**Appendix**

Table A.1

Trends in number of large MWC plants and units, 1990-2005

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Number of Large MWC Plants** | **Number of Large MWC Units** | **Capacity (tpd)****(in 2000)** |
| 1990 | 59 | 153 | 78,420 |
| 1993 | 71 | 186 | 94,426 |
| 1995 | 63 | 164 | 88,652 |
| 1996 | 70 | 175 | 93,049 |
| 1999 | 67 | 170 | 90,887 |
| 2000 | 66 | 167 | 89,477 |
| 2005 | 66 | 167 | 89,477 |

Source: Huckaby (2002a, p. 3) provides data for 1995 and 2000, while Huckaby (2002b, p. 3) provides data for 1990, 1993, 1996, 1999, 2000, and 2005. The two memos agree on the number of plants, units, and capacity existing in 2000.

Table A.2

 Combustion technology at large MWCs in 2000

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Large MWC Unit Type** | **Number of Large MWC Plants** | **Number of Large MWC Units** | **Capacity (tpd)** | **Percent Capacity of Total** |
| Mass burn (MB) | 53 | 133 | 67,968 | 76 |
| Refuse-derived fuel (RDF) | 13 | 34 | 21,509 | 24 |
| Total: | 66 | 167 | 89,477 | 100 |

Source: Huckaby (2002a, p. 3)

Note: MB includes MB/WW and MB/RC units

Table A.3

MWC units subject to subpart Ea (2000)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Facility Name** | **State** | **Combustion Technology** | **Status (1995)**  | **Construction Start** | **Startup Year** | **Number of Units**  |
| Lisbon | CT | MB/WW | UC | --- | 1995 | 2  |
| Lee County | FL | MB/WW | UC | --- | 1995 | 2  |
| SEMASS Resource Recovery Facility (Expansion – unit 3) | MA | RDF | OP | 1985 | 1993 | 1  |
| Montgomery County | MD | MB/WW | UC | --- | 1995 | 3  |
| Union County | NJ | MB/WW | OP | 1992 | 1994 | 3  |
| Onondaga County | NY | MB/WW | UC | --- | 1995 | 3  |
| Wheelabrator Falls | PA | MB/WW | OP | --- | 1994 | 2  |

Source: Huckaby (2002a,b) is the source of information on plant characteristics, except for the status of the plant in 1995 which is from Cone and Kane (1997).

Note: UC = under construction, and OP = in operation.

Table A.4

Additional Capital Expenditures

(Source: Berenyi, 2006)

The following are the column headings of the table:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Facility****(City)** | **State** | **Plant ID** | **Cost** | **Year**  | **Description****(Verbatim)** | **Cost assignments (Tables 4 and 6)** | **Page** **(Berenyi, 2006)** |

The Cost, Year, and Description (Verbatim) information is from the Directory section (pp. 97-337) of Berenyi (2006). Because information for the Cost, Year, and Description (Verbatim) columns are subject to copyright considerations, they cannot be included in this abridged version of the table. The complete version of Table A.4 is available from the corresponding author upon request.

