

Water Management Plan

United States Environmental Protection Agency
Region 2 - Edison Facility

2890 Woodbridge Avenue
Edison, NJ 08937



13 April 2006

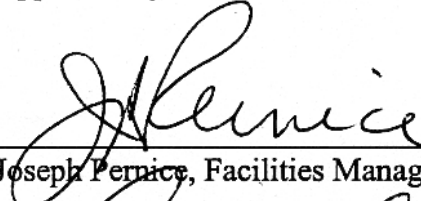
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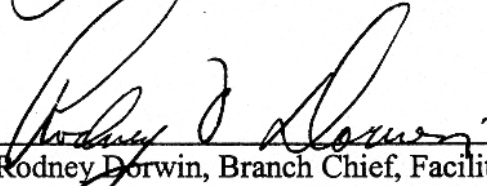
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2 - EDISON FACILITY

WATER MANAGEMENT PLAN

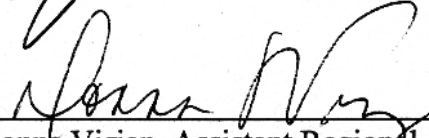
Approved by:



Joseph Perrice, Facilities Manager 4/17/06 Date



Rodney Dorwin, Branch Chief, Facilities and Administration Management Branch 5/4/06 Date



Donna Vigan, Assistant Regional Administrator, Office of Policy and Management 5/8/06 Date

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1.0 EPA'S STATEMENT OF PRINCIPLES ON EFFICIENT WATER USE

In order to meet the needs of existing and future populations and ensure that habitats and ecosystems are protected, the nation's water must be sustainable and renewable. Sound water resource management, which emphasizes careful, efficient use of water, is essential to achieve these objectives.

Efficient water use can have major environmental, public health, and economic benefits by helping to improve water quality, maintain aquatic ecosystems, and protect drinking water resources. As we face increasing risks to ecosystems and their biological integrity, the inextricable link between water quality and water quantity becomes more important. Water efficiency is one way of addressing water quality and quantity goals. The efficient use of water can prevent pollution by reducing wastewater flows, recycling process water, reclaiming wastewater, and using less energy.

EPA recognizes that regional, state, and local differences exist regarding water quality, quantity, and use. Differences in climate, geography, and local requirements influence the water efficiency programs applicable to specific facilities. Therefore, EPA is establishing facility-specific Water Management Plans to promote the efficient use of water and meet the water conservation requirements under Executive Order 13123, Greening the Government Through Efficient Energy Management.

This Water Management Plan has been established to document and promote the efficient use of water at the Region 2, Edison, New Jersey Facility. The plan is organized according to the Federal Energy Management Program (FEMP) Facility Water Management Planning Guidelines under Executive Order 13123.

2.0 FACILITY DESCRIPTION

The Edison facility occupies 205 acres on the former Raritan Arsenal property in Edison, New Jersey, a suburban location approximately 30 miles southwest of New York City. The facility comprises multiple buildings and numerous temporary trailers. Most of the buildings are brick construction, originally built by the Army at various times between the World War I era and the 1950s. These buildings have undergone or are undergoing reconstruction and renovation. Numerous temporary trailers, some over 20 years old, house laboratory facilities. Long range plans call for activities to be relocated from these trailers to permanent structures. A figure showing the facility layout is provided as Appendix B. The major buildings, identified on the figure, are utilized as follows:

- Buildings 5, 10, and the ERT Center (Building 18) – Office space;
- Health Unit (Building 200) – Health assessments and medical monitoring;
- Building 205 – Office space and training facilities;
- Building 209 – Laboratory and office space;
- Building 212 – Storage;

- Building 238 – Undergoing renovation;
- REAC trailers – Temporary trailers used as contractor laboratory space;
- Urban Watershed Research Facility – Laboratory research (the structures shown on the figure were removed and replaced with a new laboratory building in 2005, located in the same general area);
- Building 245/246 – FEMA storage and nine vacant bays;
- Building 255/256 – Unoccupied and abandoned.

All totaled, the buildings and trailers at Edison contain 316,483 square feet of conditioned space. The facility is EPA owned and EPA operated.

