Water Efficient Technologies Program (WET)

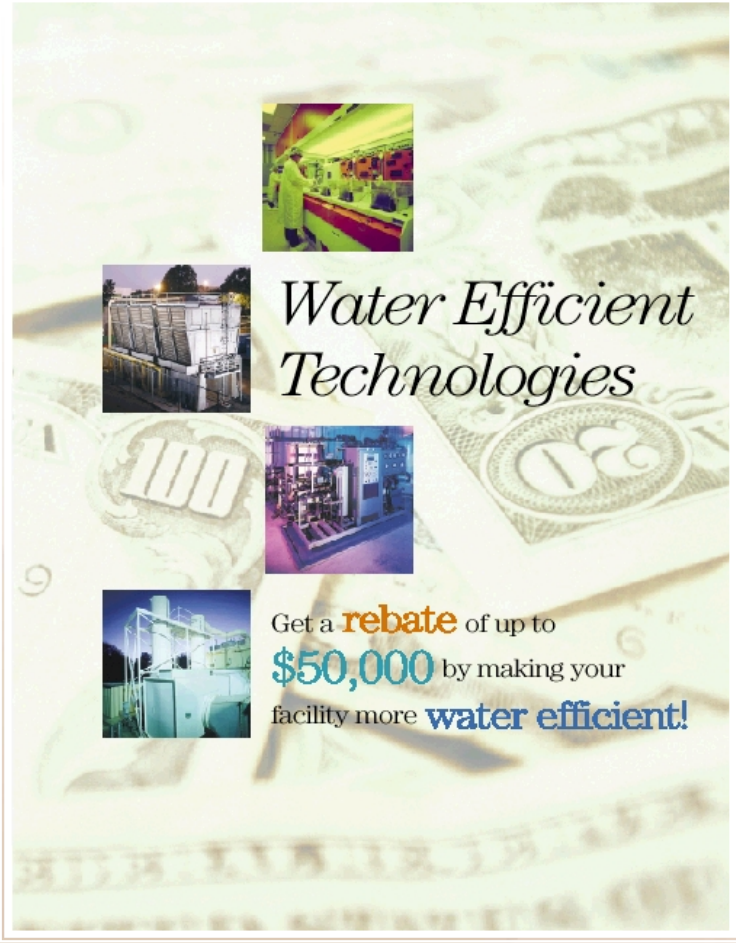
San Jose/Santa Clara Water Pollution Control Plant

Serving the cities of San Jose, Santa Clara, Milpitas, Cupertino, Saratoga, Campbell, Los Gatos

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

What Is WET?

- Incentive program featuring rebates
- All industrial users discharging to Plant are eligible



