17140 S. Avalon Blvd., Suite 210, Carson CA 90746 310-217-2411 www.westbasin.org

September 30, 2014

Deb Whitney
Southern California Area Office
Bureau of Reclamation
27708 Jefferson Ave., Suite 202
Temecula, CA 92590

Dear Ms. Whitney,

Enclosed is the Final Progress Report for the **Water Conservation Field Service Program Agreement No. R07AP35223: West Basin MWD's Water Efficient Equipment Installation Program.**

West Basin is not requesting reimbursement at this time and has submitted all final documentation in this report. Should you have any questions, please feel free to contact me at (310) 660-6253.

Sincerely,

Elise Goldman
Project Manager

Enclosed:
Signed Release of Claims
WCFSP_Project Benefits Form
Signed Final SF270 (also included in Appendix E)
Final Narrative Report
Appendices

- Appendix A_ Participating Sites and Water Savings Estimates
- Appendix B_ Complete List of Customers
- Appendix C_ Sample Customer Survey Reports
- Appendix D_ Reclamation Promotional Article
- Appendix E_ Final Budget Information
- Appendix F_ Marketing Materials
- Appendix G_ Sample Agreements

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

Southern California Area Office

Agreement Number
R07AP35223

Agreement Date
June 13, 2007

RELEASE OF CLAIMS

WHEREAS, by the terms of the above-identified agreement for

COMMERCIAL, INDUSTRIAL, INSTITUTIONAL (CII) INCENTIVE PROGRAM

entered into by the United States of America, hereinafter also referred to as the United States, and the grant recipient whose name appears on the agreement as

WEST BASIN MUNICIPAL WATER DISTRICT

it is provided that after completion of all work, the grant recipient will furnish the United States with a release of all claims;

NOW, THEREFORE, in consideration of the above premises and the payment by the United States to the recipient the total amount of

$66,000

the grant recipient hereby remises, releases, and forever discharges the United States, its officers, agents, and employees, of and from all manner of debts, dues, liabilities, obligations, accounts, claims, and demands whatsoever, in law and equity, under or by virtue of the said agreement except:

IN WITNESS WHEREOF, the agreement recipient has executed this release this 23 day of September, 2014.

By _____
(Signature)

Richard Nagel
(Name -- Type or Print)

General Manager
(Title)

West Basin Municipal Water District
(Agreement Recipient)

WATER CONSERVATION FIELD SERVICES PROGRAM
PROJECT BENEFITS

Please check the appropriate water management benefits for agricultural or urban measures that you anticipate addressing in you proposal. Where available, please provide an estimate of the benefit to units (i.e. Acre Feet, Dollars, Percentages)

It is essential to establish benefits of the Program. Please help us with your best estimate.

Reduces Leaks and Seepage _____ Acre Feet/Year

Reduces System Spills _____ Acre Feet/Year

Makes More Water Available __**65.1**___ Acre Feet/Year

Reduces Operation Costs _96,998_ $ /Year (approximate customer cost savings)

Reduces Energy Costs _____ $ /Year

Reduces Waste Treatment Costs _____ $ /Year

Improves Crop Yield _____ Percent/Year

Reduces On-Farm Costs _____ $ /Year

Reduces Per Capita Use _____ Gallons/Capita/Day

Provides Technical Training ___**14**__ # of People

Provides Water Conservation Education ___**65**__ # of People

Improves Water Supply Reliability ___**10**____ Frequency (Years)*
* Estimate of how often the improvement will occur (i.e. 1 = each year)

Delays Construction of New Supplies _____ Years

Reduces Drainage/Erosion _____ Tons

Improves Water Quality _____ % reduction of _____

Enhances Aquatic/Riparian Habitat _____ Years

Recipient Information

Agency: West Basin Municipal Water District
Project Manager: Elise Goldman
Phone: 310-660-6253
Email: eliseg@westbasin.org
Location: 17140 South Avalon Blvd, Ste. 210
Carson CA 90746

Project Name: Restroom Retrofit Program
Assistance Agreement Number: R07AP35223
Date of Award: 2007
Date of Project Start: February 2008
Original Completion Date: December 31, 2010
Final Extended Completion Date: June 30, 2014

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List of Appendices

1. Project Summary

Description of Project

The Commercial, Industrial, Institutional (CII) Incentive Program (Program) implemented water efficiency measures within the CII sector, targeting businesses and institutions that have facilities with cooling towers or those industries using water for the manufacturing of products and/or services. Specific sectors that utilize larger quantities of water are present in the West Basin Municipal Water District (West Basin) service area include oil refining, mining and metal plating, processing/dying/laundering of textiles, food and beverage production.

West Basin has had the opportunity to provide technical assistance, additional incentives by hiring the URS Corporation to educate businesses on the water and wastewater savings associated with increased efficiency through the funding provided by the granting agencies and other partners. West Basin and its selected vendors contacted customers and walked them through the process from beginning to end.

This Program aimed to identify solutions for high water users to use water more efficiently. Water efficiency measures included conductivity and pH controllers for cooling towers as well as equipment that allows onsite reuse through recirculation and water treatment to reuse process water onsite.

The Program was introduced through workshops conducted for West Basin's first Water Conservation Master Plan (2006). Workshop participants included customer agencies, local watershed groups, conservation coordinators and other interested stakeholders.

Description of Project Goals and Objectives

The project goals and objectives are to conserve water and energy by retrofitting existing CII sites with more water and energy efficient equipment. The Project will help West Basin's water retailers meet the goals and objectives of the California Urban Water Conservation Council's CII Best Management Practices.

2. West Basin Total Water Supply

West Basin serves a population of nearly one million people. Purchasing imported water from the Metropolitan Water District of Southern California (MWD), and wholesaling the imported water to 17 cities and several unincorporated areas in the Los Angeles County area. MWD is a State Water Project Contractor and brings water from both Northern California and the Colorado River Aqueduct. Typically, water from the State Water Project and the Colorado River Aqueduct are blended at a 45/55 level, with water imported from the Colorado River to West Basin's service area estimated at 78,940 AFY, which is 55% of the five-year average water use of 143,527 AF. Conversely, the water imported via the State Water Project is estimated at 64,587 AFY, which is 45% of the five-year average water use. (Source: West Basin Municipal Water District Annual Water Use Report Fiscal Year 2012/13).

As an imported water wholesaler and MWD member agency, West Basin sold approximately 108,549 AF of imported water and 33,434 FY of recycled water in Fiscal Year 2012/13. Several of West Basin's customers pump groundwater, which accounts for approximately 20% of the water used in the West Basin service area, which is 30,783 AFY.

3. Description and Completion of Benefits: Amount & Explanation of Estimated Water Conserved

The goals of the Program indirectly benefit the Bay–Delta and Colorado River Aqueduct systems by reducing regional demand thereby contributing to the California-Bay Delta Program's water supply reliability, water quality and ecosystem restoration goals. It helps increase water supply reliability in the southern California region and improves water efficiency in the West Basin service area. The program has also helped West Basin reach its California Urban Water Conservation Council (CUWCC) wholesaler assistance Best Management Practice (BMP) by helping our retail agencies reach their CII BMP goals as well.

The project's goals and objectives are to conserve water and energy by retrofitting existing CII sites with equipment to increase water efficiency. Additional objectives include demonstration of the use of water efficient devices in commercial and municipal settings and increasing public awareness of the need for water efficiency in the West Basin service area, the southern California region and the State.

As the Southern California population continues to grow, there is increased pressure on imported water supplies from the Bay-Delta region and the Colorado River Basin. The need to continually promote the efficient use of water is critical to southern California. Additionally, the need for more imported water to accommodate increasing populations can be ameliorated by the implementation of water efficiency projects.

Since the inception of this Program, both West Basin's 2005 Urban Water Management Plan as well as the 2003 Metropolitan Water District's (MWD) Integrated Resource Plan have been updated. At the time of program design and initial implementation, the program was consistent with both of these plans.

Approximately 65.1 AF annually and 651 AF over the 10-year lifetime of the devices will be saved because of the Program. There are also two customers pending completion of their projects that will present an additional 100 AF in annual savings – 1,000 AF over the 10-year lifetime of the process improvements. These customers have experienced delays due to internal schedules/changing priorities and budgeting cycles, however they are both seriously committed to making upgrades to their systems in light of the level of dependency they have on water for their business. West Basin will continue to track these customers to enroll them in the MWD's Water Savings Incentive Program.

The water savings estimates and brief customer profiles are included in Appendix A: Participating Sites and Water Savings Estimates are based on the assumptions as used by MWD in the case of the cooling tower controllers and through analysis of sites and proposed recommendations for process changes.

Use of Conserved Water

The water conserved can either remain in the environment to benefit the Sacramento-San Joaquin Delta and/or Colorado River systems. It can also be made available for other users or increase reliability of existing supplies.

4. Tasks and Statement of Work: Accomplishment of Project Goals

Task 1: Administration/Management
West Basin managed the program in its entirety including customer identification, and marketing/outreach activities with assistance from many local stakeholders. West Basin staff hired and managed a prime contractor and subcontractors to perform the necessary analysis. West Basin provided rebates directly to customers, adhered to program budget and schedule and performed all grant management responsibilities.

West Basin staff drafted and submitted all quarterly reports, and amendment requests to DWR, developed reimbursement applications for local cost share opportunities, tracked budget expenditures, performed site inspections and gave periodic updates to the West Basin Board of Directors on the progress of the program.

Task 2: Customer Identification
West Basin worked with the City of Torrance, Sanitation Districts of Los Angeles County, the South Bay Environmental Services Center (SBESC) and customer agencies most notably the California Water Service Company, Golden State Water Company and the City of Inglewood to identify top candidates for outreach in the West Basin and Torrance service areas. Sanitation Districts of Los Angeles County provided a list of sites of the top dischargers in the West Basin service area at the start of the program and an updated list three years into the implementation of the program. See Appendix B: Complete List of Customers.

Initailly, this list was culled of large industrial customers using recycled water. From there, URS refined the list further by ranking in order of decreasing discharge volume and sorting by industrial class. The best candidates for the Program emerged from these sectors and tended to discharge a minimum of five (5) AF annually.

West Basin staff was able to collaborate with energy efficiency account executives from the Southern California Gas Company and representatives from the US EPA through their E3 or lean manufacturing initiative. Replationships with representatives from both of these agneices have increased the opporutnity to influence the decision of large water using companies.This strategy will continue to be used with other utility agenceis as well to approach large commercial and industrial customrers.

Task 3: Marketing/Outreach
Initial outreach effort was originally conducted with a telephone screening of potential customers per the ranked customer list. The Program marketing brochure was e-mailed to the potential Customer with follow-up hard copies provided during the site visit. As a standard practice, West Basin also markets programs via www.westbasin.org, quarterly e-newsletters, specifically designed workshops and through available retail agency channels such as direct mail.

Additional contacts were made with cooling tower water treatment companies and technology companies to develop a list of additional customer within West Basin's territory that may have already been approached by one of these companies. The companies were invited to a one-day workshop to inform them about the increased incentives and technical assistance available to them.

The original Program goal was to contact up to 200 CII sites to determine potential participation and interest in the program. However, once the list was analyzed and processed, it was decided to focus on the top 70 potential customers discharging more than five AFY. Of those 70 customers, those interested in exploring water efficiency for their business are scheduled for a site inspection.

Task 4: Site Inspections/Field Survey

The purpose of the site inspection is to gather information necessary to provide recommendations for onsite reuse or other process improvement projects that would result in increased water efficiency. This process also includes obtaining water consumption data for the customer from the local retail water agency to get an ideal of the overall water use picture.

The culmination of the inspection process is a field survey report. This report is presented to the customer. Once the customer decides they want to look further at the recommendations proposed, a subsequent "equipment survey report" is developed to focus the project on one of the recommended projects. A selection of reports developed from the field surveys can be found in Appendix C: Sample Field and Equipment Survey Reports for customers participating in the Program.

Represented industrial sectors included Food Processing, Metal Plating, Chemical Manufacturing, Textiles, Electronic/Aerospace, Carwash Facilities, Hospitals and Pharmaceutical Manufacturing. These sites included Coast Plating, Texlon, Blue Creations/now doing business as Forever Blue, Pepsi Co., Alcoa, Lekos Dye and Finishing, Boeing, City of Inglewood, Custom Food Products, American Apparel and Sodexo.

Task 5: Incentives

Incentives were available for up to 45 sites to install water efficient devices and systems upgrades The Program was designed to offer two types of incentives, one incentive for industrial process water improvements and one for cooling tower equipment. Only five customers took advantage of the cash incentives offered through the program (shown in Appendix A).

The cooling tower equipment incentives were offered on a per device basis. With the funding available from both MWD and DWR, we were able to provide cooling tower controllers –product and installation - at no cost to the customers. Some changes to the incentives took place over the course of the program. In 2011, West Basin notified DWR staff that the MWD incentive for pH conductivity controllers went from $1,900 to $1,750 per controller. This change was approved by DWR July 2011 as Amendment A-2.

For customers interested in industrial process water improvements, West Basin was also able to offer $3.00 for every 1,000 gallons of water saved as a result of the project. MWD's base rate of $3/1,000 gallons was increased to a range depending on the size of the project and the level of monitoring the customer wants to perform. The low end of the range is $4.60/1,000 gallons for smaller projects that do not require a monitoring period. The higher end of the incentive range is $6.00/1,000 gallons for larger projects that require a one-year minimum monitoring period.

The customer was also offered up to $5,000 to installation costs (not-to-exceed total installation cost).

Task 6: Post-Installation Site Inspections
URS and its subcontractors conducted post-installation site inspections for sites that enrolled in the program to ensure that the equipment was installed properly and that staff was using the equipment to result in actual water savings. This task was modified slightly to also include post-installation of meters to ensure that the meter was installed correctly to record usage data. Under this task, the vendor provided site surveys and technical assistance noting any problems or issues that arose in the meter installation process. These modifications were approved by DWR July 2011 as Amendment A-2.

Task 7: Monitoring and Analysis
A metered monitoring program established pre-installation baseline water usage on the existing equipment. This data was compared to post installation water usage to verify water savings. This information is included in Appendix C (sample reports).

5. Future Tracking of Project Benefits: Monitoring and Assessment

The outcome of this grant benefits multiple entities and increases water supply reliability through demand management measures.

West Basin obtained water consumption records for sites participating in the Program. The data was used to perform the water consumption analysis as a part of the initial visit report development. Information captured in the field survey reports include: pre-project conditions, historical water-use review, existing equipment and the feasibility of replacing/retrofitting existing equipment. While participating customers were required to have a water meter installed to measure the water used in the CII process, consideration of external factors allowed us to use the “city meter” where appropriate. Regardless of how the data is tracked, West Basin staff will continue to watch the water consumption of these sites annually to monitor water use/savings. Developing a metric of savings is very important to determine whether increases or decreases in water consumption are as a result of implemented measures. Production data that correlates with water consumption data is needed to determine this metric. While production data exists, it may be difficult for facility staff to summarize and present the data to the water district in a way that can be utilized.

Additionally, West Basin will continue to work with a hand-selected group of high potential customers that participated in the Program but had not implemented at the time of this report including Lekos Dye and Finishing, American Apparel, Custom Food Products, Car Pros and Boeing.

6. Collaboration, Stakeholders and Partnerships

Collaborative partnerships are important to identifying, marketing and implementing water efficiency in the industrial and large commercial sectors.
The ***Department of Water Resources*** *(DWR)* provided co-funding to assist with all aspects of the Program including customer outreach, initial surveys, technical assistance, monitoring and analysis of industrial and cooling tower water use.

The ***Sanitation Districts of Los Angeles County*** *(Sanitation Districts)* provided a list of the top industrial dischargers in the West Basin service area. This list formed the backbone of the Program's outreach. Additionally, West Basin staff now participates in the Sanitation District's Industry Advisory Council. The group meets quarterly and is made up of industrial dischargers in Los Angeles County that are interested in understanding how the State and local sustainability initiatives affect their business practices. The following is taken directly from the Sanitation Districts of Los Angeles County's webpage describing the organization's Industry Advisory Council (IAC). The IAC provides a forum for dissemination of information about water efficiency to a regional group that uses substantial amounts of water in process:

> "The Industry Advisory Council was formed in February 1992 to provide a forum for the Sanitation Districts and their regulated industries to address issues that are of concern to each group. The Council generally consists of 15 members from industry with alternates. The make-up of the Countil reflects the industrial base served by the Sanitation Districts. Large industries like petroleum refineries as well as smaller industries like metal finishers are represented. Council members include company presidents, plant managers, environmental affairs managers, and small business owners. The Council is chaired by an industry executive. The Council members themselves are active in their respective trade associations and serve as conduits to companies within their industries. A senior engineer from the Sanitation Districts is assigned to coordinate the activities of the Council."
> http://www.lacsd.org/wastewater/industrial_waste/advisorycouncil.asp

South Bay Environmental Services Center/South Bay Cities Council of Governments *(SBESC/SBCCOG)* assisted in marketing the program by identifying high profile water users in the West Basin and Torrance service areas. The SBESC also helped develop two workshops during the course of the program to outreach to commercial and industrial customers as well as water treatment technicians working for companies that service larger industrial customers and customers using cooling towers.

California Water Service Company, Golden State Water Company, City of Manhattan Beach and City of Inglewood provided technical assistance by providing water consumption data as requested. California Water Service Company, Golden State Water Company additionally provided funding to assist with initial site surveys and other follow up activities.

The ***City of Torrance*** provided assistance by helping identify potential sites and co-funding for the program to assist with initial surveys interested in retrofitting their facilities.

Water Replenishment District of Southern California *(WRD)* additionally provided funding to assist with initial site surveys and other follow up activities.