The Region 2 Facility hosts many varied activities, summarized below:

- **Division of Environmental Science and Assessment (DESA)** is responsible for collection, analysis, and evaluation of environmental quality data in support of regional and national monitoring requirements and enforcement programs. The laboratory provides chemical, biological, microbiological, and other laboratory support.
- **Emergency and Remedial Response Division (ERRD)** responds to spills, manages spill prevention activities, coordinates regional disaster response activities, manages Region 2's CERCLA removal program, and manages the contractor Superfund Technical Assistance Response Team (START).
- **Division of Enforcement and Compliance Assistance (DECA)**, Pesticides and Toxic Substances Branch manages program planning, implementation and quality assurance under the Federal Insecticide, Fungicide, and Rodenticide Act, the Toxic Substances Control Act; and Section 313 of the Emergency Planning and Community Right-to-Know Act.
- **The Edison Facilities Team**, within the Office of Policy and Management, provides a comprehensive program of engineering, environmental compliance, health and safety, security, and administrative management services at the Edison facility.
- **The Environmental Response Team (ERT)**, within the Office of Solid Waste and Emergency Response, is at the forefront of national spill containment and hazardous substances cleanup efforts.
- **The Urban Watershed Management Branch (UWMB)**, part of the Office of Research and Development, National Risk Management

Research Laboratory, researches, develops, and demonstrates technologies, systems and methods to manage risk to human health and the environment from wet-weather flows and petroleum and chemical storage systems.

3.0 FACILITY WATER MANAGEMENT GOALS

The resource conservation goals of the Edison facility are achieved through the implementation of an Environmental Management System (EMS). The EMS has been established and implemented consistent with Region 2 Environmental Management System Policy. The Region 2 policy statement, as well as objectives and targets related to water consumption, are provided below.

Environmental Management System Policy

On April 21, 2000, Executive Order (EO) 13148 “Greening the Government Through Leadership in Environmental Management,” was issued by President William Clinton. This order established goals and requirements for Federal agencies to improve environmental performance through management systems and an emphasis on pollution prevention.

On May 17, 2002, Environmental Protection Agency Administrator, Christine Todd Whitman, issued the EPA’s Environmental Management System Implementation Policy. In support of EO 13148, the policy encourages the effective use of environmental management practices that focus on environmental compliance and pollution prevention within the Agency and present the Agency as a role model for Environmental Management Systems.

Here at EPA Region 2 we are committed to safeguarding the environment and have implemented EMS at our Regional facilities in pursuit of this mission. As noted in the EPA Environmental Management System Implementation Policy, the Region 2 EMS is designed to meet the following goals:

- Ensure compliance by meeting or exceeding all applicable environmental requirements;
- Strive to continuously improve environmental performance in terms of both regulated and unregulated environmental impacts;
- Employ source reduction and other pollution prevention approaches whenever possible;
- Require consideration of environmental factors when making planning, purchasing, and operating decisions;
- Establish, track, and review specific environmental performance goals;
- Provide training to educate our employees and others working in Region 2 office space to be environmentally responsible on the job;

- Work cooperatively with other stakeholders to further common environmental objectives;
- Recognize and reward accomplishments and take corrective action to address non-conformances; and
- Share information on environmental performance with our employees and others working in Region 2 office space and allow appropriate opportunities for input into EMS development and implementation.

In addition to our annual review of the Regional office and laboratory's progress on environmental goals and adherence to this policy, we invite interested parties to provide us with input on this policy.

EMS Water Management Objectives

The Edison facility has identified reduction of discharges to the publicly owned treatment works and managing the discharge of pollutants to stormwater systems as objectives under the EMS. We have established seven targets related to these objectives:

- 1) Reduce water discharges to the sanitary sewer compared to a baseline year of 2000. The facility will accomplish this goal by minimizing unnecessary water usage from laboratory activities and by continuing to review standard operating procedures to find opportunities to reduce water use. This target is monitored by tracking water consumption data. Baseline consumption in FY 2000 was 5,844,800 gallons.
- 2) Reduce the impacts of stormwater runoff by implementing and maintaining the use of native vegetation in landscaping and restoring unused paved areas to native vegetation.
- 3) Minimize the entry of silt and debris into storm drains due to construction by implementing and maintaining work practice controls and engineering controls and monitoring contractor construction and removal methods.
- 4) Limit excessive use of pesticides and herbicides by establishing work practice controls, employee training, and xeriscaping; increasing the use of native vegetation; and increasing composting practices.
- 5) Reduce wastewater discharges from facility maintenance operations by promoting minimized use of chemicals in maintenance operations.
- 6) Reduce water use required for equipment such as dishwashers, autoclaves, and deionized (DI) water systems. The laboratory will pursue this goal by upgrading laboratory equipment to more efficient models as necessary.
- 7) Reduce water use required for facility maintenance activities by promoting water minimization with facility maintenance staff.