Table A.5

 Differences between 1995 and 2000 Inventories of Large MWCs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **State** | **Facility Name (City)**  | **Plant ID** | **Effect on large MWC inventory (2000 relative to 1995)** | **Explanation of change in classification of MWC** |
| CT  | Lisbon | 54758 | Increase | Listed in 1995 inventory as UC and listed in 2000 large MWC inventory (classified as small MWC in 2010 inventory)  |
| FL | Bay County (Panama City) | --- | Decrease | Listed in 1995 inventory as large MWC, and not listed in 2000 large MWC inventory (classified as small MWC in 2001 and 2005 small MWC inventories and 2010 inventory) |
| FL | Lee County (Fort Meyers) | 52010 | Increase | Listed in 1995 Inventory as UC and listed in 2000 large MWC inventory |
| FL  | McKay Bay (Tampa) | 50875 | Increase | Listed in 1995 Inventory as MWC that was reclassified from large to small WMC as result of 1997 court vacatur and listed in 2000 large MWC inventory (classified as small MWC in 2010 inventory) |
| GA | Savannah | N/A | Increase | Listed in 1995 Inventory as MWC that was reclassified from large to small WMC as result of 1997 court vacatur, and listed in 2000 large MWC inventory (closed in 2008) (<http://www.energyjustice.net/map/displayfacilityadvanced-72726.htm>) |
| IL | Northwest (Chicago) | --- | Decrease | Listed in 1995 inventory as large MWC, closed in 1996 (U.S. DOE 2001, p. 65) |
| MA | Fall River | --- | Decrease | Listed in 1995 inventory as large MWC, taken off line in 2000 (<http://www.heraldnews.com/news/x787563427/Fall-River-incinerator-wont-likely-be-fired-up-anytime-soon>) |
| MA | Haverhill-Lawrence  | --- | Decrease | Listed in 1995 inventory as large MWC, closed in 1998 (U.S. DOE 2001, p. 66) |
| MD  | Montgomery County (Dickerson) | 50657 | Increase | Listed in 1995 inventory as UC and listed in 2000 large MWC inventory |
| MD | Pulaski (Baltimore) | --- | Decrease | Listed in 1995 inventory as large MWC, closed in 1995(<http://www.energyjustice.net/map/displayfacility-72226.htm>) |
| ME | Portland | 50225 | Increase | Listed in 1995 inventory as MWC that was reclassified from large to small WMC as result of 1997 court vacatur, and listed in 2000 large MWC inventory (classified as small MWC in 2010 inventory) |
| MI  | Central Wayne (unit 3) (Dearborn Heights)  | 50209 | Increase | Units 1 and 2 were listed in 1995 inventory as MWCs that were reclassified from large to small WMC as result of 1997 court vacatur (classified as small MWC in 2001 small MWC inventory). Unit 3 was excluded from the 1995 inventory**,** but was listed in 2000 large MWC inventory. (All 3 units at the plant were permanently shutdown in 2003 - see Berenyi, 2006, p. 215-217) <http://www.energyjustice.net/map/displayfacility-68412.htm> |
| MI | Clinton (Mt. Clemens) | --- | Decrease | Listed in 1995 inventory as large MWC, closed in 1998 <http://www.energyjustice.net/map/displayfacilityadvanced-72154.htm> |
| NC | Fayetteville | --- | --- | Listed in 1995 inventory as UC (opened in 1995 and closed in 1996)<http://www.energyjustice.net/map/displayfacilityadvanced-72376.htm> |
| NC | New Hanover (unit 3)(Wilmington) | 50271 | Increase | Listed in 1995 inventory as MWC that was reclassified from large to small WMC as result of 1997 court vacatur, listed in 1998 small MWC inventory, listed in 2000 large MWC inventory  |
| NH | Concord (Penacook) | 50873 | Increase | Listed in 1995 inventory as MWC that was reclassified from large to small WMC as result of 1997 court vacatur and listed in 2000 large MWC inventory (classified as small MWC in 2010 inventory) |
| NY | Huntington (East Northport) | 50656 | Increase | Listed in 1995 inventory as MWC that was reclassified from large to small WMC as result of 1997 court vacatur and listed in 2000 large MWC inventory (classified as small MWC in 2010 inventory) |
| NY  | MacArthur / Islip (Ronkonkoma) | --- | Decrease | Listed in 1995 inventory as large MWC, listed in 1998, 2001, and 2005 small MWC inventories (classified as small MWC in 2010 inventory) |
| NY | Onondaga  | 50662 | Increase | Listed in 1995 inventory as UC and listed in 2000 large MWC inventory |
| NY | Hudson Falls /Adirondack | 10503 | Increase | Listed in 1995 inventory as MWC that was reclassified from large to small WMC as result of 1997 court vacatur and listed in 2000 large MWC inventory (classified as small MWC in 2010 inventory) |
| OH | Montgomery - North | --- | Decrease | Listed in 1995 inventory as large MWC, closed in 1996 (U.S. DOE 2001, p. 67) |
| OH | Montgomery - South | --- | Decrease | Listed in 1995 inventory as large MWC, closed in 1996 (<http://www.energyjustice.net/map/displayfacilityadvanced-72145.htm>) |
| PA | Harrisburg  | --- | Decrease | Listed in 1995 inventory as large MWC, listed in 1998 small MWC inventory, closed in 2003 (see Berenyi, 2006, p. 322), 2005 small MWC inventory (Table B, footnote a) states small MWC plant was retrofitted with 3 large MWC units that are subject to subpart Eb (see Berenyi, 2006, p. 324)  |
| WI | French Island (LaCrosse) | 4005 | Increase  | Listed in 1995 inventory as MWC that was reclassified from large to small WMC as result of 1997 court vacatur, listed in 1998 small MWC inventory, listed in 2000 large MWC inventory (classified as small MWC in 2010 inventory) |

Table A.6

APCD Configurations of Large MWC plants (2000)

|  |  |
| --- | --- |
| APCD Configurations  | Number of WMC Plants (2000) |
| SD/FF/CI/SNCR | 39 |
| SD/FF/CI | 2 |
| SD/FF/SNCR | 9 |
| SD/FF | 5 |
| SD/ESP/CI/SNCR | 6 |
| SD/ESP/CI | 2 |
| SD/ESP/FF/CI | 1 |
| SD/ESP | 2 |
| DSI/FF | 1 |
| DSI/EGB | 1 |

Source: Huckaby (2002a)

Note: The number of plants in Table 1 and Table 8 sums to 67 because SEMASS (MA is treated as both an existing (EG) and new (NSPS) MWC.

where

|  |  |
| --- | --- |
| CI | activated carbon injection (used for mercury control) |
| DSI | dry sorbent injection |
| EGB | electrified gravel bed filter |
| ESP | electrostatic precipitator |
| FF | fabric filter (baghouse) |
| SD | spray dryer (dry scrubber) |
| SNCR | selective non-catalytic reduction (ammonia injection for NOx control) |

Source: U.S. EPA (1994a, p. xii)

Table A.7

Number of Existing (EG) MWCs assigned to model plant category using capacity range

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model Plant | Abbreviation | Combustion (Point Estimate) Capacity of Model Plant(Mg MSW/day)\* | Capacity Ranges for Model Plant used in *Economic Analysis*  | Range of Capacities of Plants Assigned to Model Plant Categories in 2000 (tpd) |
| 4 | MB/WW (large) | 2,041 | Capacity > 1000 Mg/day (or Capacity > 1100 tpd) | 1125-3000 (21 plants) (includes 11 plants with capacities of at least 2200 tpd) |
| 5 | MB/WW (mid-size) | 980 | 225 Mg/day < Capacity ≤ 1000 Mg/day (or 250 tpd < Capacity ≤ 1100 tpd) | 300-1050 (23 MB/WW plants) (includes 7 plants with capacities between 500-576 tpd) |
| 6 | MB/WW (small) | 181 | Capacity ≤ 225 Mg/day (or Capacity ≤ 250 tpd) | --- |
| 7 | RDF (large) | 1,814 | Capacity > 1000 Mg/day (or Capacity > 1100 tpd) | 2000-3300 (7 plants) |
| 8 | RDF (small) | 544 | 225 Mg/day < Capacity ≤ 1000 Mg/day (or 250 tpd < Capacity ≤ 1100 tpd) | 576-750 (6 plants) |
| 12 | MB/RWW | 454 |  | 1344-2688 (2 MB/RC plants – Delaware Valley (PA) and York (PA)) |

Source: U.S. EPA (1990, p. 2-5)

Source: Assignment of existing MWCs to model plants in Table 8, Table 10, and Table 13.

