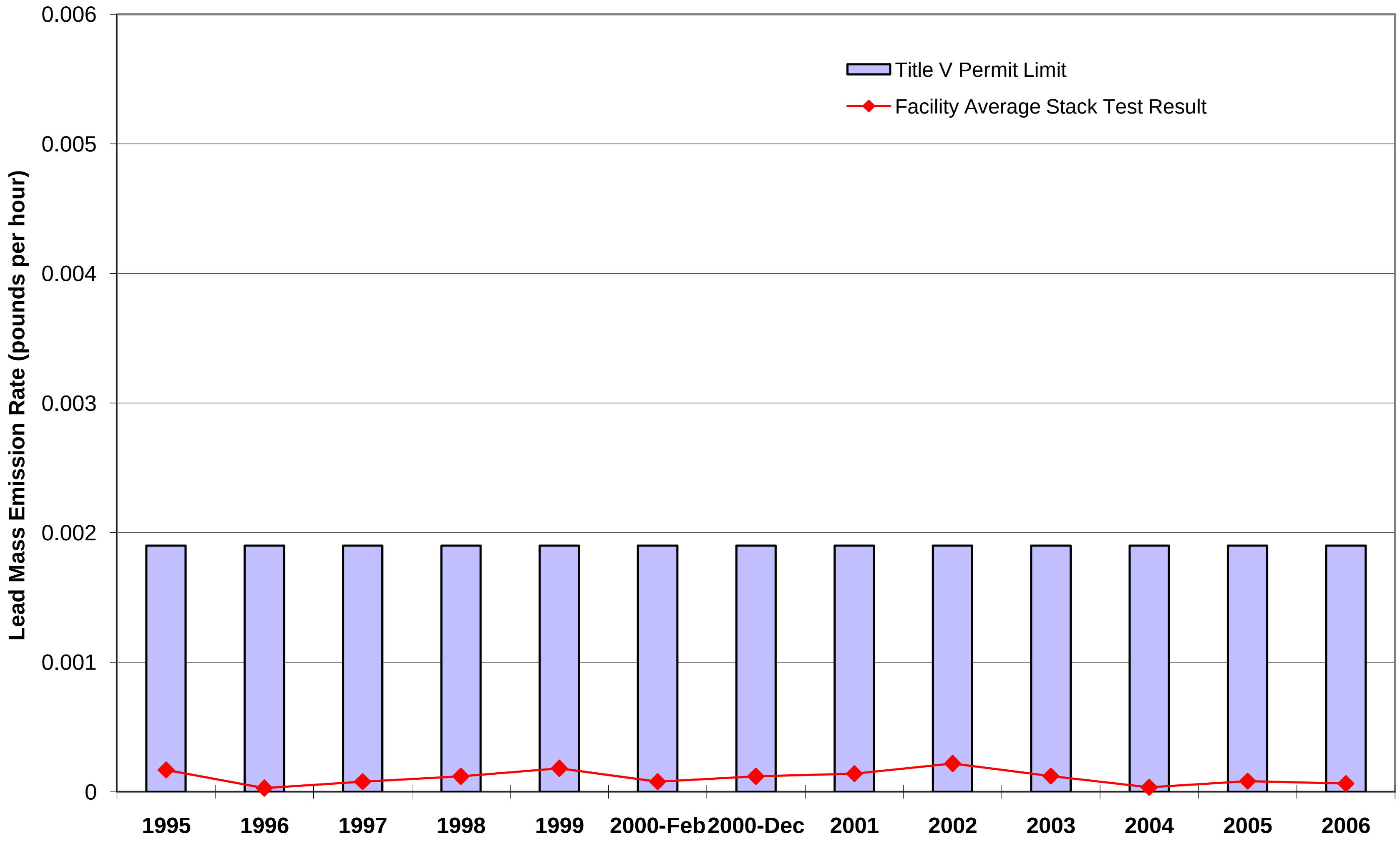


Figure 23. 11-Year Average & 2006 Emissions vs. HRA Levels

Onondaga County Resource Recovery Facility