4.0 UTILITY INFORMATION

Contact Information

Potable water supply is provided by:

Middlesex Water Company
1500 Ronson Road
Iselin, New Jersey 08830-0452

732-634-1500

Sewer service is provided by:

Township of Edison
100 Municipal Boulevard
Edison, NJ 08817

732-248-7323

Water Rate Schedule

The Edison facility is billed for water use measured on two parallel meters. Water is billed at a rate of \$2.4012 per 100 cubic feet (\$3.21 per 1000 gallons, effective 8 December 2005). There is also a monthly facilities charge of \$822 which is independent of utilization.

Sewer Rate Schedule

Sewer service for the current year is billed based on water consumption for the prior year. Service is billed at a rate of \$2.88 per 1,000 gallons (effective in 2005), multiplied by the prior year consumption. This total is then billed in two installments, due in April and October of the current year.

Payment Office

Research Triangle Park Finance Center (RTP-FC)
Kim Poteat, 919-541-1468

(Pouch and Regular Mail)
Environmental Protection Agency
Mail Code - D143-02
Research Triangle Park, NC 27711

(FEDEX)
 Environmental Protection Agency
 Mail Code - D143-02
 4930 Page Road
 Research Triangle Park, NC 27711

The fax number for RTP-FC is: 919-541-4975

5.0 FACILITY INFORMATION

The Edison complex contains multiple buildings with a mixed use of office, laboratory, training, and laboratory space. The laboratory space is configured to conduct bench-scale analyses of environmental samples. Water is used for mechanical systems, sanitary needs, laboratory processes, and irrigation. Additional details on facility water use are provided in the following sections.

Major Water Using Processes

Estimates of potable water consumption by major use area are provided in Table 1. These data reflect average facility water use between October 2003 and September 2005.

Table 1. Major Water Using Processes

Major Process	Annual Consumption (gallons)	Percent of Total	Comments
Irrigation water	100,000	1.7	Engineering estimate
Fire hydrant testing	130,000	2.2	Calculated from high flow meter readings
Cooling tower make-up water	1,300,000	22.2	Engineering estimate
Sanitary water	1,800,000	30.7	Engineering estimate
Autoclaves	500,000	8.5	Engineering estimate
Urban Watershed Research Branch facility	40,000	0.7	Extrapolated from metered flow, November 2005 to January 2006
Miscellaneous laboratory water use, leaks	1,990,580	34.0	Calculated by difference
TOTAL	5,860,580	100	Metered total

Additional detail on assumptions and calculations supporting these water use estimates are provided in Appendix A.

Measurement Devices

Incoming water supplied by Middlesex Water Company is split and flows through two parallel metered pipes in a metering shed. Each meter provides a high flow and a low flow component reading. The sum of the two readings (high and low flow) from each of the two meters is the measured total. The locked metering shed is located in a separate fenced area outside of the northeast corner of the EPA property.

Laboratory water supplied to the new Urban Watershed Research Branch (UWMB) facility is metered and logged by UWMB staff.

The new cooling tower installed for cooling of Building 205 is equipped with a flow totalizing meter. When this cooling tower becomes fully operational, expected during the 2006 cooling season, cooling tower water consumption will be recorded and tracked on a monthly basis under this plan. The Facilities Manager will use these data to monitor trends in cooling tower water consumption.

Shut-off Valves

Shut-off valves to the Edison facility are located in the metering shed. A second set of isolation valves are located in a below grade pit just to the north-west of the Health Unit (Building 200).

Occupancy and Operating Schedules

Approximately 470 people work at the Edison facility. The facility operates on a flex time schedule and is typically occupied between 6:30 a.m. and 6:00 p.m., Monday through Friday.