7. Budget: Final Funding Information

Local share cost funding partners are critical to securing grant funding and implementing projects. Partners commit funding during the program design/grant application phase of a project; however, the amounts may vary by the time the project is completed. The table below shows the projected cost share amounts and the final funding information. Several of the funding partners not projected to contribute any funding during the design phase of the project ended up contributing about 10% of the total Program budget.

Local Cost Share - Funding Partners	Projected Local Cost Share	Final Funding Information
West Basin In-kind Contribution, Budget Funds,	$247,563	$164,200
Incentives via Metropolitan Water District	$155,000	$10,950
Department of Water Resources	$404,437	$171,979
California Water Service Company	n/a	$30,500
City of Torrance	n/a	$9,382
Water Replenishment District	n/a	$7,000
Golden State Water Company	n/a	$1,700
TOTAL LOCAL COST SHARE	**$ 807,000**	**$395,711**

Appendix E contains final financial information including the final SF 270 form.

No changes were made to the funding structure of the Program that directly affected the Reclamation portion of the funding provided. However, a total of $411,289 was unspent in the program. Customers did not take advantage of incentives (Task 5) and funding for post-installation technical assistance (Task 6) as offered. However, both administrative tasks (Task 1) and site inspections/field surveys (Task 4) were overspent; West Basin utilized budgeted funds, in-kind contributions, and local funding partners to cover costs for the additional administrative activities and technical assistance.

The majority of the funds remained in Tasks 5 and 6 because participating customers chose not to take advantage of available incentives and post-installation technical assistance. Employees may have time to go through a survey of the facility and the subsequent report review but any further engagement is difficult and requires many follow up calls and other technical assistance. Facility engineers have many demands on their time, and often times have limited time to spend exploring these possibilities. Other customers will take the time to implement a best practice or a recommendation made in the report but may not have the time/resources to file all the necessary paperwork, may not have the support to enter into a formal agreement in order to receive the funds. With others, the act of measuring water use because of the initial survey and taking a closer look at a facility's water use is enough to increase efficiency.

8. Schedule and Deliverables

The schedule was developed at the start of the Program however, This Program was operating in conjunction with the Department of Water Resources as well and when the State of California froze bond funding for water efficiency projects in 2009, the Program was halted, a new schedule was established, and the agreement end date extended. Deliverables associated with this project include semi-annual progress reports and standard forms 425, 269 and 270. Eleven (11) semi-annual progress reports were submitted to Reclamation from *May 2009 through April 2014*.

9. Final Statements

The CII Incentive Program explored methods to increase water efficiency, which in turn helps industrial customers save money, reduce sewer discharge and in some cases, save energy. These statements are a compilation of observations made over the course of Program implementation.

9.1 The role of cooperators and partners is critical. Collaborators such as water purveyors, sanitation districts and other environmental agencies are very important to the success of an industrial outreach program. Partnerships with energy utilities can assist in bringing awareness of water efficiency incentives to our customers in common. This can be particularly true for the textile and industry where most water saved is hot water and therefore has direct energy saving benefits. The recommendation is to expand the use of partnerships to promote water and energy efficiency in southern California.

9.2 The corporate culture plays a large role in the importance of water efficiency for a compnay. Everything from annual improvements, repairs or refurbishment budgets, to how much time employees can devote to investigation of water-efficiency projects depends on support from upper management. Focus on the items that incentivize both " C-level" executives and maintenance/facilities engineers.

9.3 Sustainability policies can be used as marketing tools. Research companies and look for published policies that call for reductions in water and energy use. Reference these policies during the initial meetings to encourage the customer to consider the opportunity offered. Additionally, project managers may need to make a case for water-efficiency projects. These policies can help the "pitch" within the organization, namely to upper management.

9.4 Distinguish between water "in-product" vs. water "in-process". This distinction may be most important in the food-processing sector but can also occur in other sectors. During the field survey analysis and interviewing employees who know the breakdown of the process, the amount of water that can be recovered and put back into the process can be determined. Water that is going into the sewer system has the potential to be recovered, treated and reused. Therefore, companies discharging large amounts of water have a greater opportunity for savings. The data provided by the Sanitation Districts helped make the distinction between large water user and large water discharger.

9.5 If the project does not make sense to the customer's bottom line, often times it will not move forward. It is best to discuss financial aspects of the project as soon as possible. This includes potential project costs, dollar savings for reduced water and sewer charges, any other changes that would result in lower chemical costs, etc. The sooner these figures are presented to the customer the better. However, since water is still not most companies' most costly expense, any capital costs may not be able to be justified. It is important to highlight which factors are given to as justification to not implement water efficiency projects. Over time, these factors may change and a project may become viable again.

9.6 Not all participating customers chose to take advantage of available incentives. The majority of the funds remained in two categories, incentives and post-installation technical assistance. Day-to-day operations may not allow time to focus on even minor improvements that may add up to significant water savings. Facility engineers have many demands on their time, and often times have limited time to spend exploring these possibilities. They may have

time to go through a survey of the facility and the subsequent report review but any further engagement is difficult and requires many follow up calls and other technical assistance. Some of the customers take the recommendations made in the reports and implement a part of the proposed change. Sometimes the act of taking a closer look at a facility's water use is enough to increase efficiency. Some start to measure their water use as a result of the increased awareness of water efficiency.

9.7 Formal barriers prevented customers from enrolling in the program. Customers' interest/ability to move forward with a project without the financial incentives was underestimated. Formal enrollment in the program was required for customers to receive incentives. There are several reasons for this resistance we experienced during the course of the project. The reasons range from not wanting to enter into a formal agreement (the company may perceive risk associated with entering into the agreement), to not having time to transmit production data, a step necessary to measure the effectiveness of a system upgrade. Those that had the time to make upgrades to the system but did not formally enroll in the program cited time constraints and corporate decisions not to sign the necessary documentation.

9.8 Recognition for implementing water-efficiency projects benefits (most) businesses. West Basin writes press releases to highlight companies' efforts to increase water efficiency. Staff has also invited participating businesses to a meeting of the board of directors for recognition of their efforts. Businesses obviously benefit from the publicity. They also benefit from having a working relationship/partnership with a water agency, as agencies are likely to offer new incentive programs to companies that have been eager partners in the past.

9.9 Information gathered during post-participation interviews revealed that companies participated in the program for both monetary and sustainability benefits. West Basin and other agencies with similar industrial process improvement programs have conducted interviews to research and document current drivers for industrial water efficiency. These questions included how they heard about the program, the size of the company in terms of number of staff and revenue. The company representatives were also asked if they have sustainability goals and if they had participated in any energy efficiency programs. They were asked if the company monitors their water use on a regular basis and where water ranked in order of "raw material" costs. Customers were also asked to rank their reasons for participating in the field survey portion of the Program. Both sustainability benefits and the opportunity to find ways to save money by saving water were cited as reasons to say "yes" to the survey offered through the Program. Those that implemented measures did so only after detailed analysis was performed (in house or by West Basin representatives) on the proposed equipment upgrades. Companies that are big enough to have revenue to pay for upgrades and staff that has sustainability incentives

9.10 Similar industries can benefit from similar water efficiency technologies and strategies. The section covers examples of how specific industry sectors can improve water efficiency. The remainder of the section is comprised of statements about working with industrial customers in general. These summaries, in part, was submitted as a presentation/white paper given at the California Chapter WateReuse Conference, May 2014. The presentation was given by West Basin and RMC, one of the subcontractors working on the program. Sector specific information was compiled from a variety of program reports, field notes and research.

Textiles and Laundry Companies

Equipment used to dye and launder textiles has become more efficient as a result of new processes and water use control. Many facilities have equipment dating back to the 1980s, which was manufactured based on equipment design from the 1970s or 1960s prior to the focus on efficient water use. A list of effective water reduction strategies in the textile industry is as follows:

- Existing processes such as tunnel washers can be piped to reuse relatively clean final rinse water in the first initial rinse stage of the subsequent batch.
- New equipment automation designed to control water level and chemical use based on specific loads.
- Tub configuration designed to minimize excess water in equipment.
- Larger machines with faster drain times allow newer, more efficient units to complete the work of multiple older units.
- Processes such as ozone (seen in photo on right) can be used in lieu of chemical addition, reducing chemical cost, costs to heat water as well as the rinse water volume required.
- Newer equipment is designed to process fabric dyeing at lower temperatures than older equipment, reducing the amount of water lost through evaporation. Equipment is also designed to capture residual heat from one process to the next.

Food Processing

Food processing customers are often hesitant to consider water reuse projects because of concerns with potential impact to health and safety. However, a range of process improvements have been identified and implemented to achieve water use reduction:

- Final rinse water may be used for initial rinse
- Often water is used to rinse finished product containers. If water flow is controlled by a manually-controlled valve, automation of the water flow using a flow meter, set-point and flow control valve allows optimization of the water flow rather than water flow that may creep up from shift to shift.
- Water efficient spray nozzles and spray bars are designed to use optimal pressure, flow and flow angles to achieve efficient rinsing. Nozzle selection and spacing can eliminate waste from overlapping spray patterns.
- Continuous spray systems can be automated to sense when a container is in the spray zone and shut off when there is no container present.

Car Wash Facilities

Modern carwash systems offer improved water efficiency from a wide range of improvements:

- Reuse of final rinse water in initial rinse. Drain water is collected, settled and decanted for reuse. Reuse water tank sizing must be matched with supply and demand or water may overflow to the sewer when demand is low, and require makeup potable water when demand is high.
- Use of water efficient spray nozzles.
- Improved control to reduce spray prior to or after vehicle is in the spray zone.
- Treated drain water may be used as feed water for the water treatment system in some cases.
- Some car wash facilities wash and dry rags at the facility. There may be potential for reduced water use through newer, water efficient washing machines.

Metal Finishing

There are two major areas for water efficiency improvements in metal plating operations, water in the rinse process and "drag out" process. The following summary is from the State of Washington's comprehensive Department of Ecology website's Electroplating and Metal Finishing webpage: http://www.ecy.wa.gov/programs/hwtr/p2/sectors/platsecttop10.html

Rinse-water reduction:

- Have rinse water flow counter-current to part processing and use several rinse tanks for each process tank, usually the most economical results are obtained by using two or three rinse tanks in series.
- Add rinse water automatically only when needed. Use either rinse bath pH or conductivity to activate rinse water addition. Whenever possible, add rinse water directly onto the parts as they leave the rinse.
- Use rinse water from the most concentrated rinse (the first rinse) to make up the process bath in processes (such as plating) where chemicals can be recovered without compromising part quality. Never use rinse water from a cleaning process, such as an acid or alkaline etch, to make up the process bath because the rinse water will contaminate the bath.
- Place flow restrictors on rinse flows that are not automatically controlled by pH or conductivity.
- Use conductivity controllers and solenoid valves to regulate the addition of water into rinse tanks.

Drag-out reduction:

- Use a "drag-out recovery tank." This tank functions as a pre-rinse to the counter current rinses and concentrates rinsed-off process chemicals so they can be added back to the tank.
- Allow parts to drip over tanks for a period of time, usually around 30 seconds is optimum.
- Place drain boards between tanks so that drips run back into the bath the part just left.
- Withdraw the part slowly from the solution. This allows the surface tension of the solution to keep more of the solution in the tank.
- Lower bath chemistry concentrations to the minimum effective concentration. Rinses will be contaminated less by an equal amount of drag in.
- Use air knives, squeegees, or rollers on the part so excess will run into the process bath to remove excess solution from the part.

Additional considerations may be to install de-ionization systems to recirculate wastewater to remove contaminants for reuse in rinse tanks. These systems can be tank-specific or facility wide depending on the needs of the user.

General

In addition to industry specific recommendations, general observations from the field audit often provide additional water savings. A few general potential improvements are listed below:

- Automation can be applied to many industries to control make-up water, rinse operations and other processes.
- Use brooms in lieu of spray water for most of floor cleaning
- Fix dripping hose bibs
- Install water efficient toilets

- Install conductivity probes and controllers on cooling towers and other cooling equipment.
- Consider reuse of first stage reject water on reverse osmosis or other water treatment systems.
- Irrigation water demand reductions through plant selection or installation of weather based irrigation controllers.

Considerations for moving forward

Water agencies in Southern California operate under the umbrella of the Metropolitan Water District allowing consistent water efficiency messaging to permeate the Southern California region. Last year, MWD reinstated its "pay for performance" program under the name Water Savings Incentive Program (WSIP). The incentive portion of RECIRC and SAVE was mirrored after MWD's original pay for performance program. As West Basin's full-scale technical assistance ends, MWD will continue to offer incentives to customers interested in innovative water-efficiency projects.

Along with West Basin, the Municipal Water District of Orange County has a similar program called the Industrial Process Water Use Reduction Program, while the Los Angeles Department of Water and Power also offers assistance through their TAP or Technical Assistance Program. These local programs translate into an opportunity for agency collaboration on customer specific barriers and solutions. If we can better understand the commonalities between companies that invest time and resources to implement water-efficiency projects and those companies that do not implement recommended projects, we can target outreach and assistance dollars in a more direct way to companies that are most likely to be successful.

Appendix A:
Participating Sites and Water Savings Estimates

APPENDIX A: PARTICIPATING SITES AND WATER SAVINGS ESTIMATES

PARTICIPATING SITE	PROPOSED IMPROVEMENT	STATUS	INCENTIVE AMOUNT	ESTIMATED ANNUAL WATER SAVINGS (AFY)	ESTIMATED OPERATIONS COST SAVINGS	ESTIMATED EQUIPMENT & INSTALLATION COSTS
COOLING TOWERS						
City of Inglewood, City Hall	3 pH Conductivity Controllers installed and monitored	Complete	$10,836	5.8	n/a *	$10,836
Pepsi Bottling Company	3 pH Conductivity Controllers installed and monitored	Complete	$9,992	5.8	$9,996	$9,992
PROCESS IMPROVEMENT						
Blue Creations	Ozone system to decrease the amount of water needed for fabric preparation	Complete	$20,000	17	$6,411	$62,500
Coast Plating	De-ionization system allows water used in the metal plating process to be treated and reused in the process.	Complete Customer changing the configuration of the system installed to be able to meet increased demand. West Basin monitor the new configuration and determine a new gallons per pound metric	$12,803	14	$34,436	$104,500
Alcoa Carson	Meters, conductivity sensors and valves to manage purge and fill cycles in metal plating baths	Customer is using the conductivity control to manage the fill and purge cycles of the plating rinse tanks	($16,120)**	6	$9,087	$10,000***
Enterprise Holdings	High-efficiency, in-bay carwash equipment to replace existing spray nozzle system; all four bays	Customer elected to make recommended changes without enrolling in incentive program	($26,302)**	13.5	$29,721	$250,000
Hollywood Riviera Car Wash	Reconfiguration and fine-tuning of spray nozzle system.	Customer elected to make recommended changes without enrolling in incentive program	($6,502)**	3	$7,347	$6,500
PENDING PROJECTS						
American Apparel	Upgrade dye machines to reduce water usage	Report drafted by Gas Company. Project review with Golden State Water. Company Enroll in MWD WSPP program. West Basin will continue to follow up.	($102,303)**	68	$187,282	$1,000,000

Lekos Dye and Finishing	Upgrade dye machines to reduce water usage	Report review, Project option selected, Meter installed, Customer researching options Customer made some changes to existing equipment with a 30% water-use reduction rather than the 50% as estimated in the report. West Basin will continue to follow up.	($18,362)**	12	$18,677	$320,000
Custom Food Products	Eliminate once-through cooling of a high-powered microwave device	Report sent to customer, need baseline data to establish time of use. Change of management; staff met with new management. New management has not provided baseline data necessary. West Basin will continue to follow up.	($29,388)** Incentive would not exceed total project cost)	20	$28,787	$17,000

*City of Inglewood also operates the water system and does not “pay” for the water; therefore, there was no cost savings associated with the project.
** Customer has not taken advantage of incentives; this is the projected incentive amount
*** Cost estimate not provided by contractor. Customer paid for upgrades to systems and did not submit cost information. This is a rough estimate for the control equipment purchased.