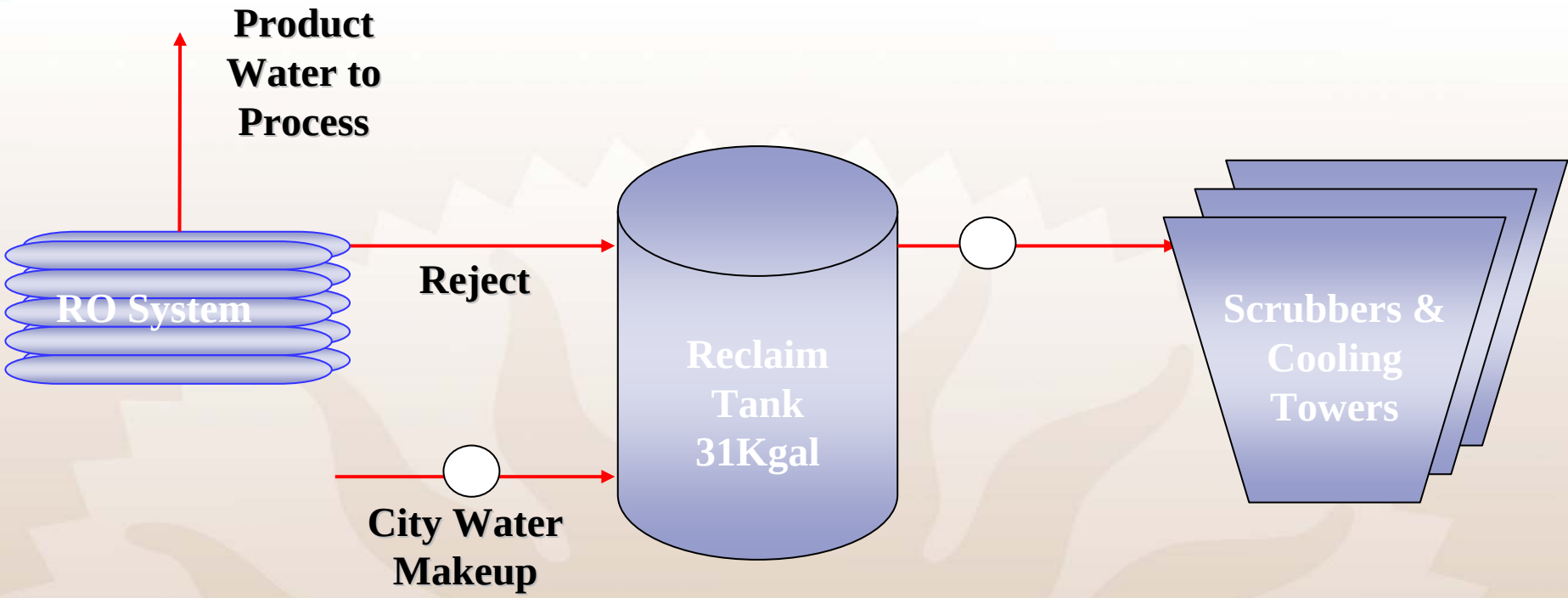
Qualifying Projects

- Reduce wastewater flows at least 100 ccf per year
- Have a minimum life expectancy of five years
- Purchase equipment or lease (a minimum of 3 years)
- Maintenance projects do not qualify

How the Program Works

- The Rebate
  - Based on wastewater flow
  - Maximum rebate is $50,000 per year, or 50% of project cost
  - Based on $4/ccf
- The Process
  - Apply before you begin
  - Pre- and Post-Installation site visits
  - Document savings and costs
  - First Come ~ First Served

Sample Project



47,000 gpd flow reduction !

Sample Project Worksheet

Project: Reuse RO Reject in Cooling Towers and Scrubbers

Project Cost:	$180,000
Water Saved:	47,200 gpd
Rebate Received:	**$50,000**

Sample Project Worksheet

Reuse to CTs/Scrubbers	56,030 gpd
City Water Makeup	-5,577 gpd
Increased Blowdown	-3,195 gpd
Net Savings	47,258 gpd

Convert to ccf/yr

47,258 gpd x 350 d/yr x 1 ccf/748 g = 22,113 ccf/yr

Rebate Calculation

Water Savings Rebate

22,113 ccf/yr x $4/ccf = $88,432

50% Project Costs

0.5 x $180,000 = $90,000

Rebate

$50,000 (maximum)

Real Examples

success stories

PROJECTS THAT REDUCE POLLUTION AND WASTEWATER

Highlights:

DDI Dynamic Details Incorporated

Dynamic Details had to reduce demand for fresh water from their existing processes in order to continue to grow.

Project: Ion exchange system to recycle plating rinsewater

Equipment & installation costs: $125,000

Project challenges: Some rinses were incompatible with the system.

Payback: One month

DDI Daily Water Use

An estimated 30 gpm reduction in water use was achieved, saving over 40,000 gallons of water per day.

Dynamic Details: Savings Were in the Details

DYNAMIC DETAILS, a manufacturer of quick-turn prototype printed circuit boards located in Milpitas, California, has implemented a number of pollution prevention and flow reduction projects over the past ten years. As a result of their efforts, they were awarded the California Water Environment Association's Large Industrial Plant of the Year Award in 1995 and 2000. One of the largest reductions in Dynamic Details' water use was the installation of a system to recycle rinsewater from their plating lines.

Problem: In 1996, Dynamic Details grew very quickly. The increase in demand for their products meant additional process lines were needed, with a subsequent increase in water use. Manufacturing operations ran around the clock. The amount of water needed rapidly approached the capacity of their existing water supply line. Increasing the capacity of the water supply line was not a viable option due to a very high cost. Dynamic Details needed to reduce demand for fresh water from their existing processes in order to continue to grow at this location.

Solution: Dynamic Details began to look for ways to save water, scrutinizing every wet process in the facility for water conservation opportunities. The goal was to find changes that would pay for themselves in less than a year. The rinsewater used during plating was identified as one of the largest uses of water in the facility. Although a variety of measures were already in place to reduce the amount of rinsewater used, they decided to do more.