\*Combustion Capacity of Model Plant from Table 1.

Table A.7

(continued)

Number of NSPS (subpart Ea or subpart Eb) MWCs assigned to model plant category using capacity range

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model Plant | Abbreviation | Combustion Capacity (Point Estimate) of Model Plant(Mg MSW/day)\* | Capacity Ranges for Model Plant used in *Economic Analysis* | Range of Capacities of Plants Assigned to Model Plant Categories in 2000 (tpd) |
| 1 | MB/WW (small) | 181 | Capacity ≤ 225 Mg/day (or Capacity ≤ 250 tpd) | --- |
| 2 | MB/WW (mid-size) | 726 | 225 Mg/day < Capacity ≤ 1000 Mg/day (or 250 tpd < Capacity ≤ 1100 tpd) | 300-990 (3 plants) |
| 3 | MB/WW (large) | 2,041 | Capacity > 1000 Mg/day (or Capacity > 1100 tpd) | 1200-1800 (4 plants) |
| 6 | RDF | 1,814 |  | 1000 (1 plant) |

Source: U.S. EPA (1990, p. 2-4)

Source: Assignment of NSPS MWCs to model plants in Table 8, Table 10, and Table 13.

\*Combustion Capacity of Model Plant from Table 1.

Note: This table shows the model plant categories the 53 NSPS and existing MWC plants that combust waste using MB/WW (or MB/RC) when using a capacity range. (see Tables 2 and 3). For existing MWCs, the U.S. EPA (1994a) specified more stringent regulationsfor “very large” MWC plants (capacity greater than 1000 Mg/day) relative to “large” MWC plants (capacity greater than 225 Mg/day and up to 1000 Mg/day). Converting Mg/day to tpd, a plant with combustion capacity greater than 1100 tpd is assigned to MB/WW (large) model plant while a plant capacity between 250 tpd and 1100 tpd is assigned to a MB/WW (midsize) modelplant.[[1]](#footnote-1),[[2]](#footnote-2)  The remaining 13 NSPS and existing MWC plants installed refuse-derived fuel (RDF) combustion technology and using their combustion capacity, they were assigned to either RDF (large) or RDF (small) model plants.

Table A.8[[3]](#footnote-3)

Number of Existing (EG) MWCs assigned to model plants category using combustion capacity point estimate

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model Plant | Abbreviation | Combustion Capacity (Point Estimate) of Model Plant(Mg MSW/day)\* | Capacity Ranges for Model Plant used in *Economic Analysis*  | Range of Capacities of Plants Assigned to Model Plant Categories in 2000 (tpd) |
| 4 | MB/WW (large) | 2,041 | Capacity > 1000 Mg/day (or Capacity > 1100 tpd) | 1650-3000 (12 plants) (includes 11 plants with capacities of at least 2200 tpd**)** |
| 5 | MB/WW (mid-size) | 980 | 225 Mg/day < Capacity ≤ 1000 Mg/day (or 250 tpd < Capacity ≤ 1100 tpd) | 600-1500 (23 MB/WW plants)  |
| 6 | MB/WW (small) | 181 | Capacity ≤ 225 Mg/day (or Capacity ≤ 250 tpd) | 301-576 (9 MB/WW plants) (includes 7 plants with capacities between 500-576 tpd) |
| 7 | RDF (large) | 1,814 | Capacity > 1000 Mg/day (or Capacity > 1100 tpd) | 2000-3300 (7 plants) |
| 8 | RDF (small) | 544 | 225 Mg/day < Capacity ≤ 1000 Mg/day (or 250 tpd < Capacity ≤ 1100 tpd) | 576-750 (6 plants) |
| 12 | MB/RWW | 454 |  | 1344-2688 (2 MB/RC plants – Delaware Valley (PA) and York (PA)) |

Source: U.S. EPA (1990, p. 2-5)

Source: Assignment of existing MWCs to model plants in Table 8, Table 10, and Table 13.

\*Combustion Capacity of Model Plant from Table 1.

Table A.8

(continued)

Range of Capacities of NSPS (subpart Ea or subpart Eb) MWCs assigned to model plants based on

 combustion capacity point estimate of model plant

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model Plant | Abbreviation | Combustion Capacity (Point Estimate) of Model Plant(Mg MSW/day)\* | Capacity Ranges for Model Plant used in *Economic Analysis* | Range of Capacities of Plants Assigned to Model Plant Categories in 2000 (tpd) |
| 1 | MB/WW (small) | 181 | Capacity ≤ 225 Mg/day (or Capacity ≤ 250 tpd) | 300 (1 plant) |
| 2 | MB/WW (mid-size) | 726 | 225 Mg/day < Capacity ≤ 1000 Mg/day (or 250 tpd < Capacity ≤ 1100 tpd) | 500-1200 (3 plants) |
| 3 | MB/WW (large) | 2,041 | Capacity > 1000 Mg/day (or Capacity > 1100 tpd) | 1440-1800 (3 plants) |
| 6 | RDF | 1,814 |  | 1000 (1 plant) |

Source: U.S. EPA (1990, p. 2-4)

Source: Assignment of NSPS MWCs to model plants in Table 8, Table 10, and Table 13**.**

\*Combustion Capacity of Model Plant from Table 1.