6.0 BEST MANAGEMENT PRACTICE SUMMARY AND STATUS

FEMP has identified Water Efficiency Improvement Best Management Practices (BMPs) in 10 possible areas. Implementation of BMPs in four or more areas are required under FEMP guidance. The Edison facility has adopted and will maintain BMPs in six of the 10 areas, as checked below:

- ✓ Public Information and Education Programs
- Distribution System Audits, Leak Detection, and Repair
- ✓ Water-Efficient Landscape
- ✓ Toilets and Urinals
- ✓ Faucets and Showerheads
- Boiler/Steam Systems
- ✓ Single-Pass Cooling Systems
- ✓ Cooling Tower Systems
- Miscellaneous High Water-Using Processes
- Water Reuse and Recycling

Additional information related to each BMP area is provided in the following sections.

Public Information and Education Programs (BMP #1)

The Edison facility promotes water conservation and awareness using the FEMP Lead by Example poster series. Conservation posters are displayed in prominent locations throughout the facility. In addition, employees have been educated on water and other resource conservation topics through the implementation of the facility EMS. As discussed in Section 3, several water conservation targets are being pursued under the EMS.

Distribution System Audits, Leak Detection, and Repair

Facility staff are trained to report leaks and malfunctioning water-using equipment to the Facilities Manager or the operations and maintenance (O&M) contractor. Reported maintenance problems are assigned a work order, which is completed promptly by the O&M contractor.

Because of the age and configuration of the facility, water leaks are a potential problem. A major portion of the water main supplying water throughout the facility, circling the primary facility buildings at the north side of the property, was replaced in the mid 1990s. This upgrade addressed many of the recurring problems with water main leaks the facility had experienced. There still remain some problems with leaks from the water supply piping to the REAC laboratory trailers. The trailers are above grade, and in cold weather the supply piping from the ground to the trailers has a tendency to freeze and burst. This problem will ultimately be addressed when renovations to building 209 are complete and REAC laboratory activities are moved from the trailers to this permanent building.

A screening level system review was conducted in January 2006 and known water uses account for 66 percent of water consumption. Given the age and wide distribution of the water supply piping, less than full accounting of known water uses, and recurring problems with leaks associated with the REAC trailers, BMP credit is not claimed in this area at this time.

As part of an ongoing effort to proactively monitor for leaks, the instantaneous water flow rate will be monitored at the main water meters during off hours at least two times per year. The total water flow rate will be monitored for one hour when the laboratory is generally unoccupied (overnight hours) and the cooling towers and irrigation system are not in operation. If a steady, sustained off-hour flow rate of greater than 2 gallons per minute is observed, the possibility of a leak or continuous water flow to untended process equipment will be further investigated.

Trends in monthly water use will also be monitored by the Facility Manager and changes that are not understood or expected will be investigated and resolved.

Water-Efficient Landscape (BMP #2)

Irrigation water use has been largely eliminated at the Edison facility. Currently, the only remaining use of irrigation is to sustain shrubs in the steeply-sloped planted beds surrounding Building 10. These beds cover less than one quarter acre, or about 0.1 percent of the facility grounds.

Water applied to these beds is carefully monitored by the O&M contractor, and controlled with an automated irrigation timer. Water is applied three days per week in the overnight hours. The watering frequency is reduced when natural precipitation is adequate to maintain healthy plant growth.

The vast majority of landscaped areas are allowed to brown out during dry periods, and are naturally restored when precipitation occurs.

Based on the limited quantity of landscape that is irrigated, and the careful control of irrigation water in the one remaining irrigated area, BMP credit is claimed in this area.

Toilets and Urinals (BMP #3)

Toilets and urinals throughout the Edison facility have been either newly installed, or retrofitted to be water efficient (1.6 gallons per flush (gpf) for toilets and 1.0 gpf for urinals). An inventory of sanitary fixtures is provided in Table 2.

Table 2. Edison Facility, Inventory of Sanitary Fixtures

Fixture Type	Total Number	Number that are Water Efficient	Number that are Sensor Controlled
Toilets	67	65 (1.6 gpf or less)	6
Urinals	15	15 (1.0 gpf or less)	2
Lavatory faucets	50	48 (2.2 gpm or less)	6
Showers	5	2 (2.5 gpm or less)	0

Janitorial staff and employees are trained to report leaks or other maintenance problems to the Facilities Manager or O&M contractor, which are immediately corrected.

Faucets and Showerheads (BMP #4)

Faucets and showerheads throughout the Edison facility have been either newly installed, or retrofitted to be water efficient (2.2 gallons per minute (gpm) or less for lavatory faucets and 2.5 gpm or less for showerheads). An inventory of sanitary fixtures is provided in Table 2.