Dynamic Details investigated the use of ion exchange to remove metals from plating rinsewater, allowing the treated water to be recycled. They negotiated with Memtek, a water treatment equipment company marketing a new line of ion exchange products, and bought a prototype system for approximately $100,000. The final installed system consisted of two parallel sets of ion exchange resin (one cationic and one anionic resin column each), a carbon filter, two bag filters, two pumps, a tank each for supply and product water, regeneration chemicals, and all the associated piping and instrumentation (See Figure 1). One set of resin columns is in use while the other is being regenerated or is idle. The total cost of the system, including all piping and installation, was approximately $125,000.

Dynamic Details' staff installed the system in about a month, with a few modifications. The piping throughout the shop was installed so that city water feed could be restored by turning some valves. This allowed the system to be brought online without disrupting the production through the plating lines. The dual piping also ensures water can be supplied to the plating lines in the event of an ion exchange system failure.

success stories

PROJECTS THAT REDUCE POLLUTION AND WASTEWATER

Highlights:

LSI Logic wanted to have the ability to expand their manufacturing facility, but was limited by the amount of water supply that was available.

LSI LOGIC®

Project: Idle flow reduction on chemical/mechanical polishing equipment

Equipment & installation costs: $7,000 for design, testing and programming

Project challenges: None. Product yield rates were unaffected by the water reduction

Payback: Six months

Water savings: 9,000 gallons per day (16% of CMP flow)

LSI Logic determined that some of the tools use water at a constant rate whether any product is in process or not. They reduced wastewater by decreasing the water flow during idle times.

LSI Logic uses logic to find water reduction

LSI LOGIC is a manufacturer of custom integrated circuits with local facilities in Milpitas and Santa Clara. Local manufacturing is done in Santa Clara. With a water supply restricted by the size of their incoming line and requirements from the San Jose/Santa Clara Water Pollution Control Plant (Plant) to investigate potential water conservation, LSI Logic evaluated their manufacturing areas to see what opportunities for wastewater reduction were available. LSI Logic determined that some of the tools they use to manufacture integrated circuits use water at a constant rate whether any product is in process in that tool or not. They decided to evaluate if the tool settings could be modified to reduce the amount of water used during idle time, when the equipment is on but no wafers are being processed. The tools evaluated are used for chemical/mechanical polishing (CMP) operations.

Problem: LSI Logic wanted to have the ability to expand their manufacturing facility (fab) but was limited by the amount of water supply that was available. Replacing the incoming line from the City of Santa Clara water utility was prohibitively expensive. LSI Logic was also required to complete a Flow Audit Study as a condition of their Industrial Wastewater Discharge Permit from the Plant, since their discharge was above 100,000 gallons per day (gpd). Their overall wastewater discharge was just over 200,000 gpd. They were also looking for ways to reduce operational costs. Six chemical/mechanical polishers, several in research and development and several in production, were identified for potential water savings. The six CMP machines were made by three different manufacturers and had different operating requirements, so each one was evaluated separately. The goal was to reduce the nearly 56,000 gpd overall water use from the CMP machines by 15%.

CMP is used during semiconductor manufacturing to smooth out multiple layers of metal and silicon on wafers prior to the next process step. The polishing is done with tools that dispense a slurry and ultra pure water onto orbiting circular pads that polish the wafers' surface. Each polishing tool uses menu-driven programs for each processing cycle. The programs use specified parameters (water flow, polishing speed, etc.) given by the manufacturer or identified through internal research. During idle times, when no wafers are being processed, ultra pure water is dispensed onto the platen and polishing pads to keep the humidity within the machine and the moisture on the platen and pads at a constant level. This helps to keep the polishing operation consistent. It was suggested that water flow during idle time could be lowered without affecting the humidity in the CMPs or the moisture content of the platens and polishing pads. The original manufacturers of the equipment may not have emphasized water efficiency in their design. The CMP tools used between 2 and 5 gallons per minute of water each during idle time prior to the investigation.

success stories

PROJECTS THAT REDUCE POLLUTION AND WASTEWATER

Highlights:

Reaction Technology needed to reduce their wastewater discharge in order to lower their sewer use fees.

REACTION TECHNOLOGY

Project: Flow reduction for fume scrubbers

Equipment & installation costs: $58,000 for replacement scrubbers, parts and labor

Problems: No major problems occurred

Payback: Approximately one year, factoring in WET rebate

Water savings: 17,654 gallons per day

Reaction Technology reduced the discharge of wastewater from their fume scrubbers by over 17,000 gallons per day. This exceeded their initial estimates of the expected water savings.