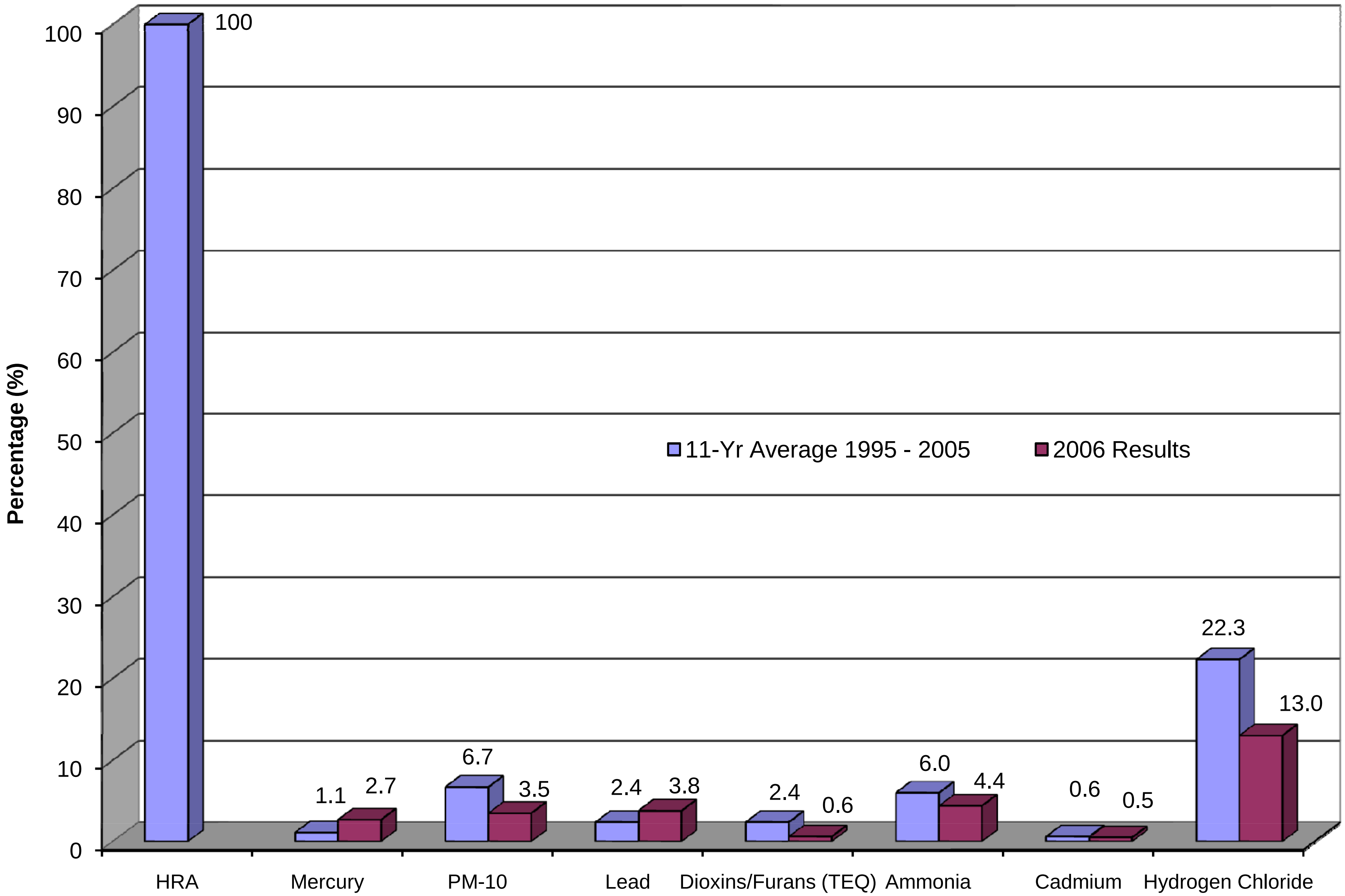


Figure 24. Sulfur Dioxide (SO_2) Annual Emissions
Onondaga County Resource Recovery Facility