Table A.9

15 Existing (EG) MWCs with SD/FF installed at Baseline and 2000

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **State** | **Facility Name** | **Plant ID** | **Total Plant Capacity (tpd)** **(in 2000)** | **Combustion Technology****(in 2000)** |  **Baseline APCD**  | **2000 APCD**  |
| CA | Commerce Refuse-to-Energy Facility | 10090 | 360 |  MB/WW | SD/FF**/**SNCRa | SD/FF/SNCR |
| CA | Southeast Resource Recovery Facility (SERRF) | 50837 | 1380 |  MB/WW | SD/FF**/**SNCRa | SD/FF/SNCR |
| CA | Stanislaus County Resource Recovery Facility | 50632 | 800 |  MB/WW | SD/FF**/**SNCRa | SD/FF/CI/SNCR |
| CT | Bristol Resource Recovery Facility | 50648 | 650 |  MB/WW | SD/FF | SD/FF/CI/SNCR |
| CT | Mid-Connecticut Resource Recovery Facility | 54945 | 2025 |  RDF | SD/FF | SD/FF/SNCR |
| CT | Wheelabrator Bridgeport Company, L.P. | 50883 | 2250 |  MB/WW | SD/FF | SD/FF/CI |
| IN | Indianapolis Resource Recovery Facility | 50647 | 2361 |  MB/WW | SD/FF | SD/FF/CI/SNCR |
| ME | Maine Energy Recovery Company | 10338 | 600 |  RDF | SD/FF | SD/FF/SNCR |
| ME | Penobscot Energy Recovery Corp. | 50051 | 720 |  RDF | SD/FF | SD/FF |
| MN | Hennepin Energy Resource Co. | 10013 | 1200 |  MB/WW | SD/FF | SD/FF/CI/SNCR |
| MN | Great River Energy – Elk River Station | 2039 | 750 | RDF | SD/FF | SD/FF/CI/SNCR |
| NY | Babylon Resource Recovery Facility | 50649 | 750 |  MB/WW | SD/FF | SD/FF/CI/SNCR |
| NY | Hempstead Resource Recovery Facility | 10642 | 2505 |  MB/WW | SD/FF | SD/FF/SNCR |
| OR | Marion County Solid Waste-to-Energy Facility | 50630 | 550 |  MB/WW | SD/FF  | SD/FF/CI/SNCR |
| PA | York Resource Recovery Center/Montenay York | 50215 | 1344 |  MB/RC | SD/FF | SD/FF/CI/SNCR |

Source: Huckaby (2002a,b) for Total Plant Capacity, Combustion Technology, and 2000 APCD. Discussion of baseline APCDs is found in Table 1.

Note: Plant ID refers to DOE/EIA ORIS Plant Code

The source of baseline SNCR configurations is:

a = U.S. DOE, EIA Form 860 (2013) – EIA-860 lists year of Cl and SNCR expenditures for Babylon (NY) as 1989. Due to lack of evidence that those APCDs were installed pre-1990, we changed the date from 1989 to 1999 to be consistent with the GAA date of expenditures.

Table A.10

4 Existing (EG) MWCs with SD/ESP installed at Baseline and 2000

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **State** | **Facility Name** | **Plant ID** | **Total Plant Capacity (tpd)** **(in 2000)** | **Combustion Technology****(in 2000)** |  **Baseline APCD**  | **2000 APCD**  |
| FL | North County Resource Recovery Facility | 50071 | 2000 |  RDF |  SD/ESP | SD/ESP |
| MA | Wheelabrator Millbury Inc. | 50878 | 1500 |  MB/WW | SD/ESP  | SD/ESP/CI/SNCR |
| ME | Greater Portland Resource Recovery Facility | 50225 | 500 |  MB/WW | SD/ESP | SD/ESP/CI/SNCR |
| SC | Montenay Charleston Resource Recovery Inc. | 10344 | 600 |  MB/WW | SD/ESP  | SD/ESP/CI |

Sources: Huckaby (2002a,b) for Total Plant Capacity, Combustion Technology, and 2000 APCD. Discussion of baseline APCDs is found in Table 1.