Appendix B:
Complete List of Customers

Appendix B: Complete List of Customers

	Type of Industry	Facility Name	Company Address and Phone Number	Current Water Use in Gallons per Day	*Estimated* Water Usage in Million Gallons per Year (260 Days)	Usage in Acre Feet per Year	# of people educated	# of people trained
1	Electronics/Aerospace	Raytheon Company	2000 E El Segundo Boulevard El Segundo, CA 90245	NO LIMIT	133.4	**409.4**	2	
2	Textile	American Apparel Dyeing & Finishing Inc.	12537 Cerise Avenue Hawthorne, CA 90250	450,000	117.00	**359.1**	2	1
3	Textile	Pacific Continental Textiles, Inc.	2880 Ana Street Compton, CA 90221	420,300	109.28	**335.4**	2	
4	Textile	Lekos Dye & Finishing, Inc.	3131 Harcourt Street Rancho Dominguez, CA 90221	420,000	109.20	**335.1**	2	
5	Textile	Caitac Garment Processing Inc.	14725 S Broadway Street Gardena, CA 90248	264,490	68.77	**211.0**	2	
6	Textile	Texollini, Inc.	2575 E El Presidio Street Carson, CA 90810	260,000	67.60	**207.5**	2	
7	Electronics/Aerospace	Northrop Grumman Aerospace Systems	3301 Aviation Boulevard Bldg D1 Manhattan Beach, CA 90266	216,000	56.16	**172.3**	2	
8	Chemical Manufacturing	Rhodia Inc.	20720 S Wilmington Avenue Carson, CA 90810. (310) 885-6758	210,000	54.60	**167.6**		
9	Chemical Manufacturing	Air Products and Chemicals, Inc.	23300 S Alameda Street Carson, CA 90810. (310) 847-7300 ext. *811	195,000	50.70	**155.6**		
10	Electronics/Aerospace	Maxima Enterprises Inc.	23920 S Vermont Avenue Harbor City, CA 90710	170,000	44.20	**135.6**		
11	Chemical Manufacturing	Hitco Carbon Composites, Inc.	1600 W 135TH Street Gardena, CA 90249. (310) 970-5298	155,490	40.43	**124.1**		
12	Textile	Radiant Services Corp.	651 W Knox Street Gardena, CA 90248	140,000	36.40	**111.7**	2	
13	Textile	Sodexo Textile Servcie Center	2565 S Dominguez Hills Drive Compton, CA 90220	137,000	35.62	**109.3**	2	
14	Electronics/Aerospace	Boeing Satellite Systems Inc.	2060 E Imperial Highway El Segundo, CA 90245	134,400	34.94	**107.2**	4	
15	Food	Custom Food Products, LLC	20704 S Fordyce Avenue Carson, CA 90810.	130,000	33.80	**103.7**	3	
16	Food	Bottling Group LLC (Pepsi Beverages Company)	19700 S Figueroa Street Carson, CA 90745. (310) 527-3336	116,900	30.39	**93.3**	3	2
17	Chemical Manufacturing	Ineos Polypropylene LLC. (Arco)	2384 E 223RD Street Carson, CA 90810. (310) 847-8545	84,100	21.87	**67.1**		
18	Food	Nissin Foods (USA) Co., Inc.	2001 W Rosecrans Avenue Gardena, CA 90249. (310) 527-5700	76,346	19.85	**60.9**	2	
19	Food	Don Lee Farms (Goodman Food Products, Inc.)	200 E Beach Avenue Inglewood, CA 90302. (310) 674-3180	60,000	15.60	**47.9**		
20	Chemical Manufacturing	Praxair Inc.	2300 E Pacific Coast Highway Wilmington, CA 90744. (562) 983-2175	57,300	14.90	**45.7**		
21	Textile	Sun Dyeing & Finishing, Inc.	15621 S Broadway Center Street Gardena, CA 90248	57,000	14.82	**45.5**	1	
22	Food	Field Fresh Foods Inc.	14805 S San Pedro Avenue Gardena, CA 90248.	50,120	13.03	**40.0**		
23	POWER-GEN	Carson Cogeneration(site 2)	17171 S Central Avenue Carson, CA 90746	50,000	13.00	**39.9**		
24	Metal Plating	Alcoa Fastening (Huck International Inc.)	900 Watsoncenter Road Carson, CA 90745. (310) 847-8130	45,300	11.78	**36.1**	4	2
25	Food	Sweet Ovations, LLC	16911 S Normandie Avenue Gardena, CA 90247	43,400	11.28	**34.6**		
26	LANDFILL-NONHAZ	Tetra Tech, Inc.	20400 Main Street Carson, CA 90745	43,200	11.23	**34.5**		
27	Chemical Manufacturing	Western Tube & Conduit Corporation	2001 E Dominguez Street Carson, CA 90810. (310) 537-6300	43,000	11.18	**34.3**		
28	Metal Plating	Coast Plating, Inc.	128 W 154th Street Gardena, CA 90248. (310) 386-7794	39,400	10.24	**31.4**	1	1
29	Electronics/Aerospace	Northrop Grumman Space & Mission Systems Corp	One Space Park Drive Redondo Beach, CA 90278	37,300	9.70	**29.8**		
30	Textile	Bay Cities Laundry, Inc.	1517 W 130th Street Gardena, CA 90249	37,200	9.67	**29.7**		
31	Food	Dae Won Inc.	400 E Alondra Boulevard Carson, CA 90248	36,000	9.36	**28.7**		
32	Electronics/Aerospace	Sanyo Solar (USA) LLC	970 E 236th Street Carson, CA 90745	33,500	8.71	**26.7**		

33	Chemical Manufacturing	TP Industrial, Inc.	525 E. Alondra Blvd. Gardena, CA 90248. (718) 510-6003	32.000	8.32	**25.5**		
34	Electronics/Aerospace	Northrop Grumman Corp (ISAS)	1 Hornet Way El Segundo, CA 90245	31.930	8.30	**25.5**		
35	Electronics/Aerospace	Raytheon Company	2030 E Maple Avenue El Segundo, CA 90245	30.500	7.93	**24.3**		
36	Metal Plating	Prime Wheel Corporation	17705 S Main Street Gardena, CA 90248. (310) 516-9126	30.000	7.80	**23.9**		
37	Textile	International Linen Supply Co.	1249 W 132nd Street Gardena, CA 90247	27.900	7.25	**22.3**		
38	PHARMA-MANUFACTURE	Cosway Company Inc.	14805 S Maple Avenue Gardena, CA 90248	24.300	6.32	**19.4**		
39	Electronics/Aerospace	OSI Optoelectronics, Inc.	12525 Chadron Avenue Hawthorne, CA 90250	24.000	6.24	**19.1**	2	
40	Metal Plating	Permaswage (Designed Metal Connections)	14800 S Figueroa Street Gardena, CA 90248. (310) 323-6200	22.325	5.80	**17.8**		
41	Chemical Manufacturing	Nalco Company	2111 E Dominguez Street Carson, CA 90810. (310) 900-5400	20.000	5.20	**16.0**		
42	Food	Risvold's Inc.	1234 W El Segundo Boulevard Gardena, CA 90247.	17.870	4.65	**14.3**		
43		Coast Plating, Inc.	417 W 164th Street Carson, CA 90248. (310) 386-7794	16.600	4.32	**13.2**	1	1
44	PHARMA-MANUFACTURE	Sunrider Manufacturing, L.P.	1452 Knox Street Los Angeles, CA 90501	15.900	4.13	**12.7**		
45	TECLEAN	Hollywood Riviera Car Wash	1500 S Pacific Coast Highway Redondo Beach, CA 90277	15.800	4.11	**12.6**	1	1
46	Chemical Manufacturing	Air Products MFG Co. Inc.	2021 E. Rosecrans Ave. El Segundo, CA 90245. (310) 643-8691	15.507	4.03	**12.4**		
47	Metal Plating	Aerodynamic Plating Co., Inc.	13629 S St. Andrews Place Gardena, CA 90249. (310) 329-7959	15.500	4.03	**12.4**		
48	CORRUGATED-BOX	International Paper Company	1350 E 223rd Street Carson, CA 90745	15.300	3.98	**12.2**		
49	Textile	Blue Creations of California	22632 Avalon Boulevard Carson, CA 90745	15.200	3.95	**12.1**	2	2
50	CORRUGATED-BOX	International Paper Company	19615 S Susana Road Compton, CA 90221	14.000	3.64	**11.2**		
51	Metal Plating	Gardena Plating Company	12901 S Western Avenue Gardena, CA 90249. (310) 327-2634	13.800	3.59	**11.0**		
52	Food	MGH Gourmet	2910 E. Harcourt St. Compton, 90221.	13.750	3.58	**11.0**		
53	Chemical Manufacturing	Marchem Technologies, LLC	20851 S Santa Fe Avenue Carson, CA 90810	13.400	3.48	**10.7**		
54	Electronics/Aerospace	Triumph Aerostructures, LLC	3901 Jack Northrop Avenue Hawthorne, CA 90250	12.960	3.37	**10.3**		
55	Food	First Class Foods-Trojan, Inc.	12500 Inglewood Avenue Hawthorne, CA 90250	12.550	3.26	**10.0**		
56	Food	SANTA MONICA SEAFOOD	18511 Broadwick Street Rancho Dominguez, CA 90220	12.400	3.22	**9.9**		
57	Textile	Rock Laundry	1102 W 135th Street Gardena, CA 90247	12.000	3.12	**9.6**		
58	Food	Barton Brands of California, Inc.	2202 E Del Amo Boulevard Carson, CA 90810. (310) 763-3246	12.000	3.12	**9.6**		
59	Metal Plating	Swift-Cor Aerospace	15700 S Figueroa Street Gardena, CA 90248. (310) 354-1262	11.900	3.09	**9.5**	1	
60	Electronics/Aerospace	Teledyne Relays	12525 Daphne Avenue Hawthorne, CA 90250	11.000	2.86	**8.8**	2	
61	TECLEAN	Rainbow LLC	21119 S Wilmington Avenue Carson, CA 90745	10.000	2.60	**8.0**		
62	Metal Plating	Mechanical Metal Finishing	15220 S Broadway . Gardena, CA 90248. (800) 253-2877	10.000	2.60	**8.0**		

63	Metal Plating	Monico Alloys, Inc.	18383 S Susana Road Rancho Dominguez, CA 90221. (310) 928-0168	10.000	2.60	**8.0**		
64	TECLEAN	ChemTrans	14700 S Avalon Boulevard Gardena, CA 90220	9.700	2.52	**7.7**		
65	Metal Plating	International Die Casting, Inc.	14733 S Avalon Boulevard Gardena, CA 90248. (310) 324-2278	9.400	2.44	**7.5**	1	
66	Electronics/Aerospace	Stork Material Testing & Inspection	18100 S Wilmington Avenue Rancho Dominguez, CA 90220	8.800	2.29	**7.0**		
67	Chemical Manufacturing	Praxair Surface Technologies Inc	18502 S Laurel Park Road Compton, CA 90220	8.100	2.11	**6.5**		
68	TECLEAN	Ventura Transfer Company	2418 E 223rd Street Carson, CA 90810	7.100	1.85	**5.7**		
69	Metal Plating	Avalon Glass and Mirror Company	642 E Alondra Boulevard Carson, CA 90746	6.800	1.77	**5.4**		
70	TECLEAN	Manhattan Beach Toyota	1500 N Sepulveda Boulevard Manhattan Beach, CA 90266	6.714	1.75	**5.4**		
71	PRINTING	Lithographix, Inc.	12250 S Crenshaw Boulevard Hawthorne, CA 90250	5.900	1.53	**4.7**		
72	SOAP-DETERGENT	Pacifica Chemical Inc.	935 E Artesia Boulevard Carson, CA 90746	5.900	1.53	**4.7**		
73	Food	Super Frec USA Inc. dba Frec Food	13630 Cimarron Avenue Gardena, CA 90249	5.700	1.48	**4.5**		
74	HOSPITAL	Vista Hospital of South Bay, LP	1246 W 155TH Street Gardena, CA 90247	5.580	1.45	**4.5**		
75	Food	Bristol Farms, Inc.	915 E 230th Street Carson, CA 90745	5.500	1.43	**4.4**		
76	Metal Plating	Decore Plating Inc	434 W 164th Street Carson, CA 90248	5.200	1.35	**4.1**		
77	Textile	Chemtex Print USA Inc.	3061 Maria Street Rancho Dominguez, CA 90221	5.000	1.30	**4.0**		
78	Electronics/Aerospace	Integra Technologies, Inc.	321 Coral Circle El Segundo, CA 90245	4.200	1.09	**3.4**		
79	TECLEAN	Cruise America, Inc.	2233 E 223rd Street Carson, CA 90810	4.100	1.07	**3.3**		
80	Metal Plating	FS Precision Tech LLC	3025 E Victoria Street Rancho Dominguez, CA 90221	3.600	0.94	**2.9**		
81	Food	Tom & Glasser Inc.	18933 S Reyes Avenue Compton, CA 90221	3.500	0.91	**2.8**		
82	Food	BDS Natural Products	1904 1/2 E Dominguez Street Carson, CA 90810	3.450	0.90	**2.8**		
83	Metal Plating	Multichrome Co. Inc	1013 W Hillcrest Boulevard Inglewood, CA 90301	3.400	0.88	**2.7**		
84	Metal Plating	Chromalloy Los Angeles	2100 W 139TH Street Gardena, CA 90249	3.400	0.88	**2.7**		
85	Food	Let's Do Lunch	310 W Alondra Boulevard Carson, CA 90248	3.400	0.88	**2.7**		
86	PRINTING	R R Donnelley & Sons Company	19681 Pacific Gateway Drive Los Angeles, CA 90502	3.223	0.84	**2.6**		
87	PRINTING	Southwest Offset Printing Co.	13650 Gramercy Place Gardena, CA 90249	3.200	0.83	**2.6**		
88	Metal Plating	Angelus Plating Works	1713 W 134th Street Gardena, CA 90249	3.200	0.83	**2.6**		
89	Food	Versacold Logistics, LLC	1610 E Sepulveda Boulevard Carson, CA 90745	3.200	0.83	**2.6**		
90	Food	Sonora Mills Food, Inc.	3064 E Maria Street UNIT Compton, CA 90221	3.200	0.83	**2.6**		
91	PLASTIC	NanoH20, Inc.	750 Lairport Street El Segundo, CA 90245	3.100	0.81	**2.5**		
92	Metal Plating	Superior Metal Finishing	1733 W 134th Street Gardena, CA 90249	3.100	0.81	**2.5**		
93	Metal Plating	Anemostat, a Mestek Company	1220 Watson Center Road Carson, CA 90745	3.000	0.78	**2.4**		
94	Chemical Manufacturing	Matsui International Company Inc.	1501 W 178th Street Gardena, CA 90248	3.000	0.78	**2.4**		
95	Textile	Royal Airline Linen, Inc.	125 N Ash Avenue Inglewood, CA 90301	2.900	0.75	**2.3**		
96	Electronics/Aerospace	Tri-Star Electronics International Inc.	2201 Rosecrans Avenue El Segundo, CA 90245	2.700	0.70	**2.2**		

97	Propery Management	CB Richard Ellis	201 N Douglas Building El Segundo, California	These sites were not included in the original list provided by the Sanitation Districts and therefore were not included in the original ranking	2	
98	Hostpital/Health Care	Beach Cities Health District	514 N. Prospect Avenue Redondo Beach, CA 90277		3	
99	Supermarket	Albertsons, a SUPERVALU Company	1421 South Manhattan Ave. Fullerton, California 92831 *		2	
100	TECLEAN	Enterprise Holdings	9020 Aviation Blvd. Inglewood CA 90301		2	1
101	Municipal	City of Inglewood	1 Manchester Blvd. Inglewood, CA 90301		2	2
102	Textile	Texlon	555 Van Ness Ave. Torrance CA 90501		1	1
			* stores within the West Basin service area were surveyed		58	14

The number of people trained DOES NOT include the approx. 15-20 attendees of a workshop hosted by West Basin in 2008

Appendix C:
Sample Customer Survey Reports

17140 South Avalon Boulevard, Suite 210, Carson, CA 90746-1296, 310.217.2411, www.westbasin.org

INDUSTRIAL PROCESS WATER AND COOLING TOWER WATER REDUCTION PROGRAM

FIELD SURVEY REPORT

prepared for:

Blue Creations

22632 Avalon Blvd
Carson, CA 90746

Prepared by:

RMC Water and Environment
15510-C Rockfield Blvd., Suite 200
Irvine, CA 92618

PROGRAM DESCRIPTION

The West Basin Municipal Water District (West Basin) in cooperation with the Metropolitan Water District of Southern California (MET) has developed the **RECIRC & $AVE** Program (Program) for large users of water in industrial process operations and cooling towers. The Program provides funding to West Basin Customers for installing equipment that captures, treats, saves, and reuses water that is normally discharged to the sewer. The Program is made possible through funding from the California Department of Water Resources, the U.S. Department of the Interior Bureau of Reclamation, and your local water agency. West Basin is assisted in conducting the Program by URS Corporation (URS), RMC Water and Environment (RMC), and Maureen Erbeznik and Associates.

Qualifications for participating in the Program include:

- Must be a Customer of West Basin Municipal Water District or one of its water retailers;
- Enroll in the Program before water savings improvements have been made at the facility;
- Install and operate the water savings equipment; and
- Obtain a measured water savings over a monitoring period of mutually agreed upon duration such as six months.

This report summarizes the results of a Field Survey (Survey) conducted at Blue Creations of California, Inc (Blue Creations) in Carson, California by RMC on Thursday, October 27th, 2011. The goal of the Survey Process is to identify targeted businesses that possess the potential for significant water reduction in their facilities and that meet the qualifications to participate in the Program.

This Survey is limited in its scope to collecting basic information via interviews and a brief site visit. No independent measurements were made and the accuracy of the information provided was not verified, except as is possible by the site visit. The Survey is not intended to be a detailed investigation and data have been voluntarily provided by the Customer. Recommendations made in this report are based on the data collected during the site visit and a review of limited facility water records. This field survey has been supplemented with more technical data than a typical survey because a more detailed comprehensive survey is not anticipated.

FACILITY DESCRIPTION

Blue Creations is located in Carson, California and provides garment washing and texturizing services. The Blue Creations operation takes place in two adjacent buildings at 22632 Avalon Blvd (Bldg 1) and 22624 Avalon Blvd (Bldg 2). Bldg 1 contains a small administrative office and primarily processes denim garments. In Blgd 2 Blue Creations handles dying and other washing/processing operations. Bldg 1 is equipped with three restrooms and Bldg 2 is equipped with 2 restrooms. There is one water meter serving Bldg 1 and one for Bldg 2, both providing water for restrooms, administrative and process purposes.

POTABLE WATER USE

The California Water Service Company is the local water retailer for Blue Creations. **Appendix B** of this report summarizes the water use records provided for the Blue Creations facility by the California Water Service Company. Blue Creations operates between 16 and 24 hours a day six or seven days a week. For the purpose of this report, it is assumed that Blue Creations operates 340 days per year.

Based on water use data provided, Blue Creations used an average of 9.83 million gallons (Mgal) per year of potable water for process operations during the 12-month period beginning November 2010. The average daily process water use for the Blue Creations facility calculates to approximately 28,904 gallons per day (GPD).

Blue Creations sewer services are provided by the County Sanitation Districts of Los Angeles County. Currently, wastewater flow from the facility is not metered prior to discharge to the sewer. Blue Creations sewer charges are based on percentage of water flow that is estimated to be sewer flow. The estimation process incorporates calculated deductions of water use resulting from water evaporation in the garment processing based on natural gas usage.