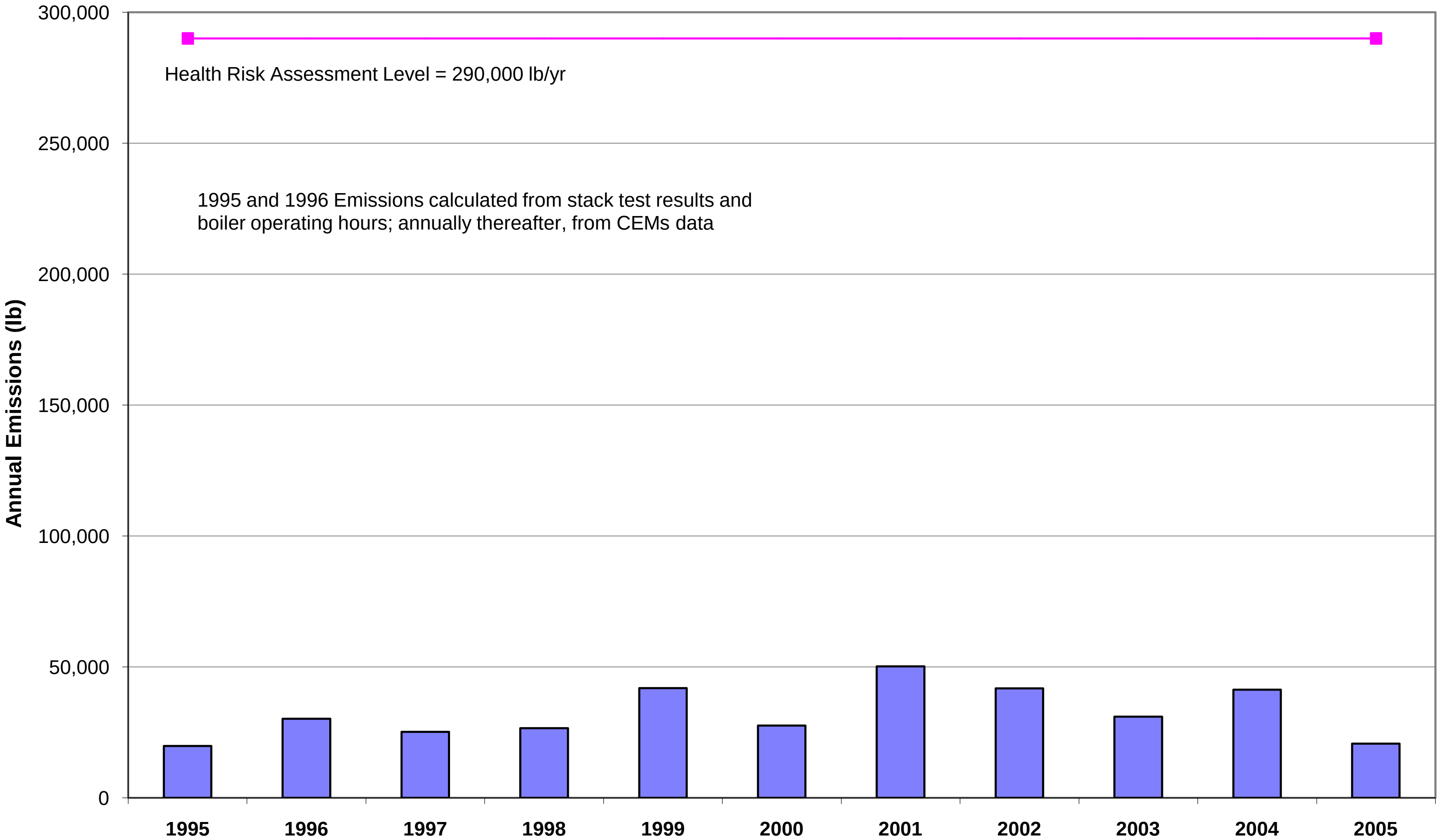


Figure 25. Annual Nitrogen Oxides (NO_x) Emissions

Onondaga County Resource Recovery Facility

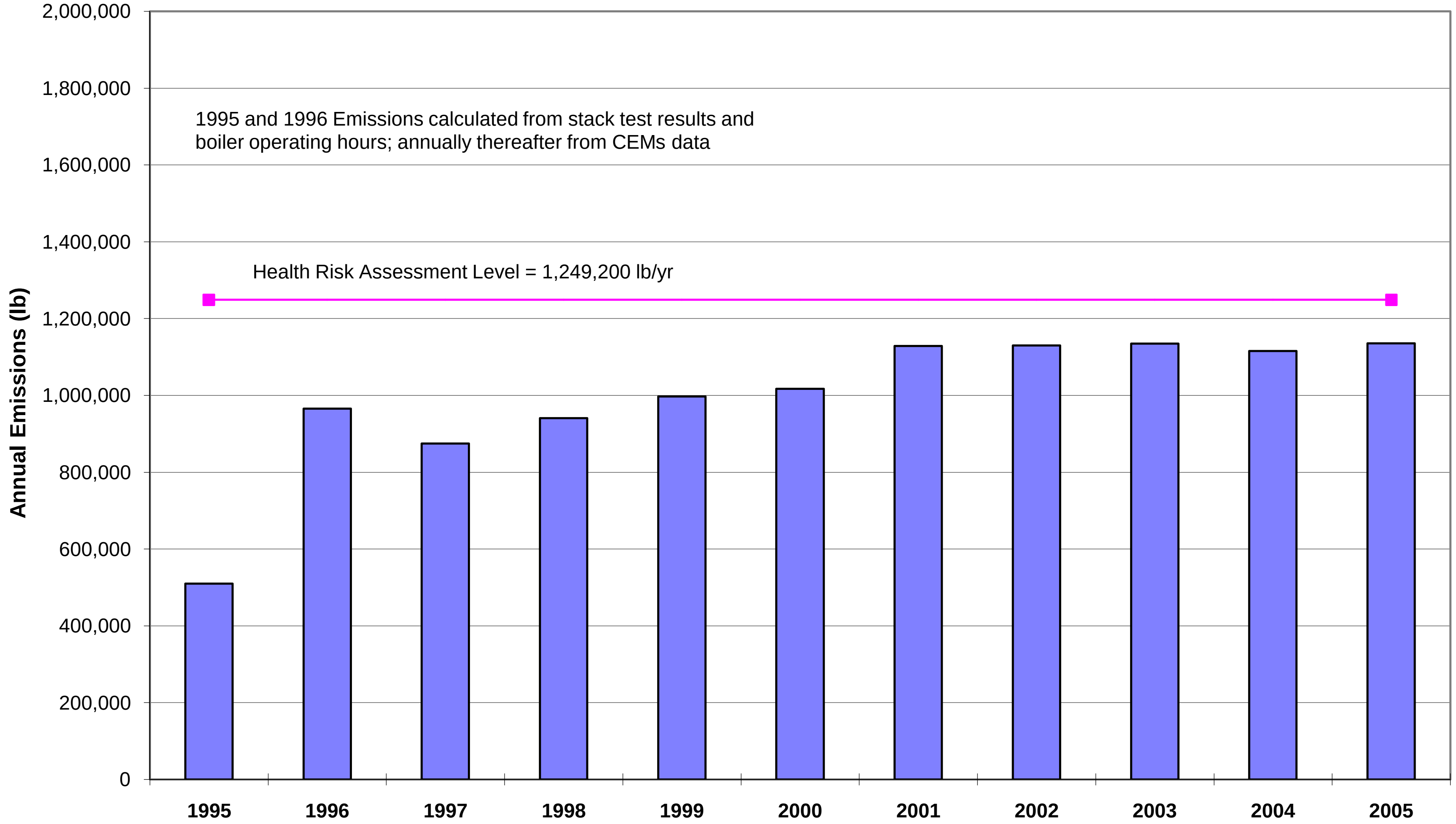