Water pressure is maintained at approximately 75 pounds per square inch, within the range needed for optimum system performance.

Janitorial staff and employees are trained to report leaks or other maintenance problems to the Facilities Manager or O&M contractor, which are immediately corrected.

Boiler/Steam Systems

Boilers produce low pressure, hot water rather than steam. No steam condensate is generated. Therefore, no BMP credit is claimed in this area.

Single-Pass Cooling (BMP #5)

The facility implemented an initiative in the 1990s to eliminate the use of single-pass cooling water. All laboratory equipment cooling needs are now supplied by point of use, air-cooled chiller units, no single-pass cooling water is utilized.

Cooling Tower Systems (BMP #6)

The facility is equipped with two cooling towers: one rated at 350 tons of total cooling capacity, installed in 2000, that supplies cooling for Building 209, and the other a 100 ton unit, installed in

2005, that will supply cooling for Building 205. The Building 205 unit is not yet fully operational, but will be brought on line for the 2006 cooling season.

The Building 205 tower is equipped with a make-up water flow meter, the Building 209 tower is not.

A cooling tower maintenance contractor performs a monthly quality, performance, and water chemistry review of the Building 209 cooling tower operation. Chemical treatment is provided to control scale and corrosion. The tower is equipped with a side stream filtration unit to remove entrained solids and improve efficiency. A conductivity meter set at approximately 1,400 $\mu\text{S}/\text{cm}$ is used to control blowdown. This set point results in efficient water use, as the facility achieves 4 cycles of concentration in the cooling tower. Once the facility takes operational control of the Building 205 tower, expected in 2006, a similar water chemistry and blowdown water control regimen will be implemented for that tower.

Miscellaneous High Water-Using Processes

The facility is equipped with two autoclaves, a new unit manufactured by Tuttnauer and an older unit manufactured by AMSCO. The Tuttnauer unit was installed in 2005 to replace a second older unit that had a continuous flow of cooling water to temper steam condensate blowdown. The Tuttnauer unit only uses cooling water for tempering when condensate is actually being discharged, thereby saving a significant quantity of water.

Cooling water flows through the AMSCO unit whenever it is turned on. A dial valve on the front panel of the autoclave controls the cooling water flow. Management controls have been instituted to reduce the time that cooling water flows through the AMSCO unit; however, most of the cooling water flow is wasted by the old style technology employed by this autoclave. No BMP credit is claimed in this area, pending the elimination of the continuous flow of cooling water in the AMSCO autoclave.

Water Reuse and Recycling

No BMP credit is claimed in this area.

7.0 DROUGHT CONTINGENCY PLAN

In the event of a drought or other water supply shortage, the Edison facility will follow the water use recommendations and restrictions of the New Jersey Department of Environmental Protection and the Edison Township.

In accordance with the Water Supply Management Act (N.J.S.A. 58:1A-1), during water shortages a State-appointed “Drought Coordinator” and a “Drought Management Task Force” will communicate voluntary and mandatory water conservation, in six drought management regions, through the New Jersey Department of Environmental Protection. When advisories and restrictions are established for the “Central” drought management region, which encompasses the Edison facility, facility management will assess water use at the laboratory and implement appropriate conservation actions to reduce consumption.

Regional drought conditions and general information on water supply management can be found at the New Jersey Drought Information Web page: <http://www.njdrought.org/index.html>.

As required, the Facilities Manager will implement the facility response to any applicable water use restrictions.

8.0 COMPREHENSIVE PLANNING

The Facilities Manager will ensure that water supply, wastewater generation, and water efficiency BMPs are taken into account during the initial stages of planning and design for any facility renovations or new construction. These factors will also be considered prior to the purchase and installation of any equipment that would measurably change facility water consumption.