DESCRIPTION OF EQUIPMENT USING SIGNIFICANT WATER VOLUME

The Blue Creations facility uses the majority of water for garment processing. Water is used in sample machines to establish the chemical use and other process parameters required for the specified garment appearance. The production machines are used to process the batches of garments once the parameters are established. A minor amount of water is used for landscaping, restrooms and administrative purposes.

Building 1 – Denim Handling Operations

Sample washing machines are front loaded with a view port for visual observation. There are five sample washing machines in Building 1 with capacities as follows:

- Washing Machine 1 – 35 lbs
- Washing Machine 2 – 50 lbs
- Washing Machine 3 – 75 lbs
- Washing Machine 4 – 100 lbs
- Washing Machine 5 – 50 lbs

Production washing machines are top loaded, totally enclosed such that water levels within the machines cannot be observed. The water usage in the machines is controlled through a manually operated valve, with water level estimated. There are six production washing machines with capacities as follows:

Washing Machine 6 – 400 lbs
Washing Machine 7 – 600 lbs
Washing Machine 8 – 900 lbs
Washing Machine 9 – 700 lbs
Washing Machine 10 – 700 lbs
Washing Machine 11 – 250 lbs

Building 2 – Dye Process Related Operations

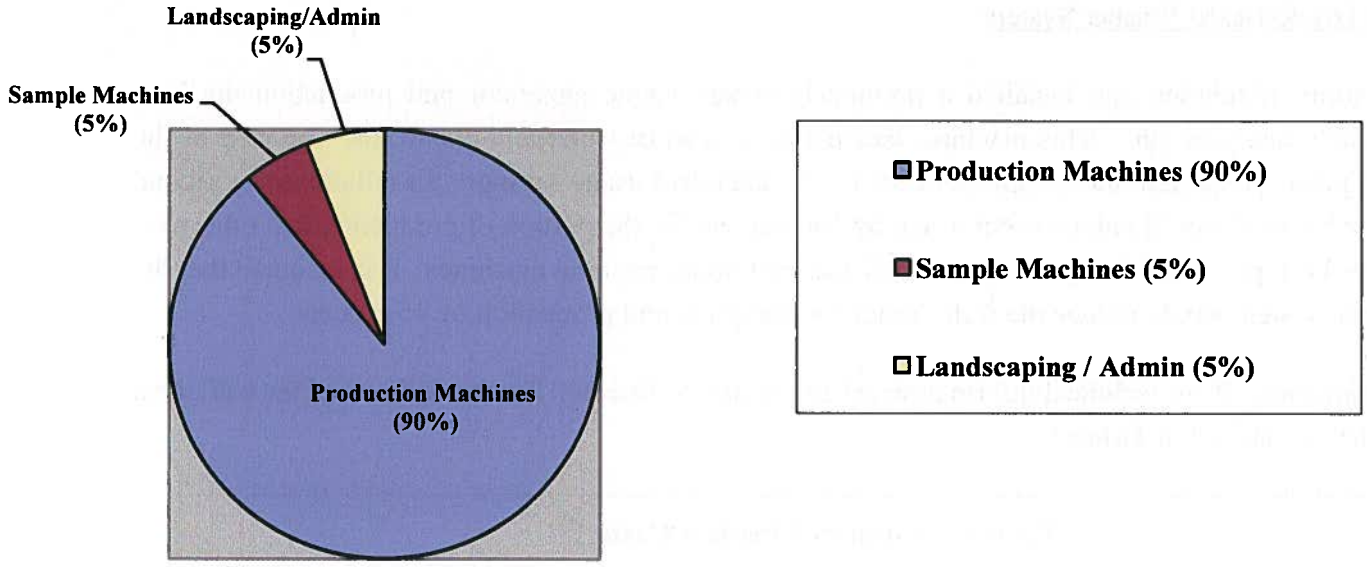
Sample washing machines are front loaded with a view port for visual observation. There are eight sample washing machines in Building 2 with capacities as follows:

Washing Machine 12 – 50 lbs
Washing Machine 13 – 50 lbs
Washing Machine 14 – 50 lbs
Washing Machine 15 – 50 lbs
Washing Machine 16 – 50 lbs
Washing Machine 17 – 50 lbs
Washing Machine 18 – 100 lbs
Washing Machine 19 – 100 lbs

Production washing machines are top loaded, totally enclosed such that observation of water levels cannot be observed. The water usage in the machines is controlled through a manually operated valve, with water level estimated. There are four production washing machines with capacities as follows:

Washing Machine 20 – 400 lbs
Washing Machine 21 – 400 lbs
Washing Machine 22 – 600 lbs
Washing Machine 23 – 1000 lbs

Approximately one year ago, Blue Creations installed an Ozone-Based texturing system. The system consists of an ozone generator, and a washing machine that uses the ozone in lieu of water. The ozone system capacity is approximately comparable to one 250 lb production machine.



DESCRIPTION OF POTENTIAL WATER SAVINGS TECHNOLOGIES

Two potential projects were identified for water conservation:

1) Flowmeters Installation on production washing machines

2) Additional Ozone-Based washer system

The detail descriptions of the two potential projects are as follow:

Option 1: Flowmeters Installation

Blue Creations installed a flowmeter/flow totalizer on one of the Production Washing Machine to control fill cycle water usage. Previously, water fill was estimated because the water level cannot be observed with the top-loaded washing machines. The flow totalizer allows the facility manager to determine the total flow required to optimize the water usage for the batch based on the total weight (lbs) of garments that are being processed. With this control, water use is reduced to the optimal quantity required for an estimated savings of 20 percent of water usage.

This project would require installation of six (6) 1.5-inch flowmeters in Building 1 and three (3) 2-inch flowmeters in Building 2. The listed costs of flowmeter are $400 per 1.5-inch flowmeter and $430 per 2-inch flowmeter. Each unit also requires a battery kit with a cost of approximately $40. Additional cost for installation and parts is approximated by an installation factor of 1.25.

Option 2: Ozone-Based Washer System

Blue Creations purchased and installed a previously-owned ozone generator and production machine approximately one year ago. This machine uses ozone instead of water and chemicals. The cost of the additional power to operate the system is offset by the chemical usage savings. Installation of a second ozone-based system would reduce water usage by 100 percent for the portion of production that otherwise would have been processed using one of the facilities traditional washing machines. It is assumed that the ozone-based system would reduce the water usage for sampling and production by 15 percent.

Refer to **Appendix D** for technical information related to the flowmeters. The breakdown of the estimated project costs are shown in **Table 1**.

Table 1 – Estimated Project Costs (1)

Description	Equipment Cost (2)	Install. factor	Installation Cost	Total Cost
Option 1: Flowmeters				
1.5-inch flowmeters (6 required)	$ 2,640	1.25	$ 660	$ 3,300
2.0-inch flowmeters (3 required)	$ 1,410	1.25	$ 360	$ 1,770
				$ 5,070
Option 2: Ozone-Based System	$ 50,000	1.25	$ 12,500	**$ 62,500**

(1) Costs provided in October 2011 dollars.
(2) Equipment cost is approximately $400 per 1.5-inch flowmeter, $430 per 2-inch flowmeter, $40 per battery kit. Cost does not include sales tax, delivery, and engineering costs.

ESTIMATED ANNUAL WATER VOLUME SAVINGS

A summary of the estimated water volume savings in water supply and sewer disposal for each water conservation options is provided in **Table 2**. All calculations are based on 340 workdays per year.

Table 2. Summary of Estimated Water Volume Savings

Description	Gallons per Working Day	Million Gallons Per Year (1)
Option 1: Flowmeters Installation (1)	5,203	1.77
Option 2: Ozone-Based System (2)	4,119	1.40

(1) Calculated based on 340 workdays per year, 90 percent total usage * 20 percent savings.
(2) Calculated based on 340 workdays per year, 95 percent total usage * 15 percent savings

Estimated Annual Cost Savings

A summary of the estimate cost saving in water supply and sewer disposal costs for each water conservation options is provided in **Table 4**. All calculations are based on 340 workdays per year. Detailed calculations of the cost savings are provided in **Appendix C**.

Table 4. Summary of Estimated Cost Savings [1]

Description	Project Cost [2]	Annual Savings [3]	Simple Payback
Option1: Flowmeters Installation [1]	$5,070	$8,098	0.6
Option 2:Ozone Based System [2]	$62,500	$6,411	9.7

(1) Costs provided in October 2011 dollars.
(2) Equipment cost does not include sales tax, delivery, and engineering costs.

The total estimated water usage cost savings for Blue Creations is estimated based on an estimated annual water use reduction and California Water Service Company's Quantity Rates of $2.8662 per hundred cubic feet (HCF).

The total estimated wastewater treatment surcharge cost savings for Blue Creations is based on an estimated annual water use reduction and LACSD's 2010-2011 Wastewater Treatment Surcharge Statement. For this estimate, surcharges for Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), and Average Peak Flow Rate are assumed to be constant and are omitted from the total estimated wastewater treatment surcharge cost savings. Although the concentration of these constituents may increase with the reduction of water usage, the total mass (lbs) of COD and TSS would remain the same.

Program Application

Based on a review of the proposed retrofits and equipment upgrades, Blue Creations is considered a viable candidate to participate in the **RECIRC & $AVE** Program. However, because of the low water and wastewater cost savings and simplicity of the required upgrades, a detailed Equipment Survey is not recommended. The customer may still elect to use the information contained in this Field Survey (with supplemental technical data) to participate in the **RECIRC & $AVE** Program.

Additional Utility Incentive Programs Available

In addition to the Program under West Basin, other utility incentive programs are also available for industrial customers.

The Southern California Gas Company and Southern California Edison (SCE) are offering potential cash incentives to qualifying industrial users for reduction in gas and electricity usage. The South Bay Environmental Services Center (SBESC) serves as a regional clearing house for information about programs offered by the Southern California Gas Company and Southern California Edison. Visit www.sbesc.com or call (310) 371-7222 for further information.

The MET's Save Water, Save-A-Buck Program also provides rebates to industrial customers for commonly used plumbing fixtures, such as toilets and urinals. Call Elise Goldman at West Basin (310) 660-6253 or visit www.mwdsaveabuck.com for more information on these and other water saving devices.

17140 South Avalon Boulevard, Suite 210, Carson, CA 90746-1296, 310.217.2411, www.westbasin.org

Appendix A: Blue Creations
Recirc & $ave Program: Site Inspection Survey

Company: Blue Creations of California, Inc
Address: 22632 S. Avalon Blvd.
City: Carson
Zip Code: CA 90756
Type of Business: Laundry & Fabric Textile

Name of Facility Contact: Oscar Quitero/ Raul Quintero/Ana Velazquez
Title: Sales & Marketing/President /Customer Service
Direct Telephone Number: (323) 420-7269/(323) 719-2829/ (323) 816-3100
Email Address: Oscar@bluecreastionsinc.com

Facility Hours of Operation: 16 to 24 hours per day
Number of Work Shifts per Day: 3
Facility Days of Operation per Week: Six or seven days per week based on business

Process Water Reduction
What manufacturing processes use potable water and what percent of total water use?

(1) Sample Machines	90 %
(2) Production Machines	5 %
(3) Landscaping / Admin	5 %
	%
	%
	%
	%

Does Facility have an existing potable water reduction program? ☒ **Yes** ☐ **No**
Describe conservation technologies installed or considered to be installed at facility including what level of planning has already been undertaken.
Facility installed low flow (half flush/full flush) toilets in July-August 2011

Is there any on-site water treatment? ☐ **Yes** ☒ **No**
Briefly describe what streams are treated.

Appendix A: Blue Creations
Recirc & $ave Program: Site Inspection Survey

Is there any on-site recycling of water? ☐ **Yes** ☒ **No**
Briefly describe what streams are recycled.

Does Facility measure water use for each manufacturing process? ☐ **Yes** ☒ **No**
One washer has a flow totalizer / flow meter on it.

Does Facility measure wastewater discharged to the industrial sewer? ☐ **Yes** ☒ **No**
Approximate amount of water discharged to the sewer? 100% of water supply

Are the processes using industrial water the same as facility hours of operation? ☒ **Yes** ☐ **No**

How long has the Facility been at the current location? 10 years

Who would be responsible for implementing process changes within the facility?
Oscar Quintero

How long could the Facility allow implementing and installing a process change?
Could be phased so the facility production would not be impacted

What time frame is required to make the decision to proceed with a process change?
Within three months

Cooling Tower Controls
How many active Cooling Towers are at the Facility? None

Model Number and Type? N/A

Flow capacity of Cooling Tower(s)? N/A

What kind of controller is used? N/A

Has Facility used of considered other controllers in the past? N/A

Appendix B
Blue Creations
Recirc & $ave Program
Potable Water Use Data

Water Supply Data Provided by California Water Service Company

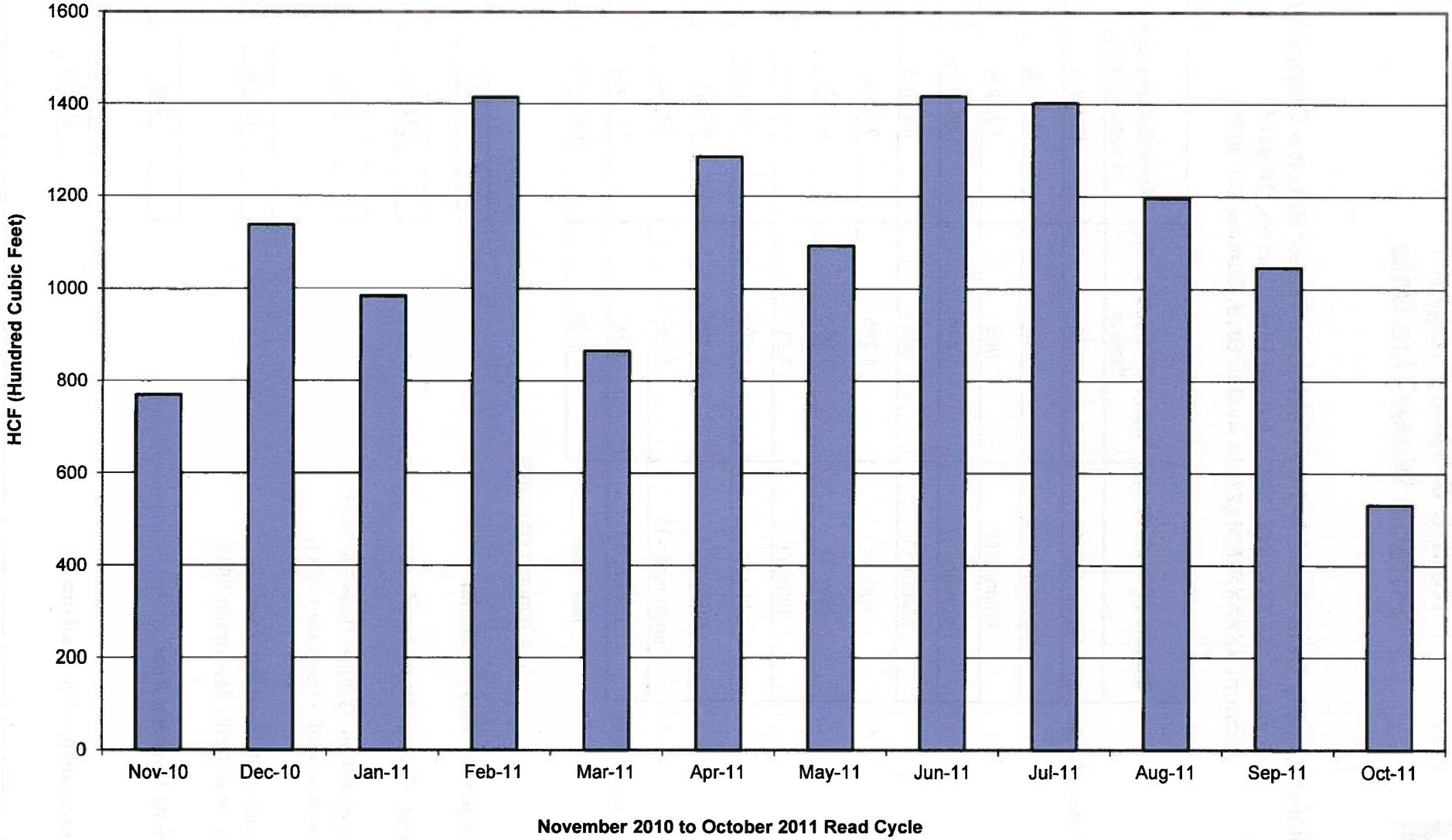
Account XXXXXX2442 (22632 Avalon Blvd, Carson, CA 90745)
Account XXXXXX1524 (22624 Avalon Blvd, Carson, CA 90745)

	Months of Cycle Read	Total HCF Used for All Meters	Total Gallons Used (Process Only)
Start of Read Cycle	November-10	769	575,212
	December-10	1,137	850,476
	January-11	983	735,284
	February-11	1,414	1,057,672
	March-11	865	647,020
	April-11	1,285	961,180
	May-11	1,093	817,564
	June-11	1,417	1,059,916
	July-11	1,402	1,048,696
	August-11	1,196	894,608
	September-11	1,046	782,408
End of Read Cycle	October-11	531	397,188
	Net Total	13,138	9,827,224

HCF = hundred cubic feet

Average HCF Used Per Month	**1,095**
Average Gallons Used Per Month	**818,935**
Average Million Gallons Used Per Year (December 2010 - November 2011)	**9.83**
Average HCF Used Per Year (December 2010 - November 2011)	**13,138**
Working Days Per Year	**340**
Average Gallons Per Working Day	**28,904**

Appendix B
Blue Creations
Recirc & $ave Program
Potable Water Use Data



Appendix C
Blue Creations
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive
Option 1: Flowmeters Installation