Figure 26. Annual Carbon Monoxide (CO) Emissions

Onondaga County Resource Recovery Facility

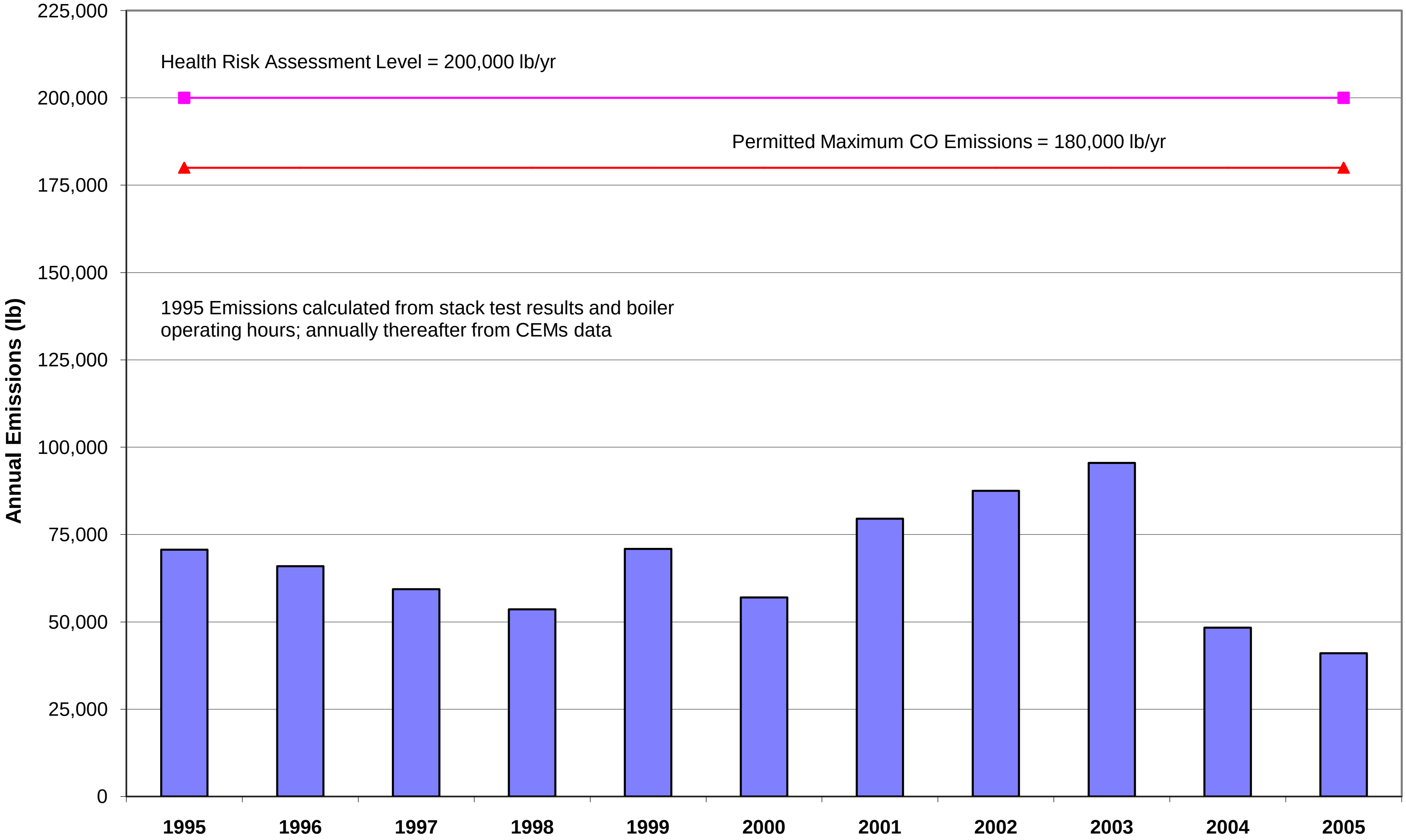


Figure 27. Mercury Emissions & Control System Effectiveness

Onondaga County Resource Recovery Facility

Figure 28. Greenhouse Gas Avoidance by Waste-to-Energy
Onondaga County Resource Recovery Facility