9.0 OPPORTUNITIES FOR FURTHER WATER CONSERVATION

The Edison facility is implementing or considering the following projects to achieve additional reductions in water use:

- 1) **Install Tempering Water Control Valve on AMSCO Autoclave.** A tempering water control valve could be installed on the autoclave, to further restrict tempering water flow to only those periods when condensate above 140 F is being discharged. At an installed cost of \$1,000 to \$1,500, the unit is estimated to save approximately 450,000 gallons per year, for annual savings of \$2,700 at current water and sewer rates. Simple payback would be 1 year or less.
- 2) **Install and Monitor Make-up and Blow Down Flow Meters on Both Cooling Towers.** The cooling towers are the greatest single consumers of water at the Edison facility. Installing a make-up and blow down water meters on both towers (there is already a make-up meter installed on the Building 205 tower) will provide data to help ensure consistent efficient performance from this equipment. Cooling tower water utilization data should be recorded and evaluated monthly.

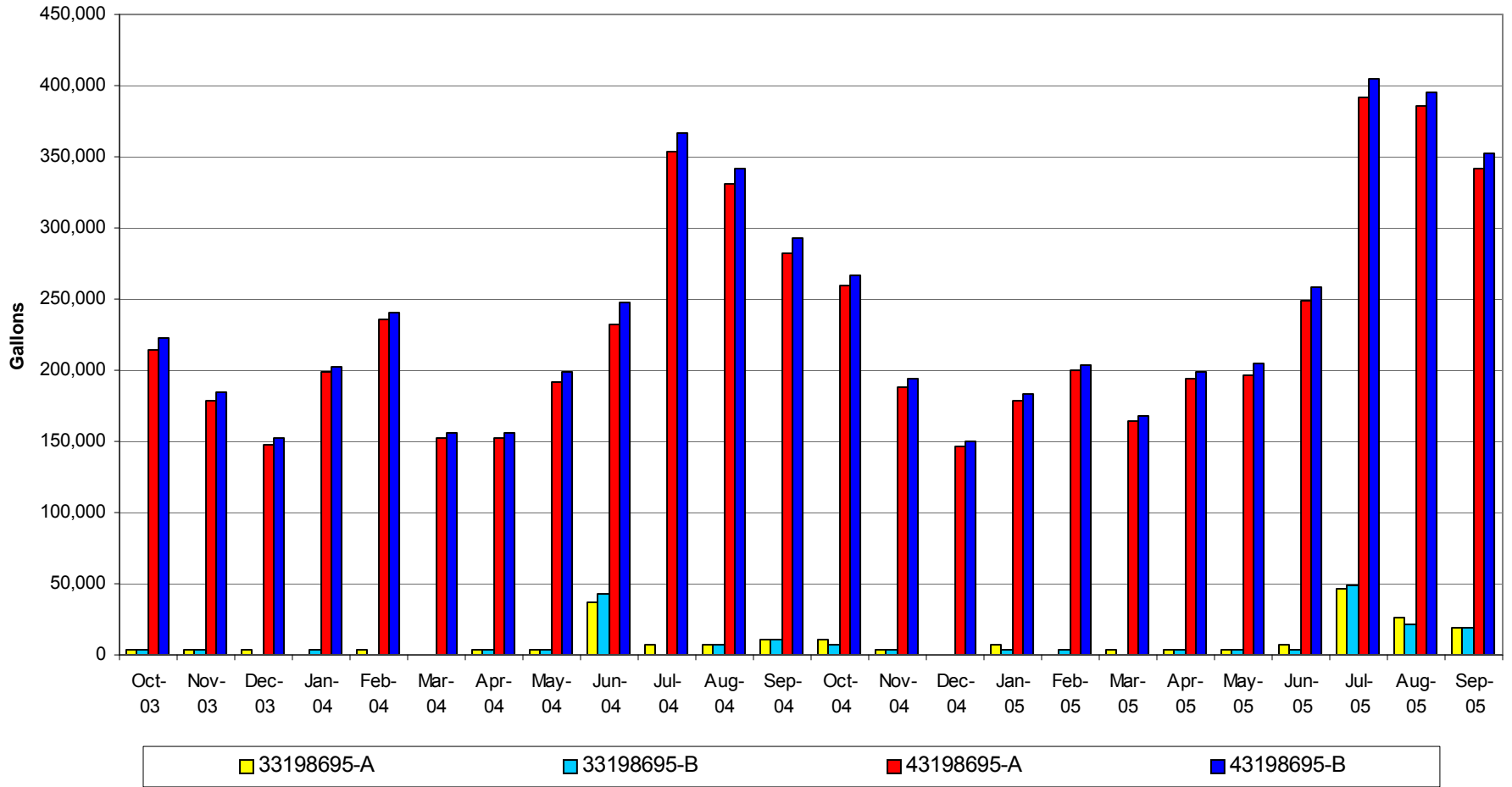
Appendix A

WATER USE AND WATER BALANCE SUPPORTING CALCULATIONS

EPA Region 2 - Edison Facility Water Balance Supporting Calculations

Major Process	Annual Consumption (gallons)	Supporting Calculations
Irrigation water	100,000	Approximate size of irrigated area is 9,000 ft ² . Assume 1 inch of water is applied per week for 20 weeks per year. $20\text{inches}/12\text{inches/foot} * 9,000 \text{ ft}^2 * 7.48\text{gallon/ ft}^3 = 112,200$ gallons.
Fire Hydrant Testing	130,000	Based on average metered usage on the high flow meters for Summer months.
Cooling tower make-up water	1,300,000	Annual flow has a seasonal pattern, increasing in the Summer because of irrigation, cooling tower, and hydrant testing. Baseline non-seasonal monthly use calculated for November through April is 362,000 gallons per month or 4,340,000 gallons per year. Seasonal use is calculated as total use minus baseline use. $5,860,580 - 4,340,000 = 1,520,580$. Cooling tower use is this total minus irrigation and hydrant testing. $1,520,580 - 100,000 - 130,000 = 1,290,580$
Sanitary water	1,800,000	Engineering estimate based on 470 people using 15 gallons/day, 250 days per year. $470 * 15 * 250 = 1,762,500$ gallons.