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: California Water Service Company Quantity Rates (1) $2.866 Per HCF	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) $746 per Mgal/yr	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	28,904	9.83	13,138	1,095	37,656	7,331	$ 44,987
Estimated Water Savings	5,203	1.77	2,365	197	6,778	1,320	**$ 8,098**

(1) Quantity Rates of $2.8662 per HCF is effective April 1, 2011. Quantity Rates do not include base rate or surcharges authorized by the California Public Utilities Corporation

(2) 2010 - 2011 LACSD Wastewater Treatment Surcharges:

a. Total Flow Volume Per Year (Mgal/yr) x $746.00

b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $131.90

c. Total Suspended Solids Per Year (1000 of lbs) x $372.70

For this preliminary estimate, surcharges b and c are assumed to be constant and are omitted from the Wastewater Treatment Surcharges Calculation

Total Work Days Per Year
340 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	**1.77 Mgal/yr**	
Potential Water Reduction Incentive	Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period.	**$ 5,307**

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 8,098
Potential Program Cash Incentives	$ 5,307
Potential Annual Cost Savings	**$ 13,404**

Appendix C
Blue Creations
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive
Option 2: Ozone-based Washer System

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: California Water Service Company Quantity Rates (1) $2.866 Per HCF	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) $746 per Mgal/yr	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	28,904	9.83	13,138	1,095	37,656	7,331	$ 44,987
Estimated Water Savings	4,119	1.40	1,872	156	5,366	1,045	**$ 6,411**

(1) Quantity Rates of $2.8662 per HCF is effective April 1, 2011. Quantity Rates do not include base rate or surcharges authorized by the California Public Utiltiies Corporation

(2) 2010 - 2011 LACSD Wastewater Treatment Surcharges:

a. Total Flow Volume Per Year (Mgal/yr) x $746.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $131.90
c. Total Suspended Solids Per Year (1000 of lbs) x $372.70

For this preliminary estimate, surcharges b and c are assumed to be constant and are omitted from the Wastewater Treatment Surcharges Calculation

Total Work Days Per Year
340 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	**1.40 Mgal/yr**	
Potential Water Reduction Incentive	Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period.	**$ 4,201**

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 6,411
Potential Program Cash Incentives	$ 4,201
Potential Annual Cost Savings	**$ 10,612**

MEMORANDUM

15510-C Rockfield Blvd, Ste 200, Irvine, CA 92618
Phone: (949) 587-1700, Fax: (949) 587-1300

To: Elise Goldman
West Basin Municipal Water District

Job No. 0343-06

From: Tricia Butler, P.E., RMC Water and Environment

Date: March 23, 2012

Subject: Blue Creations
Potential Program Cash Incentive

In December 2011, the completed field survey for Blue Creations was presented by RMC and West Basin to the customer at their Carson facility as part of the **RECIRC & $AVE** Program (Program). California Water Service Company was also in attendance. Two options for water conservation were presented, and RMC has worked with the customer to develop the technical data needed to compare the project options and select the most viable alternative. Blue Creations has elected to move forward with evaluation of installation of an ozone-based garment processing system that will significantly reduce water usage in many of their product lines.

In addition to the technical data, RMC has requested and received operations and production data from the customer and developed an approach to monitor the water savings projected as a result of the new equipment. The manufacturer for the ozone-based equipment has provided water savings projections that were also used in the estimation, as follows:

Description	Units	Quantity
Total annual water use	gallons per year (1)	9,830,000
Assumed administrative use	gallons per year (2)	280,000
Water used by process	gallons per year	9,550,000
Water savings, estimated	40 percent	3,820,000 gallons
Water savings, estimated	1,000 gallons	3,820

(1) Blue Creations Recirc and Save Field Report, 12/12/2011, Appendix B
(2) Assumed 30 employees per day, 25 gallons per employee per day. Ave 15 employees per shift, 1-3 shifts per day depending on production needs. Additional admin use 500 gallons per month.

MEMORANDUM

15510-C Rockfield Blvd, Ste 200, Irvine, CA 92618
Phone: (949) 587-1700, Fax: (949) 587-1300

To: Elise Goldman,
West Basin Municipal Water District

Job No. 343-06

From: Tricia Butler, PE

Date: December 5, 2012

Subject: Blue Creations of California, Inc.
Water Savings Verification

The purpose of this memo is to compare actual water savings data with the water savings previously estimated in the Recirc and Save Field Survey Report and Enrollment Agreement for Blue Creations of California, Inc. (Blue Creations). The objective of this comparison is to verify that the water conservation measures recommended have been effective in conserving water.

A field survey was conducted at the Blue Creations facility on October 27, 2011 and the recommendation included the installation of a second ozone-based washer system. It was estimated that the second ozone-based system would reduce the overall water consumption at the facility by approximately 40-percent, or 3,820,000 gallons based on 2011 production levels.

Blue Creations of California entered into an agreement dated April 23, 2012 with West Basin Municipal Water District for enrollment into the Recirc and Save: Water Savings Performance Program. The agreement estimated a water savings of 4,000,000 gallons per year or 45 percent water use reduction based on 2011 production levels.

Blue Creations installed the second ozone-based washer system at the Carson facility in the summer of 2012. The facility production data and water usage readings for the monitoring period (September through October 2012) were provided for verification of water use reduction. Water use determination is on a per unit basis to adjust for fluctuation in production.

The water usage readings provided by California Water Service Company and production data prior to and after water conservation provided by Blue Creations are shown in **Table 1** and **Table 2**.

TABLE 1: PROCESS WATER USE PRIOR TO CONSERVATION

2011 Month	Total Process Water Use (Gallons)[1]	Production (No. of Garments)	Water Usage for Process (Gallons per Garment)
January	713,534	58,211	12.26
February	1,035,922	45,174	22.93
March	625,270	89,004	7.03
April	939,430	74,298	12.64
May	795,814	76,258	10.44
June	1,038,166	110,204	9.42
July	1,026,946	77,036	13.33
August	872,858	64,653	13.50
September	760,658	42,677	17.82
October	375,438	36,193	10.37
November	344,770	50,826	6.78
December	416,578	29,350	14.19
Total	**8,945,384**	**753,884**	**11.87**

Note:
1. Administrative use of 21,750 gallons per month was removed. Administrative use assumes 30 employees per day, 25 gallons per employee per day, for 340 days per year and an additional 500 gallons per month.

TABLE 2: PROCESS WATER USE AFTER CONSERVATION

2012 Month	Total Process Water Use (Gallons)[1]	Production (No. of Garments)	Water Usage for Process (Gallons per Garment)
September	438,270	71,157	6.16
October	489,134	92,361	5.30
Total	**927,404**	**163,518**	**5.67**
Savings			**52%**

Note:
1. Administrative use of 21,750 gallons per month was removed. Administrative use assumes 30 employees per day, 25 gallons per employee per day, for 340 days and an additional 500 gallons per month.

Based on data provided by the facility, Blue Creations has achieved significant water savings after the installation of the second ozone-based washer system. The unit water usage prior to the ozone installation was approximately 11.9 gallons water per garment. After the installation of the ozone-based washer system, the unit water use was approximately 5.7 gallons water per garment, resulting in an overall savings at the facility of 52 percent of the water usage.

The comparison of the prior to and after conservation water usage reflects the savings that was anticipated. The Blue Creations Potential Program Cash Incentive Memo (March 2012) estimated a water savings of 40% (3,820,000 gallons) with the installation of the second ozone-based washer system. The Recirc and Save Performance Agreement (April 23, 2012) estimates a saving of 4 million gallons per year equivalent to approximately 45-percent overall water savings when fully operational, which is approximately 350,000 gallons per month based on the production level in 2011. Based on the monitoring period of the two months, 52-percent of water was saved.

Blue Creations provided a breakdown of all the garments produced during the monitoring period (over 100 different products). Similar to the 2011 production records, the production records for the monitoring period consisted of production of a wide range of product lines using varied processing methods. The individual garments were also analyzed for water consumption savings and assumptions were made to determine which of the eleven production methods were used as identified in the Exhibit C of the agreement. Some of product lines were the same as 2011 orders (same customer and process method) while many orders were from new customers or reoccurring customers with different production lines. Euro Outlet and Techstyles were new customers and had over 10,000 garments dyed during the monitoring period. Nissi, an existing customer, also had over 10,000 garments.

Overall, Blue Creations has significantly improved their water use efficiency. Based on the water savings of the past two months, it is estimated that Blue Creations is on track to maintain a water savings of at least 45-percent as designated in the enrollment agreement.

RMC
Water and Environment

MEMORANDUM

15510-C Rockfield Blvd, Ste 200, Irvine, CA 92618
Phone: (949) 587-1700, Fax: (949) 587-1300

To: Elise Goldman, West Basin Municipal Water District — Job No. 343-06

From: Tricia Butler, PE

Date: April 25, 2013

Subject: Blue Creations of California, Inc.
Water Savings Verification

The purpose of this memo is to compare actual water savings data with the water savings previously estimated in the Recirc and Save Field Survey Report and Enrollment Agreement for Blue Creations of California, Inc. (Blue Creations). The objective of this comparison is to verify that the water conservation measures recommended have been effective in conserving water for the second and final monitoring period.

A field survey was conducted at the Blue Creations facility on October 27, 2011 and the recommendation included the installation of a second ozone-based washer system. It was estimated that the second ozone-based system would reduce the overall water consumption at the facility by approximately 40-percent, or 3,820,000 gallons per year based on 2011 production levels.

Blue Creations of California entered into an agreement dated April 23, 2012 with West Basin Municipal Water District for enrollment into the Recirc and Save: Water Savings Performance Program. The agreement estimated a water savings of 4,000,000 gallons per year or 45 percent water use reduction based on 2011 production levels.

Blue Creations installed the second ozone-based washer system at the Carson facility in the summer of 2012. Additional facility production data and water usage readings for the monitoring period (October 31, 2012 through April 2, 2013) were provided for verification of water use reduction. Water use determination is on a per unit basis to adjust for fluctuation in production.

The water usage readings provided by California Water Service Company and production data prior to and after water conservation provided by Blue Creations are shown in **Table 1** and **Table 2**.

TABLE 1: PROCESS WATER USE PRIOR TO CONSERVATION

Period	Total Process Water Use (Gallons)[1]	Production (No. of Garments)	Water Usage for Process (Gallons per Garment)
January - 2011	713,534	58,211	12.26
February - 2011	1,035,922	45,174	22.93
March - 2011	625,270	89,004	7.03
April - 2011	939,430	74,298	12.64
May - 2011	795,814	76,258	10.44
June - 2011	1,038,166	110,204	9.42
July - 2011	1,026,946	77,036	13.33
August - 2011	872,858	64,653	13.50
September - 2011	760,658	42,677	17.82
October - 2011	375,438	36,193	10.37
November - 2011	344,770	50,826	6.78
December - 2011	416,578	29,350	14.19
Annual Total	**8,945,384**	**753,884**	**11.87 Annual Average**

Note:

1. Administrative use of 21,750 gallons per month was removed. Administrative use assumes 30 employees per day, 25 gallons per employee per day, for 340 days per year and an additional 500 gallons per month.

TABLE 2: PROCESS WATER USE AFTER CONSERVATION

Period	Total Process Water Use (Gallons)[1]	Production (No. of Garments)	Water Usage for Process (Gallons per Garment)
September 2012	438,270	71,157	6.16
October 2012	489,134	92,361	5.30
Nov 2012-January 2013	1,477,874	281,621	5.25
February-March 2013	1,123,380	271,227	4.14
Total	**3,528,658**	**716,366**	**5.21**
Savings			**56%**

Note:

1. Administrative use of 21,750 gallons per month was removed. Administrative use assumes 30 employees per day, 25 gallons per employee per day, for 340 days and an additional 500 gallons per month.

Based on additional data provided by the facility, Blue Creations has continued to achieve significant water savings after the installation of the second ozone-based washer system. The unit water usage prior to the ozone installation was approximately 11.9 gallons water per garment. After the installation of the ozone-based washer system, the unit water use is approximately 5.2 gallons water per garment, resulting in an overall savings at the facility of 56 percent of the water usage.

The comparison of the pre and post installation water usage meets and exceeds the anticipated savings. The Blue Creations Potential Program Cash Incentive Memo (March 2012) estimated a water savings of 40% (3,820,000 gallons) with the installation of the second ozone-based washer system. The Recirc and Save Performance Agreement (April 23, 2012) estimates a saving of 4 million gallons per year equivalent to approximately 45-percent overall water savings when fully operational, which is approximately 350,000 gallons per month based on the production level in 2011. Based on the monitoring period of the additional four months, 56-percent of water was saved. This translates to roughly 458,000 gallons per month, over 100,000 gallons more than anticipated.

Blue Creations provided a breakdown of all the garments produced during the monitoring period (over 100 different products). Similar to the 2011 production records, the production records for the monitoring period consisted of production of a wide range of product lines using varied processing methods. The individual garments were also analyzed for water consumption savings and assumptions were made to determine which of the eleven production methods were used as identified in the Exhibit C of the agreement. Some of product lines were the same as 2011 orders (same customer and process method) while many orders were from new customers or reoccurring customers with different production lines.

Overall, Blue Creations has significantly improved their water efficiency. Based on the water savings of the additional four months, it is estimated that Blue Creations has maintained a water savings of at least 45-percent as designated in the enrollment agreement. It is recommended that they be provided the second half of the incentive money in full.

17140 South Avalon Boulevard, Suite 210, Carson, CA 90746-1296, 310.217.2411, www.westbasin.org

INDUSTRIAL PROCESS WATER AND COOLING TOWER WATER REDUCTION PROGRAM

COMPREHENSIVE SURVEY REPORT

Prepared for:

Coast Plating, Inc.

128 West 154th Street
Gardena, California
And
417 West 164th Street
Carson, California

Prepared by:

URS Corporation
2020 East First St., Suite 400
Santa Ana, CA 92705

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APPENDICES

LIST OF FIGURES

1.0 REPORT SUMMARY

1.1 FACILITY DESCRIPTION

Coast Plating, Inc. (Coast) is a turnkey provider of metal processing and metal finishing services including non-destructive testing, cleaning, anodizing, chemical conversion, and paint coatings for aluminum, titanium, and stainless steel alloys. The company currently has two facilities within one mile of each other in the cities of Gardena and Carson, California. A Comprehensive Survey was conducted at the Coast facilities from February to August 2009.

1.2 RETROFITS AND UPGRADES

Coast is planning to upgrade the plating process lines at the Carson and Gardena facilities to reduce their potable water usage. The Carson facility will install a conductivity control system which will control solenoid valves to automatically add fresh water to their rinse tanks when the conductivity (or contamination) of the rinse water exceeds a set value. The Gardena facility will install an ion exchange system to provide recycled deionized (DI) water to the rinse tanks to replace potable water. In addition, an existing potable water rinse tank at each facility will be retrofitted into a DI water sprayer tank to minimize chemical dragout.

1.3 CHANGES TO OPERATIONAL PRACTICES

Coast currently operates a continuous flow process for their plating and anodizing rinse tanks at the Carson and Gardena facilities. Coast is proposing to convert an existing potable water rinse tank at each facility into a DI water sprayer tank. This will require a change in their operational procedures by sending the workpiece to the sprayer tank after each chemical process prior to the dip rinse tanks. The Carson facility will also use real time conductivity measurements to automatically control the rinse water flushing rates.

1.4 POTENTIAL WATER AND SEWER COST SAVINGS

After installation of the DI water ion exchange recycling system at Gardena and the conductivity control system at Carson, the total estimated water and sewer cost savings for Coast will be approximately $40,673 per year based on estimated water and sewer volume reduction. Estimated water savings will be approximately 10.4 million gallons per year based on the current annual industrial water usage of 14.4 million gallons per year. Payback period is estimated to be six years.

1.5 POTENTIAL PROGRAM INCENTIVE

Based on retrofit costs and water savings monitored for a one-year period, and the West Basin Municipal Water District's "RECIRC & $AVE" Program (Program) financial incentives available (i.e., $3.00 per 1,000 gallons of actual water saved for a one-year period), the potential Program incentive for Coast is approximately $41,309. The payback period is reduced to approximately four years when including the Program incentive.

2.0 INTRODUCTION

The West Basin Municipal Water District (West Basin), in cooperation with the Metropolitan Water District of Southern California (MET), has developed the "RECIRC & $AVE" Program (Program) for large users of water in industrial process operations and cooling towers. The Program provides funding to West Basin customers for installing equipment that captures, treats, saves, and reuses water that is normally discharged to the sewer. The Program is made possible through funding from the California Department of Water Resources, the U.S. Department of the Interior Bureau of Reclamation, and the local water agency. West Basin is assisted in conducting this Program by URS Corporation (URS), Maureen Erbeznik & Associates, and Water 3 - RMC.

Qualifications for participating in the Program include:

- Must be a customer of West Basin or one of its water retailers;
- Must have enrolled in the Program before water savings improvements have been made at the facility;
- Install and operate the water savings equipment; and
- Obtain a measured water savings over a one-year monitored period.

Based on a Field Survey conducted on February 12, 2009, URS identified Coast as a potential candidate for this Program. In order for Coast to qualify for monetary incentives, a Comprehensive Survey of the Coast facilities was conducted to obtain additional operational information. This Comprehensive Survey Report provides a summary of the site investigation and the application of Coast to the Program.

2.1 FACILITY DESCRIPTION

Coast is a turnkey provider of metal processing and metal finishing services including non-destructive testing, cleaning, anodizing, chemical conversion, and paint coatings for aluminum, titanium, and stainless steel alloys. The company has two facilities located within one mile of each other in Gardena and Carson, California. Coast's main offices are located at the Gardena facility on West 154th Street. This facility processes assorted metal parts of up to 12 feet long in a 30,000 square foot building. The Carson facility is located on West 164th Street. This is a production facility that can accommodate relatively larger metal parts and assemblies up to 27 feet long. A site vicinity map is provided as Figure 1 in Appendix A.