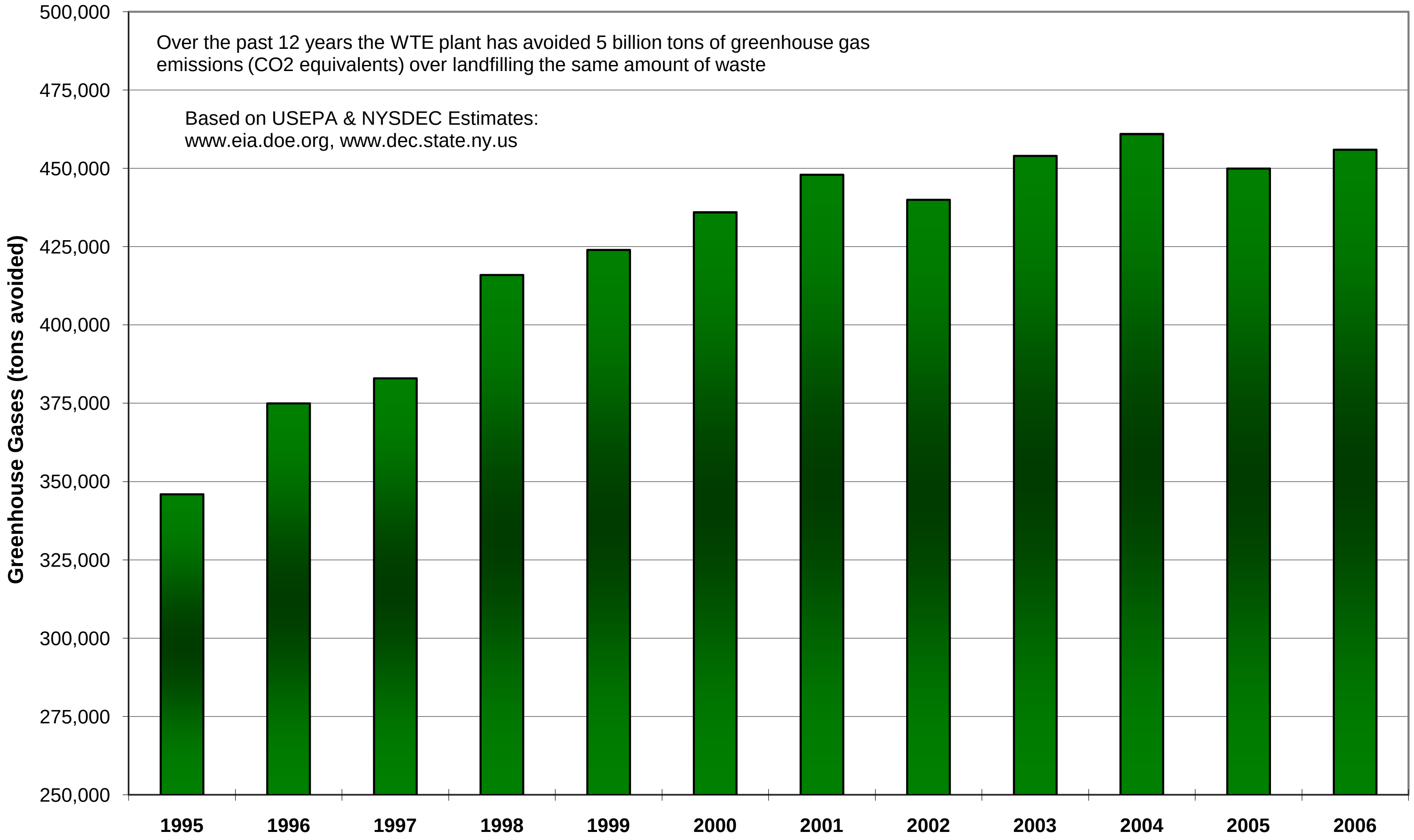


Figure 29. Annual Waste Processed & Equivalent Barrels of Oil

Onondaga County Resource Recovery Facility