Autoclaves	500,000	Assume AMSCO autoclave operates with a continuous flow of 2.6 gallons/minute during the operating day. Flow rate based on the average flow rate in operating autoclaves, as reported by Van Gelder at Jan. 2004 AWWA Water Sources Conference. $2.6 \text{ gallons/minute} * 60 \text{ minute/hour} * 12 \text{ hour/day} * 260 \text{ days/year} = 486,720$ gallons. Assume water use of the new Tuttnauer autoclave is negligible compared to the AMSCO, as it does not have a continuous flow of cooling water when in operation.
Urban Watershed Research Branch facility	40,000	Based on extrapolation of metered data for 65 days, 14 November 2005 to 18 January 2006. $6887 \text{ gallons} * 365/65 = 38,673$ gallons. This estimate may be low, as metered period does not include growing season.
Miscellaneous laboratory water use, leaks	1,990,580	Calculated as difference between metered total and other uses.
TOTAL	5,860,580	Average annual usage, October 2003 to September 2005

Monthly Water Use at Edison Facility (FY2004-FY2005)



Water Use at Edison, New Jersey Region 2 Facility

FY 2004 to FY 2005

Water Use Meters (Gal)

Month-Year	33198695-A	43198695-A	33198695-B	43198695-B	TOTAL (Gal)
Oct-03	3,740	213,928	3,740	222,904	444,312
Nov-03	3,740	178,024	3,740	184,756	370,260
Dec-03	3,740	147,356	0	151,844	302,940
Jan-04	0	198,220	3,740	202,708	404,668
Feb-04	3,740	235,620	0	240,856	480,216
Mar-04	0	152,592	0	155,584	308,176
Apr-04	3,740	151,844	3,740	155,584	314,908
May-04	3,740	191,488	3,740	198,220	397,188
Jun-04	36,652	232,628	43,384	247,588	560,252
Jul-04	7,480	353,804	0	366,520	727,804
Aug-04	7,480	331,364	7,480	341,836	688,160
Sep-04	11,220	281,996	11,220	292,468	596,904
Oct-04	11,220	259,556	7,480	267,036	545,292
Nov-04	3,740	187,748	3,740	194,480	389,708
Dec-04	0	146,608	0	150,348	296,956
Jan-05	7,480	178,024	3,740	183,260	372,504
Feb-05	0	199,716	3,740	203,456	406,912
Mar-05	3,740	163,812	0	167,552	335,104
Apr-05	3,740	194,480	3,740	198,968	400,928
May-05	3,740	196,724	3,740	204,204	408,408
Jun-05	7,480	248,336	3,740	258,060	517,616
Jul-05	46,376	391,952	48,620	404,668	891,616
Aug-05	26,180	385,968	20,944	395,692	828,784
Sep-05	18,700	341,836	18,700	352,308	731,544
TOTAL	217,668	5,563,624	198,968	5,740,900	11,721,160