2.2 DESCRIPTION OF EQUIPMENT USING SIGNIFICANT WATER VOLUME

Coast operates two anodizing and general plating lines, one in the Gardena facility and one in the Carson facility. The anodizing and general plating lines utilize a combination of chemical baths, electroplating

baths, and rinse tanks per the requirements of each production run. All materials are currently dipped by hand, first in the plating bath and then in a water rinse tank. A significant amount of water is used in the continuous flow rinse baths operating during each production run. Frequent tank dumping and refilling also contributes to additional water usage.

2.3 POTABLE WATER USAGE AND SEWER DISCHARGE RATE

The Golden State Water Company (Golden State) is the local water purveyor for Coast. Golden State provided URS the bi-monthly potable water supply data for Coast over a two-year period from November 2006 to November 2008. Seven water meters record the total potable water supplied to the two Coast facilities. Two meters record the industrial water usage at Coast and are listed as follows:

- Coast Gardena Facility, 128 West 154th Street: Meter No. 127720; and
- Coast Carson Facility, 417 West 164th Street: Meter No.399921.

A table and a graph of the facilities' potable water use data are provided in Appendix B. Coast operates from Monday through Saturday, which equals to approximately 312 days per year (i.e. 52 weeks x 6 workdays per week).

A review of the data indicates that Coast used an average of 14.4 million gallons (Mgal) of potable water per year over the two-year period from November 2006 to November 2008, or approximately 46,123 gallons per work day (gpd).

Coast currently does not have any secondary water meters within the facilities to track the water use per individual equipment or processes.

Coast currently treats its metal-containing rinse water through its on-site wastewater treatment units prior to discharging into the industrial sewer system of the Los Angeles County Sanitation District (LACSD). The wastewater treatment process included neutralization, precipitation, and flocculation. The facilities currently do not measure the amount of wastewater discharged to the LACSD.

3.0 PROPOSED CONSERVATION TECHNOLOGY

3.1 DESCRIPTION OF COMMON CONSERVATION TECHNOLOGIES

Coast has proposed to reduce its potable water consumption by updating its equipment and introducing water recycling into its plating process lines at the Carson and Gardena facilities. The following are conventional water conservation technologies typically used by the metal plating industry that had been investigated by Coast:

- Installation of high-efficiency sprayers to reduce chemical drag-out, with curtains added as necessary to prevent spray carry-over to other process areas;
- Installation of air blowers to agitate rinse water for improve efficiency of the rinsing process;
- Replacing serial rinse tanks with counter-current flow rinse tanks;
- Installation of conductivity meter-controllers to monitor Total Dissolved Solids (TDS) levels and to control fresh water additions automatically; and
- Installation of ion exchange system for generation of deionized (DI) water and recycling of the contaminated rinse water.

Considering the different sizes and types of parts processed at the two facilities, a separate scheme of conservation technologies is proposed for each Coast facility.

3.2 PROPOSED CONSERVATION TECHNOLOGY AT COAST CARSON FACILITY

Coast has proposed the installation of a conductivity control system to automatically control rinse water flushing rates at the Carson facility. The proposed retrofit addresses seven potable rinse tanks presently used to rinse parts within the anodizing and plating lines. All rinse tanks are currently operated in a once-through flow arrangement with discharge of the rinse water as a waste. Conductivity sensors will be installed with solenoid control valves into six tanks (Tanks A-2, A-4, A-6, A-8, A-17 and A-19). The conductivity control system will automatically open to add fresh water to the rinse tanks when the conductivity (or contamination) of the rinse water in each tank exceeds a set value. This control measure is especially applicable in finishing and rinsing operations, where processes are done in batch operation and the amount and type of work varies from day to day.

An additional existing potable water rinse tank (Tank No. A-11) will be retrofitted into a DI water sprayer tank. The tank will be fitted with a series of spray nozzles inside the tank that operate on a manual-actuated timer. Workpieces will be transferred to the DI sprayer tank after each chemical process prior to dipping into the potable water rinse tanks to minimize chemical dragout.

Coast is also planning to replace their existing DI water supply system with a new on-site ion exchange system. DI water is currently provided at the Carson facility through a contracted equipment rental

service, which costs approximately $4,000 per month. By installing a new ion exchange DI system, Coast can reduce costs, provide DI water on-site and eliminate the need for outside service. It should be noted that change is not included in the Program incentive. However, the new ion exchange DI system is expected to increase the potable water usage at the Carson facility by approximately 5%; therefore, it is included in the water reduction and cost savings calculations.

A site layout for the Coast Carson Facility is provided as Figure 2 in Appendix A.

3.3 PROPOSED CONSERVATION TECHNOLOGY AT COAST GARDENA FACILITY

Based on a review of the contaminant loading and the volume of water used at the Gardena facility, Coast is proposing to install a DI water ion exchange recycling system to provide DI water to the potable water rinse tanks. A total of 9 potable water rinse tanks (Tanks 4, 6, 8, 10, 14, 17, 19, 21 and 23) will be converted to use DI water. The tanks will be connected to the DI water ion exchange recycling system, which will purify the spent DI rinse water and recycle it back to the tanks. Each tank will be equipped with a flow restrictor to control the flow of recycled DI water and a water level indicator to ensure the tanks not to overflow.

The proposed DI water ion exchange recycling system will operate at approximately 20 gpm. The system shall consist of a feed pump, duplex activated carbon filters, duplex bag filters, duplex cation and anion ion exchange resin vessels, re-pressurization pump, ultraviolet lamp and controls. The system will be capable of removing particulates, oils, dissolved minerals and dissolved metal contaminants from the spent DI rinse water. Hydrochloric acid will be used for on-site regeneration of the cation resin; sodium hydroxide will be used for regeneration of the anion resin. Standard 55-gallon drums of regeneration chemicals will be stored on-site and will be drawn into the system by a regulated control valve. Undesirable trace metals will be removed from the ion exchange media for additional treatment in the existing wastewater treatment system prior to disposal to the industrial sewer. The DI water ion exchange recycling system is expected to achieve a 90% reduction in potable water consumption, eliminate the use of the contracted DI supply service and reduce the existing continuous wastewater treatment system to batch treatment.

In addition to the DI water ion exchange recycling system, an existing potable water rinse tank (Tank No. 19) will be retrofitted into a DI water sprayer tank. As with the Carson facility, the tank will be fitted with a series of spray nozzles inside the tank that operate on a manual-actuated timer. Workpieces will be transferred to the DI sprayer tank after each chemical process prior to dipping into the potable water rinse tanks to minimize chemical dragout.

A site layout for the Coast Gardena Facility is provided as Figure 3 in Appendix A.

3.4 PROPOSED LOCATIONS OF MONITORING DEVICES

After the proposed conductivity control system and DI water ion exchange recycling system are installed and in operation, verification of actual water savings is required to obtain the second payment of the Program incentive. Water meters will be installed to accurately record how much water is supplied to the plating lines. At the Carson facility, individual flowmeters shall be installed at each tank, or on a common header pipe. At the Gardena facility, a flowmeter shall be installed on the potable make-up water feed to the DI water ion exchange recycling system.

The new meters shall be non-resettable, totalized gallons reading type, and sized for the specific line diameter at each location. Each new meter should be installed with sufficient straight pipe lengths upstream, per the manufacturer's recommendations, to provide accurate readings.

3.5 PRELIMINARY DESIGN DRAWINGS AND VENDOR DATA

Preliminary design layouts that show the proposed locations of conductivity sensors at the Carson facility and the DI ion exchange water recycle system are provided as Figures 2 and 3, respectively in Appendix A. The systems are proposed by Water Innovations, Inc. Cut sheets describing the proposed system equipment and vendor quotation are provided in Appendix C. The total estimated capital cost of the equipment is approximately $113,600.

4.0 ESTIMATES ON WATER REDUCTION, COST SAVINGS AND PROGRAM FUNDING

4.1 ESTIMATED WATER REDUCTION

An analysis of the proposed conservation technologies at Coast was conducted to further refine the anticipated water reduction originally estimated in the Field Survey. As calculated in Appendix B, Coast used an average of 14.4 Mgal of potable water per year over the two-year period from November 2006 to November 2008. The breakdown of water usage at the Coast Carson and Garden facilities are as follows:

- Coast Carson Facility: 4.6 Mgal per year; and
- Coast Gardena Facility: 9.8 Mgal per year.

Installing the proposed conductivity control system at the Carson facility is estimated to reduce potable water consumption by approximately 40% to 60% (Cleinman, 1991. North Carolina, 1999). A volume reduction of 40% is selected conservatively for the purpose of this report. As discussed previously, Coast is planning to replace its existing co-current DI water supply system with an on-site DI ion exchange system. This will increase the water usage at the facility by approximately 5%. Therefore, the total reduction rate is estimated to be at 35%. As shown in Appendix D, the conductivity control system is estimated to save approximately 1.6 Mgal of potable water per year.

The DI water ion exchange recycling system is estimated to achieve close to a 100% recycle rate, or zero water discharge to the sewer system, since all spent water is sent to the system, filtered and recycled back to the rinse tanks as fresh DI water. However, to account for the wastes generated during the ion exchange resin regeneration process, an estimated reduction rate of 90% in water consumption is assumed in this report for the Gardena facility. Based on this assumption, the potable water savings is estimated to be approximately 8.84 Mgal per year.

The total estimated water reduction at Coast is approximately 10.4 Mgal per year, or 73% of the current potable water consumption rate.

4.2 ESTIMATED COST SAVINGS

After installation of the proposed conductivity control system at the Carson facility, the estimated annual cost savings is approximately $6,237 per year. This is based on an estimated annual total water savings of approximately 1.6 Mgal. The estimated annual savings are $5,323 in potable water supply costs, and approximately $914 in sewer disposal surcharges.

The total estimated cost savings at the Gardena facility is approximately $34,436 per year, based on an estimated annual total water savings of approximately 8.8 Mgal. The estimated annual savings are $29,391 in potable water supply costs, and approximately $5,045 in sewer disposal surcharges.

It should be noted that the water usage savings rate is based on the Golden State's 2009 Quantity Rates of $2.488 per hundred cubic feet of potable water. Quantity rates do not include various surcharges authorized by the California Public Utilities Commission. Savings on sewer disposal charges is based on the LACSD's 2007-2008 Wastewater Treatment Surcharge Statement. For this estimate, surcharges for Chemical Oxygen Demand, Suspended Solids, and Average Peak Flow Rate are assumed to be constant and are omitted from the total estimated wastewater treatment surcharge cost savings.

The overall potential cost savings for Coast is approximately $40,673 per operational year. Detailed calculations are shown in Appendix D.

4.3 ESTIMATED GAS AND ELECTRICITY SAVINGS

Installation of the proposed conductivity control system and DI water ion exchange recycling system is not expected to result in additional gas and electricity savings.

Both systems do not consume any natural gas. The conductivity control system will reduce the wastewater volume that is treated and may, therefore, slightly reduce chemical usage and pumping costs. However, the DI water ion exchange recycling system may increase the electrical usage at the facility due to installation of additional electrical equipment, such as pumps and controls. Therefore, it is assumed that there will be no overall change in the gas and electricity costs at the Coast facilities.

4.4 ESTIMATED PROGRAM FUNDING

Based on retrofit and water savings monitored for a one-year period, qualified participants in the Program may receive the following three payments:

- Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period;
- Reimbursement of the equipment cost of up to $5,000 maximum based on the $3.00 per 1,000 gallons saving rate over a one-year period; and
- Reimbursement of the equipment installation of up to $5,000 maximum based on actual installation costs.

The estimated Program funding for Coast is shown in Appendix E. Based on a water savings of approximately 10.44 million gallons per year after installation and monitoring, the estimated incentive payment would be $31,309 based on a reimbursement rate of $3.00 per 1,000 gallons saved. Reimbursement of the equipment cost would be $5,000, since the saving rate exceeds the limit of $5,000. The reimbursement of the equipment installation is estimated to be $5,000, since the two separate systems will require separate installation at its individual facilities.

Thus, the net potential Program incentive for Coast is approximately $41,309.

4.5 ESTIMATED PAYBACK PERIOD

Based on the project capital cost, operation and maintenance cost, the estimated cost savings in water and wastewater discharge and the Program funding, a discounted cash flow analysis is prepared to estimate the payback period for Coast, as shown in Appendix F. Several assumptions are made to achieve a more accurate estimate:

- No depreciation or salvage value was defined.
- Annual inflation rate is assumed to be 2% and discount rate is assumed to be at 5% and both are assumed to be constant throughout the life of the investment.

Under these assumptions, the payback period is calculated to be four years, as shown in Appendix F. However, if the Program incentive is not included in the calculations, the payback period is estimated to be six years.

5.0 POTENTIAL IMPACTS

5.1 IMPACT OF PRODUCTION CHANGES ON ESTIMATED WATER SAVINGS

The nature of Coast's business is quick turnaround production of various sized plating jobs that contain pieces that range widely in shape and size. Although the size of each workpiece varied, a majority of Coast's anodizing and plating jobs involved small workpieces with relatively large surface areas for rinsing and long rinse water flow periods. The fluctuation in production change may affect the volume of water used at the facilities. Therefore, URS proposed to select an appropriate benchmark to assess future water savings – the amount of water used per workpiece at current operation.

According to the plating and anodizing jobs data provided to URS, Coast completed 6,124 jobs and plated 230,210 pieces over a three-month period in 2009, while using an estimated 3.6 million gallons of potable water in its rinse tanks. The average amount of water consumed per piece was approximately 16 gallons and will be used as the baseline for current potable water usage in the plating and anodizing lines.

After the installation of the new equipment and a year of monitoring, the number of pieces anodized and plated will be tabulated from Coast's billing records and compared to the water usage recorded by the new water meters that are proposed in this report. The water savings will be calculated as the difference between the total gallons of potable water recorded and the product of the number of pieces processed multiplied by 16 gallons. This will adjust the water savings accordingly if there is a surge or decline in the production.

5.2 IMPACT OF PROCESS CHANGE ON SEWER DISCHARGE

Coast discharges industrial wastewater through a Permit with the LACSD. A copy of their current LACSD effluent limits is not provided, due to a confidentiality agreement between URS and Coast.

All wastewater will continue to be treated by the existing wastewater treatment system prior to disposal to the industrial sewer. At the Carson facility, the proposed conductivity control system will potentially reduce the current volume of water discharged to the industrial sewer by approximately 40%. This will increase the concentration of wastewater stored in the equalization tank that feeds the treatment system. The treatment plant should operate more efficiently with more concentrated wastewater, especially in improved flocculation and sludge development. However, the ultimate mass loading to the wastewater treatment plant should remain unchanged.

At the Gardena facility, the amount of wastewater requiring treatment should be significantly lower, since most of the spent rinse water will be recycled back to the process line. Only the wastewater generated during regeneration of the ion exchange resin at the DI water ion exchange recycling system will be transferred to the wastewater treatment system. The regeneration of the cation ion exchange resin will be transferred to a batch treatment system where the majority of soluble metals will be removed using a chemical precipitation process. The regeneration of the anion ion exchange resin will be sent to final neutralization prior to being discharged the sewer outfall. The quality of discharge wastewater in terms of

total dissolved solids (TDS) concentrations is potentially expected to improve, despite the relatively small amounts of acid and caustic solutions used to regeneration the ion exchange resins. The operation of the DI water ion exchange recycling system is not expected to cause a potential violation in meeting the existing LACSD effluent discharge limits.

5.3 Impact of Process Change on Product Quality

Plating rinse tank controls based on conductivity measurement are a standard practice in the metal plating industry and can be implemented at the Coast Carson facility without lowering product quality. The implementation of the proposed conductivity control system should be conducted on a tank-by-tank basis and care should be taken so that the conductivity sensor operation is not impacted by air bubbles, sludge formation, corrosion, etc.

The installation and operation of a DI water ion exchange recycling system should improve Coast's quality in plating and anodizing by replacing the potable water rinse tanks with high-quality deionized water. The DI water ion exchange recycling system is designed to handle variations in inlet water quality from the variety of plating line rinse tanks that will be re-circulated back to the system. System water quality will be carefully monitored with alarms and controls to limit excursions.

6.0 PROGRAM APPLICATION AND IMPLEMENTATION

Based on a review of the proposed modifications discussed in Section 3.0, Coast is considered as a viable candidate to apply for incentive funding under this Program.

The next step is for Coast to contact West Basin to initiate their application into the Program. The responsible Program contact at West Basin is Elise Goldman, Conservation Program Specialist (eliseg@westbasin.org).

Following acceptance and inclusion to the Program, Coast will receive 50% of the Program incentive calculated in this report. Coast can utilize the funding to proceed to install the equipment and meters, and notify West Basin when the system is fully operational. A one-year monitoring period will then begin. Coast will collect flow data on a monthly basis. Upon confirmation of the anticipated water savings, Coast may receive up to the remaining balance of the Program incentive as justified by the collected flow data.

7.0 ADDITIONAL UTILITY INCENTIVE PROGRAMS

In addition to the Program under West Basin, other utility incentive programs are also available for industrial customers.

The Southern California Gas Company and Southern California Edison (SCE) are offering potential cash incentives to qualifying industrial users for reduction in gas and electricity usage. The South Bay Environmental Services Center (SBESC) serves as a regional clearing house for information about programs offered by the Southern California Gas Company and Southern California Edison.