Reaction Technology reduced flow rate where it counts

REACTION TECHNOLOGY is an electronics manufacturer that provides silicon epitaxy reactor foundry services to the semiconductor manufacturing industry. Silicon epitaxy is usually deposited onto silicon wafers to optimize desired electrical characteristics in semiconductor devices. Reaction Technology has facilities in Santa Clara, Sunnyvale, and San Jose. This *Success Story* describes a project at their main production facility in Santa Clara. The Santa Clara facility includes four two-chambered epitaxy reactors. A separate fume scrubber removes toxic gases from the air vented from each of the eight chambers. The fume scrubbers use a fixed amount of water at all times, set for the maximum loading of toxic gas in the air, regardless of whether any toxic gases were in use or not. The fume scrubbers are located on the roof of the facility, and are thus not readily in view and their water use can easily be overlooked.

The fume scrubbers — which operate at all times — contributed close to 80% of Reaction Technology's total water use.

Problem: Like many facilities, Reaction Technology did not have a particular reason to evaluate water use throughout their facility. In fact, they did not think they were using very much water at all. Then in January 2003, Reaction Technology received a letter from the City of Santa Clara notifying them that they were discharging wastewater well above their Assigned Sewer Capacity and would be assessed an Excess Sewer Use Fee. Santa Clara would bill them incrementally and encouraged Reaction Technology to reduce their wastewater discharge in order to reduce the amount owed.

This notification triggered a review of water use throughout the facility. Reaction Technology was surprised to find that they were using an average of 27,000 gallons per day. They had a total of eight scrubbers, two older and six newer units. The two older scrubbers were set at about 3 gallons per minute (gpm) of water each while the six newer scrubbers were set at about 1.5 gpm each. Since the fume scrubbers were required to operate at all times and contributed close to 80% of the total water use, Reaction Technology decided to evaluate if the flow rates through the scrubbers could be reduced when no wafers were being processed and during production steps when only inert gases were in use.

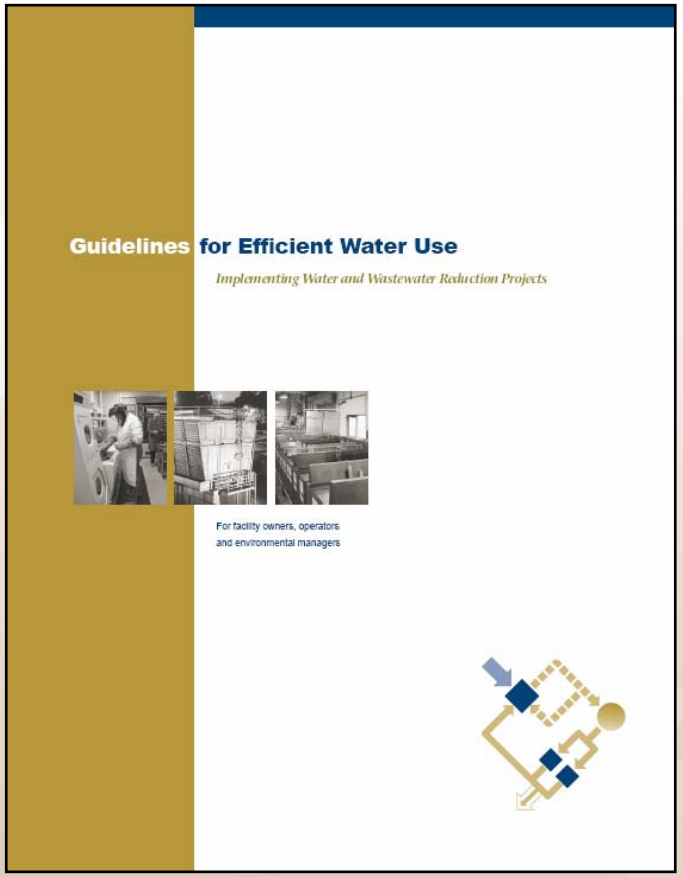
San Jose/Santa Clara Water Pollution Control Plant

Serving the cities of San Jose, Santa Clara, Milpitas, Cupertino, Saratoga, Campbell, Los Gatos

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

Technical Guidance Documents

- Guidelines for Efficient Water Use
- Guidelines for Managing Wastewater in Cooling Systems
- How to Plan an Onsite Industrial Wastewater Reuse System in San Jose



Questions?

Water Efficient Technologies

http://www.sanjoseca.gov/ESD/

Jose Anaya

(408) 277-4574

jose.anaya@sanjoseca.gov