Note: Plant ID refers to DOE/EIA ORIS Plant Code

Table A.11

40 Existing (EG) MWCs with Different FGP/FGD APCD Configurations installed at Baseline and 2000

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **State** | **Facility Name** | **Plant ID** | **Total Plant Capacity (tpd)** **(in 2000)** | **Combustion Technology****(in 2000)** |  **Baseline APCD**  | **2000 APCD**  |
| AL | Huntsville Solid Waste-to-Energy Facility | N/A | 690 | MB/WW | (ESP) | SD/FF/CI/SNCR |
| CT | Southeastern Connecticut Resource Recovery Facility | 10646 | 690 | MB/WW | (ESP) | SD/FF/CI |
| FL | Hillsborough County Resource Recovery Facility | 50858 | 1200 |  MB/WW | ESP | SD/FF/CI/SNCR |
| FL | Lake County Resource Recovery Facility | 50629 | 528 | MB/WW | (ESP) | SD/FF/CI/SNCR |
| FL | McKay Bay Refuse-to-Energy Facility  | 50875 | 1000 | MB/WW | ESP | SD/FF/CI/SNCR  |
| FL | Miami-Dade County Resource Recovery Facility | 10062 | 2688 |  RDF | ESP | SD/FF/CI/SNCR |
| FL | Pasco County Resource Recovery Facility | 50666 | 1050 | MB/WW | (ESP) | SD/FF/CI/SNCR |
| FL | Pinellas County Resource Recovery Facility | 50884 | 3000 |  MB/WW | ESP | SD/FF/CI/SNCR |
| FL | Wheelabrator North Broward, Inc. | 54033 | 2250 | MB/WW | (ESP) | SD/FF/SNCR |
| FL | Wheelabrator South Broward, Inc. | 50887 | 2250 | MB/WW | (ESP) | SD/FF/SNCR |
| GA | Montenay Savannah Operations, Inc. | N/A | 500 |  MB/WW | ESP  | SD/FF/CI/SNCR |
| HI | Honolulu Resource Recovery Venture - HPOWER | 49846 | 2160 | RDF | (ESP) | SD/ESP |
| MA | Haverhill Resource Recovery Facility | 50661 | 1650 |  MB/WW | SD/ESP | SD/FF/CI/SNCR |
| *MA* | *SEMASS Resource Recovery Facility (units 1-2)* | *50290* | *2000 (units 1-2)* |  *RDF* | *SD/ESP\** | *SD/ESP/FF/CI (COHPAC)* |
| MA | Wheelabrator North Andover Inc. | 50877 | 1500 |  MB/WW | ESP  | SD/FF/CI/SNCR |
| MA | Wheelabrator Saugus, J.V. | 50880 | 1500 |  MB/WW | ESP | SD/FF/CI/SNCR |
| MD | Baltimore Refuse Energy Systems Company (BRESCO) | 10629 | 2250 |  MB/WW | ESP | SD/ESP/CI/SNCR |
| MI | Greater Detroit Resource Recovery Facility | 10033 | 3300 |  RDF | ESP | SD/FF |
| MI | Kent County Waste-to-Energy Facility | 50860 | 625 |  MB/WW | (ESP) | SD/FF/CI/SNCR |
| MN | Xcel Energy - Red Wing Steam Plant | 1926 | 720 |  RDF | ESP | DSI/FF |
| MN | Xcel Energy-Wilmarth Plant (Mankato) | 1934 | 720 |  RDF | ESP | SD/FF/SNCR |
| NC | New Hanover County-Wastec (unit 3 is large MWC) | 50271 | 301 |  MB/WW | (ESP) | SD/FF/CI/SNCR |
| NH | Wheelabrator Concord Company, L.P. | 50873 | 500 | MB/WW | DSI/FF | SD/FF/CI/SNCR |
| NJ | Camden Resource Recovery Facility | 10435 | 1050 | MB/WW | (ESP) | SD/ESP/CI/SNCR |
| NJ | Essex County Resource Recovery Facility | 10643 | 2700 | MB/WW | (ESP) | SD/ESP/CI/SNCR |
| NJ | Wheelabrator Gloucester Company, L.P. | 50885 | 576 | MB/WW | (ESP) | SD/FF/CI/SNCR |
| NY | Huntington Resource Recovery Facility | 50656 | 750 | MB/WW | (ESP) | SD/FF/CI/SNCR |
| NY | Niagara Falls Resource Recovery Facility | 50472 | 2200 |  MB/WW | ESP  | SD/FF/CI/SNCR |
| NY | Wheelabrator Hudson Falls Inc. | 10503 | 500 | MB/WW | (ESP) | SD/ESP/CI |
| NY | Wheelabrator Westchester Company, L.P. | 50882 | 2250 |  MB/WW | ESP | SD/FF/CI/SNCR |
| OK | Walter B. Hall RDD (Tulsa) | 50660 | 1125 |  MB/WW | ESP | SD/FF/CI/SNCR |
| PA | Delaware Valley Resource Recovery Facility | 10746 | 2688 | MB/RC | (ESP) | SD/FF |
| PA | Lancaster County Resource Recovery Facility | 50859 | 1200 | MB/WW | (ESP) | SD/FF/CI/SNCR |
| PA | Montenay Energy Resources of Montgomery County, Inc. | 54625 | 1200 | MB/WW | (ESP) | SD/FF/CI/SNCR |
| TN | Nashville Thermal Transfer Corp | 50209 | 990 |  MB/WW | ESP  | SD/FF/CI/SNCR |
| VA | Alexandria/Arlington Resource Recovery Facility | 50663 | 975 |  MB/WW | ESP | SD/FF/CI/SNCR |
| VA | I-95 Energy-Resource Recovery Facility (Fairfax) | 50658 | 3000 | MB/WW | (ESP) | SD/FF/CI/SNCR |
| VA | Southeastern Public Service Authority of Virginia | 54998 | 2000 |  RDF | ESP  | SD/FF |
| WA | Spokane Regional Solid Waste Disposal Facility | 50886 | 800 | MB/WW | (ESP) | SD/FF/CI/SNCR |
| WI | Xcel Energy French Island Generating Plant | 4005 | 576 | RDF | EGB | \*SD/FF |

Source: Huckaby (2002a) for Total Plant Capacity, Combustion Technology, and 2000 APCD. Discussion of baseline APCDs is found in Table 1.

\* According to the EIA-860, French Island (WI) installed SD/FF APCDs in 2002. For the purposes of calculating ex ante and ex post costs for French Island (WI), we assume the SD/FF configuration reported by GAA and EIA-860 supersedes the 2000 APCD configuration of DSI/EGB reported by Huckaby (2002a,b).

Table A.12

MWCs with Positive Ex Ante FGD and FGP Costs

(40 Existing (EG) MWCs and 8 NSPS MWCs)

(SEMASS treated as 2 MWCs – 1 EG and 1 NSPS)

 (X = EIA-860 data submitted)