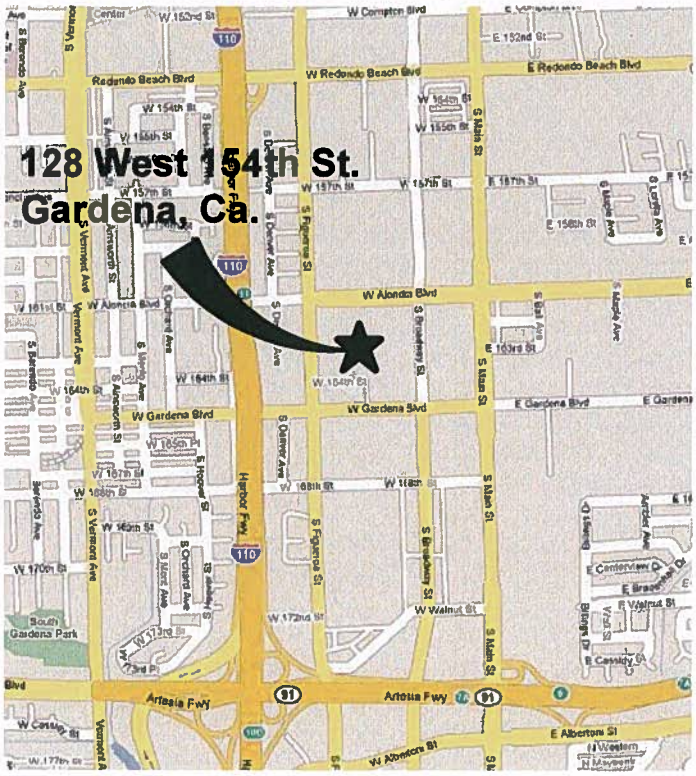
The MET's Save Water, Save-A-Buck Program also provides rebates to industrial customers for commonly used plumbing fixtures, such as toilets and urinals.

For more information on these associated programs, please contact the following:

Southern California Edison (www.sbesc.com)	(310) 271-7222
Save Water/Save-A-Buck Program (www.mwdsaveabuck.com)	(310) 660-6253

APPENDIX A

FIGURES AND SITE LAYOUTS



Gardena Facility

Carson Facility

Coast Platting
128 West 154th Street
Gardena, Ca. 90248
and
417 West 164th Street
Carson, Ca. 90248

Reference: Google Map

Coast Plating Equipment Survey Report

URS

SITE VICINITY MAP

Proj. No.: 29880043		Date: March 2007
Project: West Basin Municipal Water District Recirc & Save Program		Customer: Coast Plating
Drawn by: AC	Checked by: SK	Figure: 1

PARTS ACCESS FROM CATWALK

PARTS ACCESS FROM CATWALK

TANK NO. A-1
ALKALINE CLEAN
DIM.: 27'L X 3'W X 8.5'D
VOLUME: 4,950 GAL
NOTE: OAKITE 61B

TANK NO. A-2
TAP WATER RINSE
DIM.: 27'L X 3'W X 8.5'D
VOLUME: 4,500 GAL
FLOW RATE: 5 GPM
NOTE: 24 HR CONTINUOUS FLOW
CONDUCTIVITY CONTROLLER
SOLENOID VALVE

TANK NO. A-3
ALKALINE ETCH
DIM.: 27'L X 3'W X 8.5'D
VOLUME: 4,950 GAL
NOTE: OAKITE 61B

TANK NO. A-4
TAP WATER RINSE
DIM.: 27'L X 3'W X 8.5'D
VOLUME: 4,950 GAL
FLOW RATE: 5 GPM
NOTE: 24 HR CONTINUOUS FLOW
CONDUCTIVITY CONTROLLER
SOLENOID VALVE

TANK NO. A-5
DECONTAMINATION
DIM.: 27'L X 3'W X 8.5'D
VOLUME: 4,950 GAL
NOTE: NITRIC ACID

TANK NO. A-6
TAP WATER RINSE
DIM.: 27'L X 3'W X 8.5'D
VOLUME: 4,500 GAL
FLOW RATE: 5 GPM
NOTE: 24 HR CONTINUOUS FLOW
CONDUCTIVITY CONTROLLER
SOLENOID VALVE

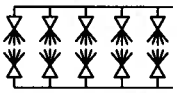
TANK NO. A-7
DEOXIDIZER 6/16
DIM.: 27'L X 3'W X 8.5'D
VOLUME: 4,950 GAL

TANK NO. A-8
TAP WATER RINSE
DIM.: 27'L X 4'W X 8.5'D
VOLUME: 6,000 GAL
FLOW RATE: 5 GPM
NOTE: 24 HR CONTINUOUS FLOW
CONDUCTIVITY CONTROLLER
SOLENOID VALVE

TANK NO. A-9
HARD ANODIZE
DIM.: 27'L X 5'W X 8.5'D
VOLUME: 8,250 GAL

TANK NO. A-10
CHROMIC ANODIZE
DIM.: 27'L X 5'W X 7.5'D
VOLUME: 7,500 GAL

TANK NO. A-11
PROPOSED DI WATER SPRAYER TANK
DIM.: 27'L X 3'W X 8.5'D
VOLUME: 4,950 GAL
FLOW RATE: 5 GPM
NOTE: CHROMIC DRAG OUT



TANK NO. A-12
DI WATER RINSE (OUT OF SERVICE)
DIM.: 27'L X 3'W X 8.5'D

TANK NO. A-13
NOT IN USE
DIM.: 27'L X 3'W X 8.5'D

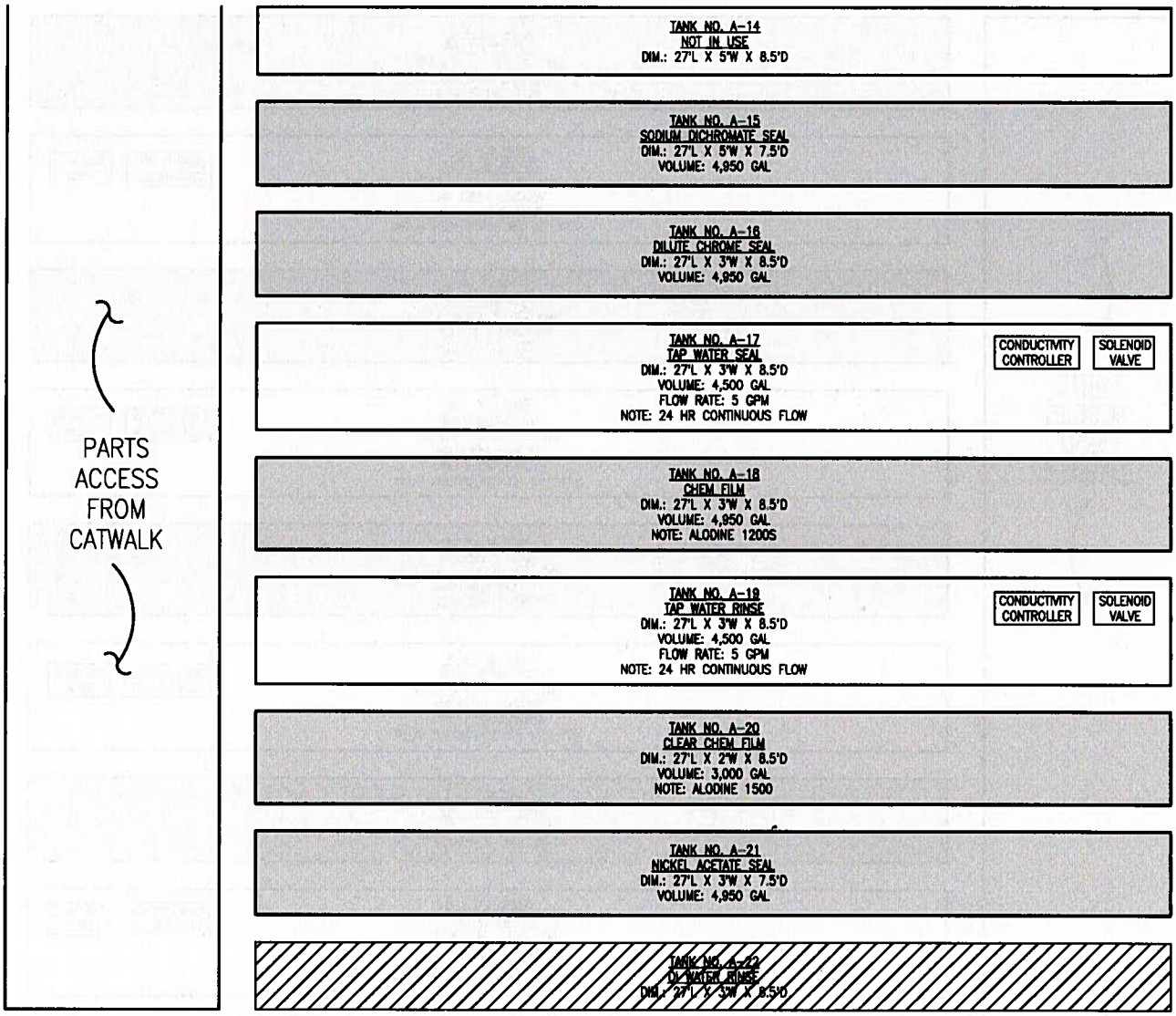
RECIRC & SAVE

Coast Plating
Equipment Survey Report

URS

FIGURE 2
PROPOSED TANKS LAYOUT
CARSON FACILITY - MAIN FLOOR

Proj. No.: 29880043	Date: AUGUST 2009
Project: West Basin Municipal Water District Recirc & Save Program	Customer: Coast Plating
Drawn by:	Checked by: Figure:



RECIRC & SAVE

Coast Plating
Equipment Survey Report

URS

FIGURE 2
PROPOSED TANKS LAYOUT
CARSON FACILITY - MAIN FLOOR

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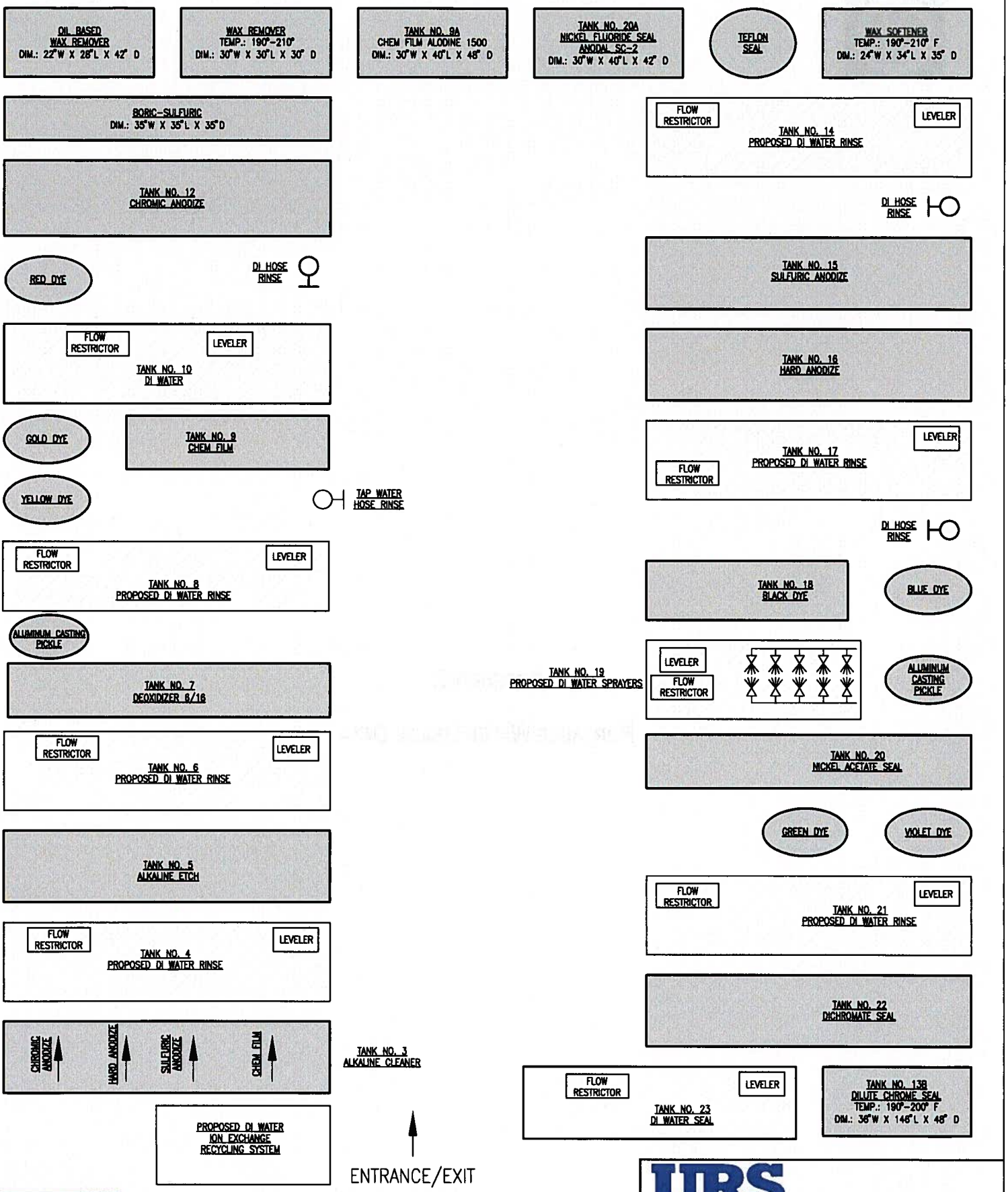
Project: West Basin Municipal Water District Recirc & Save Program	Customer: Coast Plating
Drawn by:	Checked by: Figure:



Coast Plating
Equipment Survey Report

URS

FIGURE 3
PROPOSED SITE LAYOUT
GARDENA FACILITY - MAIN FLOOR

Proj. No.: 29880043	Date: AUGUST 2009
Project: West Basin Municipal Water District Recirc & Save Program	Customer: Coast Plating
Drawn by: -- Checked by: --	Figure: -

APPENDIX B

PORTABLE WATER USAGE DATA

Appendix B
Coast Plating, Inc.
Recirc & $ave Program
Potable Water Usage Data

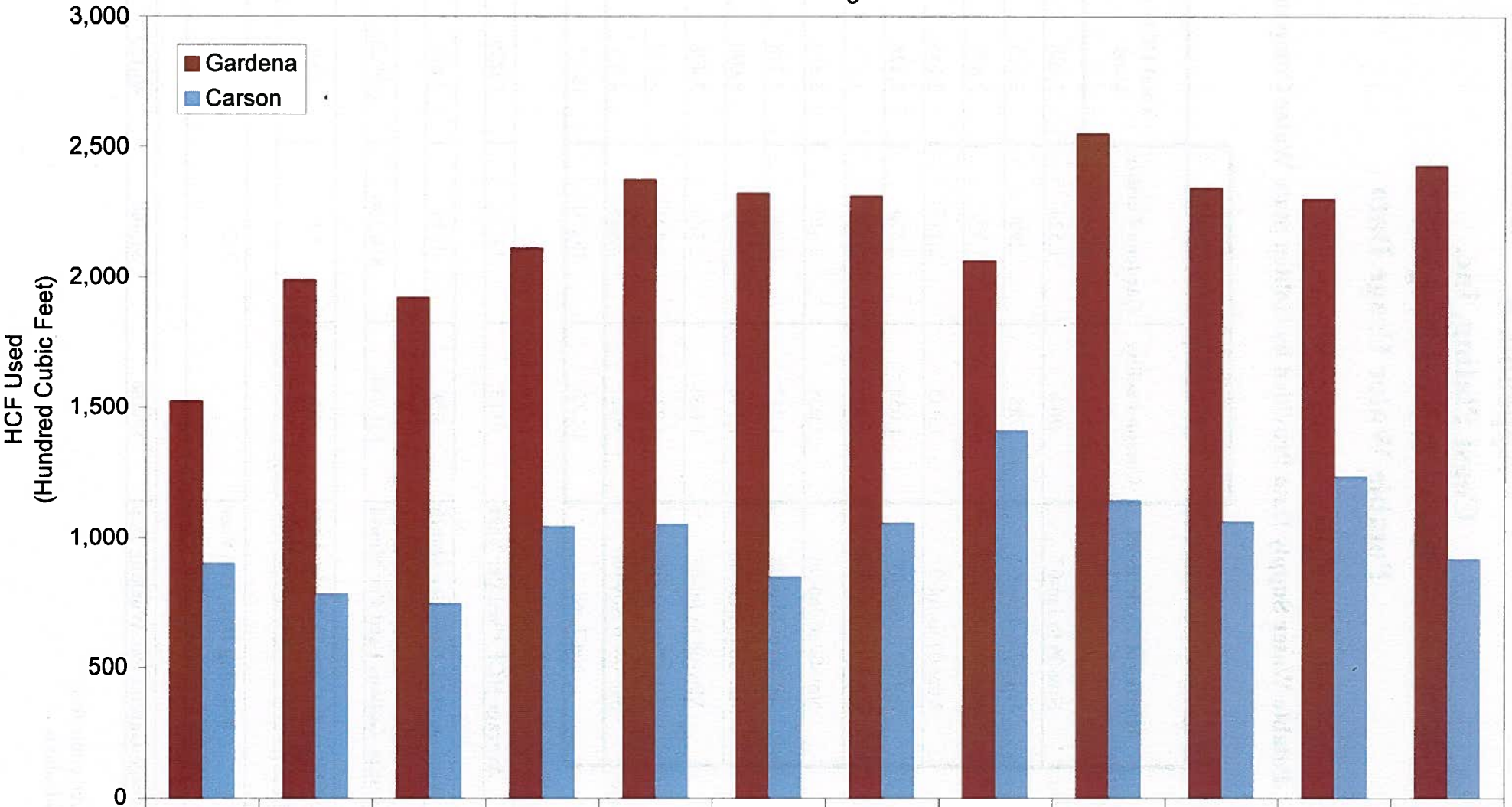
Potable Water Supply Data Provided by Golden State Water Company

		Total HCF Used Per Facility			
	Months of Cycle Read	**Carson Facility**	**Gardena Facility**	**Total HCF Used**	**Total Gallons Used**
Start of Read Cycle	Nov-06 to Jan-07	904	1,524	2,428	1,816,144
	Jan-07 to Mar-07	785	1,990	2,775	2,075,700
	Mar-07 to May-07	748	1,924	2,672	1,998,656
	May-07 to Jul-07	1,045	2,113	3,158	2,362,184
	Jul-07 to Sep-07	1,054	2,374	3,428	2,564,144
	Sep-07 to Nov-07	852	2,323	3,175	2,374,900
	Nov-07 to Jan-08	1,058	2,312	3,370	2,520,760
	Jan-08 to Mar-08	1,412	2,066	3,478	2,601,544
	Mar-08 to May-08	1,146	2,552	3,698	2,766,104
	May-08 to Jul-08	1,064	2,344	3,408	2,549,184
	Jul-08 to Sep-08	1,236	2,301	3,537	2,645,676
End of Read Cycle	Sep-08 to Nov-08	922	2,428	3,350	2,505,800
	Net Total	12,226	26,251	38,477	28,780,796

Average HCF Used Per Year	6113	13126	19239
Average HCF Used Per Month	509	1094	1,603
Average Gallons Used Per Month	381,044	818,156	1,199,200
Average Million Gallons Used Per Year (November 2006 - November 2008)	4.6	9.8	14.4
Working Days Per Year (Monday Through Saturday)		312	
Average Gallons Per Working Day	**14,656**	**31,468**	**46,123**

Notes: HCF = hundred cubic feet
1 HCF = 748 Gallons

Appendix B
Coast Plating, Inc.
Recirc & $ave Program
Potable Water Usage Data



	Nov-06 to Jan-07	Jan-07 to Mar-07	Mar-07 to May-07	May-07 to Jul-07	Jul-07 to Sep-07	Sep-07 to Nov-07	Nov-07 to Jan-08	Jan-08 to Mar-08	Mar-08 to May-08	May-08 to Jul-08	Jul-08 to Sep-08	Sep-08 to Nov-08
Gardena	1,524	1,990	1,924	2,113	2,374	2,323	2,312	2,066	2,552	2,344	2,301	2,428
Carson	904	785	748	1,045	1,054	852	1,058	1,412	1,146	1,064	1,236	922

Months of Cycle Read

APPENDIX C

PRELIMINARY ENGINEERING INFORMATION

CIX Ion Exchange Systems

Up to 20 gpm

RINSEWATER RECYCLING
FOR DEIONIZED WATER

WATERINNOVATIONS INC.

waterinnovations.net

WATERINNOVATIONS INC.