(positive ex ante FGD and FGP costs reflect change in FGD/FGP

configuration between baseline and 2000)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **State** | **Facility Name** | **Plant ID** | **FGD** | **FGP** |
| AL | Huntsville Solid Waste-to-Energy Facility | N/A | na | na |
| CT | Riley Energy Systems of Lisbon Connecticut Corp. | (\*NSPS) 54758 | X | X |
| CT | Southeastern Connecticut Resource Recovery Facility | 10646 | X | X |
| FL | Hillsborough County Resource Recovery Facility |  50858 | X | X |
| FL | Lake County Resource Recovery Facility | 50629 | X | X |
| FL | Lee County Resource Recovery Facility | (\*NSPS) 52010 | X | X |
| FL | McKay Bay Refuse-to-Energy Facility  | 50875 | X | X |
| FL | Miami-Dade County Resource Recovery Facility | 10062 | X | X |
| FL | Pasco County Resource Recovery Facility | 50666 | X | X |
| FL | Pinellas County Resource Recovery Facility | 50884 | X | X |
| FL | Wheelabrator North Broward, Inc. | 54033 | X | X |
| FL | Wheelabrator South Broward, Inc. | 50887 | X | X |
| GA | Montenay Savannah Operations, Inc. | N/A | na | na |
| HI | Honolulu Resource Recovery Venture – HPOWER | 49846 | \*\*\*\*na |  |
| MA | Haverhill Resource Recovery Facility | 50661 |  | \*\*\*X |
| *MA* | *SEMASS Resource Recovery Facility (units 1-2)* | *50290* |  | **\*\*\*X** |
| *MA* | *SEMASS Resource Recovery Facility (unit 3)* | *(\*NSPS) 50290* | ***X*** | **X** |
| MA | Wheelabrator North Andover Inc. | 50877 | X | X |
| MA | Wheelabrator Saugus, J.V. | 50880 | X | X |
| MD | Baltimore Refuse Energy Systems Company (BRESCO) | 10629 | \*\*\*\*X |  |
| MD | Montgomery County Resource Recovery Facility | (\*NSPS) 50657 | na | na |
| MI | Central Wayne Energy (unit 3 is large MWC) | (\*\*NSPS) 54804 | X | X |
| MI | Greater Detroit Resource Recovery Facility  | 10033 | X | X |
| MI | Kent County Waste-to-Energy Facility | 50860 | X | X |
| MN | Xcel Energy - Red Wing Steam Plant | 1926 | X | na |
| MN | Xcel Energy-Wilmarth Plant (Mankato) | 1934 | X | X |
| NC | New Hanover County-Wastec (unit 3 is large MWC) | 50271 | na | na |
| NH  | Wheelabrator Concord Company, L.P.  | 50873 | X |  |
| NJ | Camden Resource Recovery Facility | 10435 | \*\*\*\*X |  |
| NJ | Essex County Resource Recovery Facility | 10643 | \*\*\*\*X |  |
| NJ | Union County Resource Recovery Facility | (\*NSPS) 50960 | X | X |
| NJ | Wheelabrator Gloucester Company, L.P. | 50885 | X | X |
| NY | Huntington Resource Recovery Facility | 50656 | na | X |
| NY | Niagara Falls Resource Recovery Facility | 50472 | X | X |
| NY | Onondaga County Resource Recovery Facility | (\*NSPS) 50662 | X | X |
| NY | Wheelabrator Hudson Falls Inc. | 10503 | \*\*\*\*X |  |
| NY | Wheelabrator Westchester Company, L.P. | 50882 | X | X |
| OK | Walter B. Hall RDD (Tulsa) | 50660 | X | X |
| PA | Delaware Valley Resource Recovery Facility | 10746 | X | X |
| PA | Lancaster County Resource Recovery Facility | 50859 | na | na |
| PA | Montenay Energy Resources of Montgomery County, Inc. | 54625 | na | na |
| PA | Wheelabrator Falls Inc. | (\*NSPS) 54746 | X | X |
| TN | Nashville Thermal Transfer Corp | 50209 | na | na |
| VA | Alexandria/Arlington Resource Recovery Facility | 50663 | X | X |
| VA | I-95 Energy-Resource Recovery Facility (Fairfax) | 50658 | X | X |
| VA | Southeastern Public Service Authority of Virginia | 54998 | X | X |
| WA | Spokane Regional Solid Waste Disposal Facility | 50886 | na | na |
| WI | Xcel Energy French Island Generating Plant  | 4005 | X |  X |

Note: Plant ID refers to DOE/EIA ORIS Plant Code

N/A = unable to locate plant ID code

na = data not available (EIA, Form 860, 2013)

 \*Plant is subject to subpart Ea (NSPS).

\*\*Central Wayne Energy (unit 3) is subjectto subpart Eb (NSPS). Because Central Wayne closed in 2003, the 2001 EIA-767 survey is the source of its cost data.

\*\*\* Haverhill (MA) FGP changed between baseline and 2000 with no change in FGD

\*\*\* SEMASS (MA) FGP changed between baseline and 2000 with no change in FGD

\*\*\*\* Honolulu (HI) FGD added between baseline and 2000 with no change in FGP

\*\*\*\* BRESCO (MD) FGD added between baseline and 2000 with no change in FGP

\*\*\*\* Concord (NH) FGD changed between baseline and 2000 with no change in FGP

\*\*\*\* Camden (NJ) FGD added between baseline and 2000 with no change in FGP

\*\*\*\* Essex County (NJ) FGD added between baseline and 2000 with no change in FGP

\*\*\*\* Hudson Falls (NY) FGD added between baseline and 2000 with no change in FGP

Table A.13

 Large MWC Plant Closings (through 2010)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Site** | **State** | **Combustion****Technology**  | **TPD** | **Year Started** | **Year Closed** | **Reason for shutdown**  | **Source(s) for year closed and reason for shutdown**  |
| *Listed in 1995 MWC Inventory as “large MWC (in operation)”* |
| Northwest WTE (Chicago) | IL | MB/WW | 1,600 | 1970 | 1996 | “Alternative Disposal Option” (“Plant was 25 years old and had reached end of useful life.”) | U.S. DOE (2001, p. 65), Berenyi (1997, Shutdown, p. 1), <http://www.energyjustice.net/map/displayfacilityadvanced-72144.htm> |
| Fall River  | MA | MB/REF | 600 | 1972 | 2000 |  | <http://www.heraldnews.com/news/x787563427/Fall-River-incinerator-wont-likely-be-fired-up-anytime-soon> |
| Haverhill-Lawrence RDF | MA | RDF | 710 | 1984  | 1998 |  | U.S. DOE (2001, p. 66) |
| Pulaski  | MD | MB/REF | 1,500 | 1982 | 1995 |  | <http://www.mde.state.md.us/programs/Land/MarylandBrownfieldVCP/Documents/www.mde.state.md.us/assets/document/Pulaski%20Incinerator.pdf><http://www.energyjustice.net/map/displayfacilityadvanced-72226.htm> |
| Clinton Township(Mt. Clemens) | MI | MB/REF | 600 | 1972 | 1998 |  | <http://www.energyjustice.net/map/displayfacilityadvanced-72154.htm>  |
| Montgomery County North RRF | OH | MB/RC/REF | 900 | 1970, 1988 | 1996 | “Environmental Problems” | U.S. DOE (2001, p. 67) and Berenyi (1997, Shutdown, p. 2)  |
| Montgomery County South RRF | OH | MB/RC/REF | 900 | 1970, 1988 | 1996 | “Environmental Problems” (“Facility closed due to high costs associated with retrofit.”) | Berenyi (1997, Shutdown, p. 3)<http://www.energyjustice.net/map/displayfacilityadvanced-72145.htm> |
| Harrisburg WTE (“Old Facility”) | PA | MB/WW | 720 | 1972 | 2003 | “This plant was old…” and “… facility stopped operating … due to air control issues.”  | Berenyi (2006, p. 322-324), <http://www.energyjustice.net/map/displayfacility-66842.htm> |
| Foster Wheeler Charleston RR | SC | MB/WW | 600 | 1989 | 2009 |  | <http://www.energyjustice.net/map/displayfacilityadvanced-66966.htm> |
| Nashville Thermal Transfer Corp. | TN | MB/WW | 1,050 | 1974 | 2002 | “Plant closing … to save money, and to respond to demands to no respond to citizenry demands … to no longer burn garbage.”  | Berenyi (2006, p. 340-342), <http://www.energyjustice.net/map/displayfacility-67424.htm> |
| *Listed in 1995 MWC Inventory as “newly reclassified as small MWC (in operation)” - with unit capacities ≥250 tpd* |
|

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Savannah RRF | GA | MB/WW | 500 | 1987 | 2008 | Budget shortfall | <http://www.connectsavannah.com/savannah/good-investment-turns-to-ashes/Content?oid=2159240><http://www.energyjustice.net/map/displayfacilityadvanced-72726.htm> |

 |
|

|  |
| --- |
| *Listed in 1995 MWC Inventory as “large MWC (not currently operating – under construction)”* |
| Fayetteville RRF | NC | RDF/FB | 600 | 1995 | 1996 |  | <http://www.energyjustice.net/map/displayfacilityadvanced-72376.htm> |

 |
| *Listed in 1995 MWC Inventory as “large MWC (not currently operating - inactive)”* |
| Stamford II Incinerator | CT | MB/REF | 360 | 1973 | 1994 |  | <http://www.energyjustice.net/map/displayfacility-72161.htm>  |
| Waipahu  | HI | MB/REF | 600 | 1970 | 1994  |  | <http://the.honoluluadvertiser.com/article/2003/Apr/16/ln/ln10a.html> |
| Albany Steam Plant | NY | RDF | 600 | 1981 | 1994 | “Environmental Problems, Economic Problems” (“State … closed the facility rather than bear the costs of extensive retrofitting.”)  | U.S. DOE (2001, p. 65), Berenyi (1997, Shutdown, p. 5), <http://www.energyjustice.net/map/displayfacilityadvanced-72213.htm> |
| Henry St.(Brooklyn) | NY | MB/REF | 960 | 1959 | 1994 |  | NOTE:U.S. EPA (1989c, p. 3-51) and Fenn and Nebel (1992) is the source of the combustion technology and start date for this MWC<http://www.energyjustice.net/map/displayfacilityadvanced-72138.htm> |
| Oceanside RRF | NY | MB/WW | 750 | 1974 | 1984 | “Equipment Problems”  | U.S. DOE (2001, p. 67), Berenyi and Gould (1991, p. 719-720 and 1993, p. 629-630) |
| Monroe County RRF (Rochester)  | NY | RDF | 2,000 | 1983 | 1984 | “Unfavorable Economics / Markets”  | U.S. DOE (2001, p. 68), Berenyi and Gould (1991, p. 721-722 and 1993, p. 631) |
| Akron | OH | RDF | 1,000 | 1979 | 1995 | “Environmental Problems” (“… forced to close facility due to the high cost of air pollution compliance …”)  | U.S. DOE (2001, p. 65), Berenyi (1997, Shutdown, p. 2), <http://www.energyjustice.net/map/displayfacilityadvanced-72189.htm> |
| City of Columbus SW Reduction Fac. | OH | RDF | 2,000 | 1982 | 1995 | “Economic Problems, Insufficient Waste Steam, Environmental Problems” (“Closed … due to lack of flow control and the cost of upgrading to meet pollution control standards.”)  | U.S. DOE (2001, p. 65), Berenyi (1997, Shutdown, p. 2) |
| Philadelphia East Central (EC)  | PA | MB/WW | 750 | 1965 | c. 1989 |  | Denison and Ruston (1990, p. 278), Fenn and Nebel (1992) |
| Philadelphia Northwest (NW)  | PA | MW/WW | 750 | 1965 |  1989 |  | Denison and Ruston (1990, p. 278),Fenn and Nebel (1992)<http://theasthmafiles.org/system/files/artifacts/media/pdf/northwest_philadelphia_the_public_interest_law_center.pdf> |
| *Listed in 1995 MWC Inventory as “newly reclassified as small MWC (not currently operating - inactive)” - with unit capacities ≥250 tpd* |
| Solid Waste Reduction Center No. 1 (Benning Road Incinerator) | DC | MB/REF | 1,000 | 1972 | 1994 |  | <http://www.energyjustice.net/map/displayfacilityadvanced-72155.htm> |
| Framington | MA | MB/REF | 500 | 1970 | 1991 |  | Fenn and Nebel (1992)<http://www.energyjustice.net/map/displayfacilityadvanced-72146.htm> |
| Betts Avenue  | NY | MB/REF | 1,000 | 1964 | 1996 | “Environmental Problems”  | U.S. DOE (2001, p. 67), Berenyi (1997, Shutdown, p. 5), <http://www.energyjustice.net/map/displayfacilityadvanced-72139.htm> |
| *Listed in 1995 MWC Inventory as “large MWC (not currently operating - planned)”*  |
| Robbins RRF | IL | RDF/FB | 1,600 | 1996 | 1998 |  | U.S. DOE (2001, p. 68) |
| *Not included in MWC 1995 Inventory* |
| Albany (Answers)  | NY | RDF | 800 | 1981 | 1995 | “Economic Problems, Environmental Problems” (“Burn plant was shuttered due to public opposition and the cost of retrofitting.”)  | U.S. DOE (2001, p. 65), Berenyi (1997, Shutdown, p. 4), <http://www.energyjustice.net/map/displayfacilityadvanced-72212.htm> |
| Baltimore County | MD | RDF | 1,200 | 1976 | 1991 | “Economic Problems, No Energy Market” | DOE (2001, p. 65), Berenyi (1997, Shutdown, p. 8), <http://www.energyjustice.net/map/displayfacilityadvanced-72172.htm> |
| Central Wayne (Dearborn Heights) (unit 3)  | MI | MB/WW | 300 | 2000 | 2003 | In 2005, “this plant, in bankruptcy for several years, is being dismantled.”  | NOTE: Berenyi (2006, p. 215-217) is the source of all information for this MWC |
| Delaware Reclamation  | DE | RDF | 1,000 | 1984 | 1993 | “Environmental Problems”  | DOE (2001, p. 65), Berenyi (1997, Shutdown, p. 7), <http://www.energyjustice.net/map/displayfacilityadvanced-72247.htm> |

Note:plant characteristics and start date can vary from source to source. Except for Henry St. (NY) and Central Wayne (MI), if a plant is listed in the revised 1995 MWC inventory (Cone and Kane 1997), then that is the source for information on plant characteristics. If the plant is not included in the 1995 MWC inventory, the U.S. DOE (2001) is the source of information on plant characteristics.

Note: The closing date of plant can vary from source-to-source. If a MWC is included in the DOE (2001) inventory, then that closing date is cited in this table.

Appendix A.14

Miscellaneous information related to Table 8

Several *discrepancies between the EPA MWC inventories and the EIA-860 APCD configurations* were identified. We address these discrepancies as follows:

1. SEMASS (MA) – We include the cost of the FGD and FGP (FF) units for unit 3 (NSPS), which were installed in 1993 and report identical Hours Inservice in 2005. Although the EIA-860 reports installation dates (2000) of the ESP systems for units 1-2 (existing), we do not count these costs as ex post costs because, according to the MWC Inventory, these units had ESP systems installed at the baseline. However, we include the cost of FF (baghouse) systems installed in 2000 at units 1-2 (EG) as ex post costs.
2. SEMASS (MA) (NSPS - Model Plant 6): (MWC inventory: SD/FF)

While EIA-860 lists an expenditure for an ESP system in 1993, this expenditure is not included in the ex post cost estimate because an ESP system is not listed in the 2000 Inventory. Therefore SD/FF: $21,842 is used as the ex ante cost estimate.

1. Millbury (MA) – 2001 and 2002 EIA-767 surveys state ESP units were installed in 1987, while 2003-2005 EIA-767 and 2013 EIA-860 surveys report FF – not ESP - units were installed in 1987. In addition, the 2001 and 2005 EIA-767 survey lists different cost amounts for the FGP units. Because the 1991 and 2000 MWC Inventories indicate no change in FGD or FGP units (i.e., SD/ESP) and the EIA-860 indicates no FGD or FGP expenditures after 1987, we decided Millbury incurred no ex post costs associated with FGP systems.

Appendix A.14

(continued)

There were several MWCs with observed ex ante APCD configurations that were not included in the ex ante cost estimates. For these MWCs, we derive their ex ante cost estimates from the ex ante cost estimates of other APCD configurations:

1. Concord (NH) (Model Plant 6): (MWC inventory: DSI/FF to SD/FF)

*Economic Impact Analysis* only considered SD (Baseline) to DSI (2000 compliance) case – not the reverse, which occurred for Conrad. The following strategy was employed to generate an ex ante cost estimate for the DSI to SD change in its APCD configuration. First, data available in Table 4:

ESP (Baseline APCD) to DSI/ESP or FF (2000 compliance): $5,188

ESP (Baseline APCD) to SD/FF (2000 compliance): $9,992

Estimated ex ante cost of changing from DSI to SD = $9,992 - $5,188 = $4,804

 **B.**  SEMASS (MA) (EG - Model Plant 7): (MWC inventory: SD/ESP to SD/ESP/FF)

ESP (Baseline APCD) to SD/ESP: $53,245

ESP (Baseline APCD) to SD/FF: $64,115

Estimated ex ante cost of SD/ESP to SD/FF = $64,115 - $53,245 = $10,870 (i.e., assumes incremental cost of SD system is $53,245 and incremental cost of SD/FF system is $54,115. Hence, the difference between the two values represents the incremental cost of the FF system.)

1. The MB/WW (large) model plant corresponds to the “very large” model plant size category while the MB/WW (mid-size) model plant corresponds to the “large” model plant size category (U.S. EPA, 1990). In addition, the RDF (large) model plant corresponds to the “very large” model plant size category, while the RDF (small) model plant corresponds to the “large” model plant size category. [↑](#footnote-ref-1)
2. For NSPS plants, the MB/WW (large) model plant andthe MB/WW (mid-size) model plant bothcorrespond to the “large” model plant U.S. EPA (1990) size category. However, because Table 5 shows differences in ex ante costs for the two size categories, we separate NSPS MWCs using the same size capacity categories as existing MWCs described in footnote 2. [↑](#footnote-ref-2)
3. This table shows the number of plants assigned to each model plant category where MWCs are assigned to the model plant with a capacity that was closest to the actual capacity of a plant. This results in some plants assigned to the “very large” and “large” size categories using ranges being reassigned to the “large” and “small” size categories, respectively. [↑](#footnote-ref-3)