CIX

The cost-effective approach to rinse water recycling and environmental compliance

Industry Applications

- Electroplating
- Metal Finishing
- Printed Circuit Board
- Electronics Components
- Paint & Powder Coating
- Photographic Processing
- Parts Washing and Phosphating

Process Applications

- Copper Rinse Water Recycling
- Nickel Rinse Water Recycling
- Tin/Lead Rinse Water Recycling
- Chrome Rinse Water Recycling
- Electroless Rinse Recycling
- Selective Metal Scavenging

The **Water Innovations, Inc.** Complete Ion Exchange (CIX) Series is engineered as a comprehensive package for cost effective water purification. CIX Systems are primarily used as closed loop water recycling systems and for the removal of selected metals from waste streams. Small in size but big in performance, CIX Systems include many features that are usually found only on larger, more expensive systems.

BENEFITS

CIX Systems

- Recycle high purity deionized water
- Simplify compliance
- Offer low operating costs and low waste volumes
- Save money on water, sewer and treatment costs
- In a Duplex design for continuous operation
- Make closed loop operation possible
- Include touch-screen interface panel with data-logging
- Simplify installation-all components are skid-mounted, pre-piped and wired

Products That Meet Your Specifications

Water Innovations, Inc. CIX Systems are available in three sizes: 5,10 and 20 gallons per minute. Typical recycling applications have feed water with a TDS concentration of less than 500 mg/l. Standard systems produce pure, deionized water with less than 2 mg/l of TDS. High purity models produce wate with a resistivity of greater than 3 Meg-Ohm-cm. Feed water to typical metal scavenging systems has a metal concentration of less than 100 mg/l, but may have a high TDS background. These systems can remove regulated metals to below 1 mg/l or less.

System Extras / Options

Water Innovations, Inc. will work with you to determine other system needs, such as a treatment system or neutralization system for regenerations.

Choices

Different applications have different requirements. That's why we created three different configurations for Recycling and Metal Scavenging Systems.

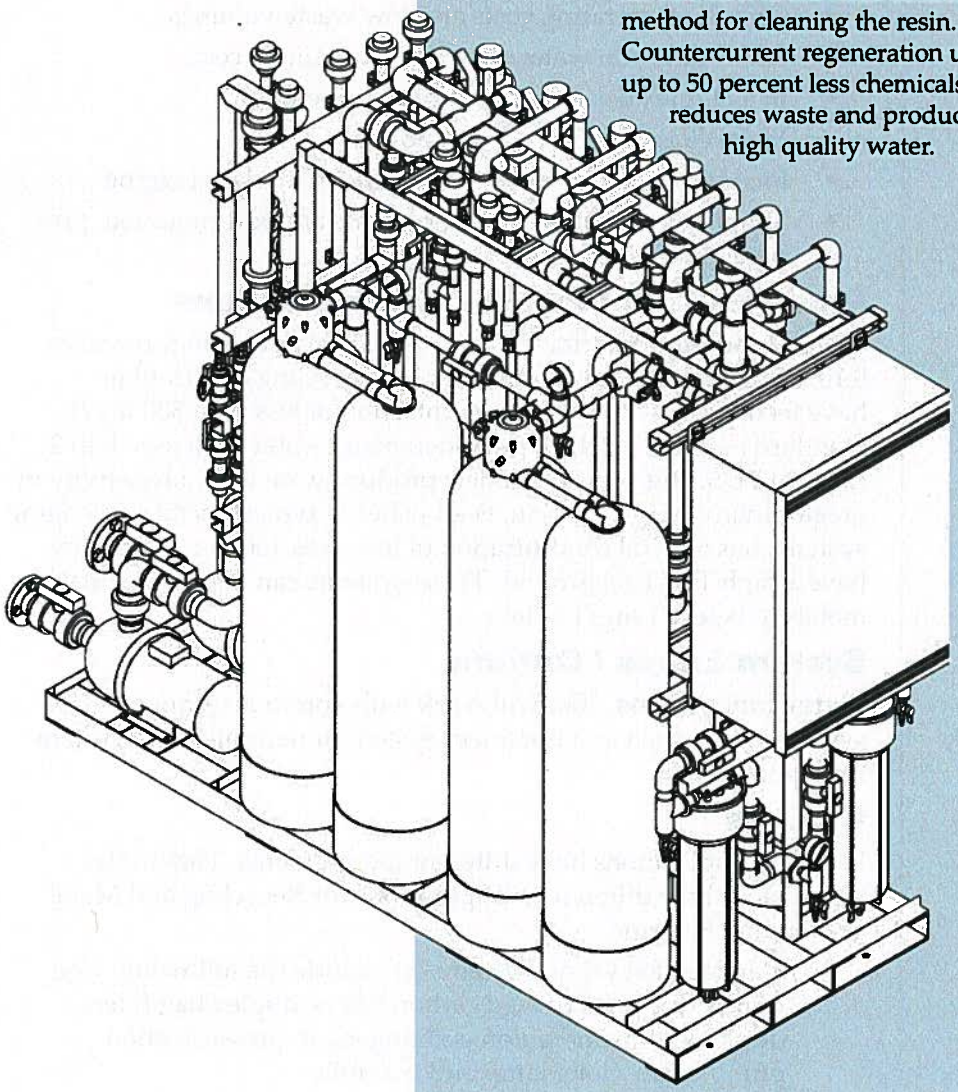
- Standard Recycling Systems (s) include the following: feed pump, duplex activated carbon filters, duplex bag filters, duplex cation and anion exchangers, re-pressurization pump, ultra-violet lamp and controls.
- High purity (hp) Recycling Models (for > 3Meg-Ohm-cm resistivity) also include a duplex cation polisher.
- Recycling Systems Models with Enhanced Pretreatment (ep) include a duplex automatic backwashing filter and can accept up to 50 milligrams per liter of suspended solids.
- Metal Scavenging Systems are available with or without activated carbon and/or a duplex automatic backwashing filter.

Complete Training and Field Support

Water Innovations, Inc. supplies start-up, training and field support on every system sold. Our systems are backed by responsive, factory-authorized service technicians.

Process and Parts Warranty

Water Innovations, Inc. offers both a process and parts warranty and our full support to guarantee that you get the water quality you expect.



Small Footprint

CIX System's compact design enables them to fit into small spaces.

Countercurrent Regeneration/Low Waste Volume

Introducing regenerant chemicals in a direction opposite to service flow is the most efficient method for cleaning the resin. Countercurrent regeneration uses up to 50 percent less chemicals, reduces waste and produces high quality water.

Independent Cation and Anion Regenerations

Cation and anion loads in process rinsewaters are rarely equal. CIX Systems regenerate each resin tank independently to optimize system capacity, and minimize chemical use and waste volume.

Touch-screen Display

All system variables and set points are displayed on the touch-screen. More than three days of system data are accessible on the screen.

Skid Mounted/ Preplumbed

Completely prepackaged, preplumbed and mounted on a stainless steel skid, the CIX minimizes space, is quickly installed and can be easily relocated.

Premium Quality Resins

Every system uses top quality, long life resins. Each resin is carefully selected by our engineers to match the specific demands of the application.

Duplex Design for Water Recycling Systems

Each system uses two tanks of both cation and anion resin. This allows one tank to be in service while the other is in regeneration or on stand by. The twin tank design provides continuous operation even during regeneration.

Double-Duplex Design for Metal Scavenging Systems

Two tanks are in service at all times,even during regenerations.

Modem

Allows for remote system monitoring and program upgrades.

Guarantee

We guarantee, in writing, the performance of every system we sell, assuring you of our commitment to reliable water treatment.

CIX Water Recycling Systems

Each CIX Recycling System includes the feed pump, duplex carbon filters, duplex bag filters, duplex cation and anion exchangers, re-pressurization pump, ultraviolet lamp and controls. High Purity models also include a duplex cation polisher.Tank sizes are selected separately. Enhanced Pre-treatment model also includes a duplex media pre-filter for waters high in suspended solids.

TYPICAL CIX RECYCLING SYSTEM SPECIFICATIONS

	CIX 500	CIX 1000	CIX 2000
FLOW (gpm)	5	10	20
EFFLUENT QUALITY			
Standard (uS)	<5	<5	<5
High Purity (M-Ohm-cm)	>3	>3	>3
CAPACITY (KGr)	25	45	90
REGENERATION MODE	COUNTER-CURRENT		
Acid Used (gal.)	2	3.5	3.5
Caustic Used (gal.)	1	1.8	1.8
WASTE VOLUME (gal.) WASTE VOLUME (gal.)	<100	<180	<180
SKID DIMENSIONS (in.) approximate	104" x 36" x 80"H		

WATERINNOVATIONS INC.

Additional Equipment Packages

Tank Assemblies	for feed water or deionized water storage
Backwater Filter	for suspended solids removal
Neutralizer	for automatic neutralization of treated water
Cation Polisher	for water purity greater than 3 megohm-cm
Evaporators	for reducing regeneration volumes
Solution Purification Systems	for on-line purification of bath chemistries
Batch Treatment Systems	for treatment of regeneration wastes

WaterInnovations • 251 N. Vinewood St. E • Escondido, CA 92029 • 760-746-7305

WATERINNOVATIONS INC.
www.waterinnovations.net

Model CIX 2000EP

SYSTEM COMPONENTS

Feed and DI Storage Tanks
- Tank Size ..... As Selected
- Tank Materials ..... HDPE

Feed Pump
- Number 2
- Horsepower 3
- Materials ..... 316 SS

Macrolite Prefilter
- Tank size ..... 12" x 52"
- Number of Tanks 2
- Materials of Construction ..... PE Lined Fiberglass
- Media Type ..... Macrolite 20/40 Mesh
- Media Volume/Tank ..... 1.5 Ft^3

Carbon Tanks
- Tank Size ..... 12" x 52"
- Number of Carbon Tanks 4
- Materials of Construction ..... PE Lined Fiberglass
- Media Type ..... Granular Activated Carbon
- Media Volume/Tank ..... 1.5 Ft^3

Bag Filter Housings
- Number of Housings 4
- Bag Micron Rating 5µ

Cation Exchanger
- Tank Size ..... 12" x 52"
- Number of Tanks 4
- Materials of Construction ..... PE Lined Fiberglass
- Media Type ..... MR Strong Acid Resin
- Media Volume/Tank ..... 2.5 Ft^3

Anion Exchanger
- Tank Size ..... 12" x 52"
- Number of Tanks 4
- Materials of Construction ..... PE Lined Fiberglass
- Media Type ..... Anion Resin
- Media Volume/Tank ..... 2.5 Ft^3

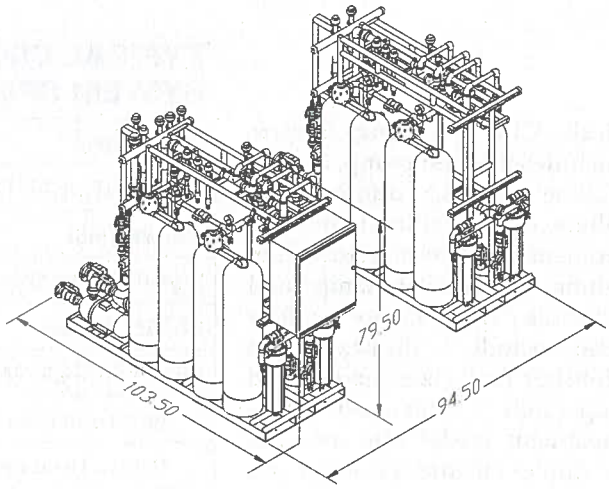
Repressurization Pump
- Number 1
- Horsepower 1.5

Ultraviolet Light ..... 24 Watt

Controls
- Inlet Conductivity Meter ..... Burkert
- Outlet Conductivity Meter ..... Burkert
- PLC ..... Allen-Bradley
- Touchscreen Interface ..... Automation-Direct
- Motor Starters ..... Sprecher & Shuh
- Enclosures ..... NEMA 12
- Acid & Caustic Level Sensors ..... One of Each
- Frame ..... 304 SS
- Piping ..... Schedule 80 PVC

UTILITIES AND SYSTEM CONNECTIONS

Electrical Supply Voltage 208-230/460
Full Load Amps 30/15
Compressed Air ..... <10 scfm
Make-up Water ..... 10 gpm
Carbon Backwash Inlet ..... 1"
Carbon Backwash Outlet ..... 1"
Inlet to Feed Pump ..... 1.5"
Return to Feed Pump ..... 1"
Acid Inlet ..... 1/2" Tube
Caustic Inlet ..... 1/2" Tube
Outlet to DI Storage Tank ..... 1"
Inlet to Repressurization Pump ..... 1.5"
From UV Light to Storage Tank ..... 1"
DI Water to Use ..... 1"
Cation Waste Outlet ..... 1"
Anion Waste Outlet ..... 1"



INLET WATER QUALITY

Temperature ..... 55°F-105°F
pH ..... 4 SU-10 SU
TSS, mg/L ..... <50
TDS, mg/L ..... <350

OPERATING SPECIFICATIONS

Flow Rate ..... ≤20 gpm
Effluent Water Quality ..... <5 µS
Flow Configuration ..... Alternating Duplex
Nominal Capacity per Regeneration (KGr) 45/Train

REGENERATION SPECIFICATIONS

Cation Exchanger
- Regeneration Type ..... Countercurrent
- Waste Flow Rate ..... 1-10 gpm
- Regeneration Time ..... 75 Minutes
- Acid Used/Regeneration (gallons) 3.5
- Waste Volume ..... 85 gal

Anion Exchanger
- Regeneration Type ..... Countercurrent
- Waste Flow Rate ..... 1-10 gpm
- Regeneration Time ..... 75 Minutes
- Caustic Used/Regeneration (gallons) 1.8
- Waste Volume ..... 96 gal

PHYSICAL DATA

Skid Dim (L X W X H) . 103.5" x 35.5" x 79.5" (each skid)
Approx. Shipping/Operating Wt (lbs.) 3500/3900

PART NUMBERS

208-230 Volts/3 Phase/60 Hertz S18331
460 Volts/3 Phase/60 Hertz S18332
380 Volts/3 Phase/50 Hertz S18333

Operating Profile
The Water Recycling System will remove ions from dilute, chemically compatible process water through carbon and particle filtration followed by a two-stage, separate bed ion exchange process. A water quality of less than 5 µS will be achieved when the equipment is operated within parameters as listed. There are two 10 gpm skids piped in parallel using a single main control panel to achieve a flow rate of 20 gpm. The deionizer on each skid shall provide a near continuous flow of deionized water through the use of a duplex (two-tank) configuration. This duplex configuration shall operate with 50% of the resin in reserve or in regeneration. System regenerations shall be initiated by measuring the feed water quality and flow rate, to accumulate the total loading on the system. Once the accumulated load surpasses the system's adjustable capacity set point, a regeneration is initiated. The cation exchangers and the anion exchangers have separate setpoints.

Feed Tank*
The feed tank is constructed of high-density polyethylene material. Four point level control is provided for automatic water make-up, high level alarm, and to prevent the pump from running dry. An automatic water make-up valve and the bulkhead fittings needed for connection to a PVC pipe are also included with the tank.

Feed Pumps
Each skid has a feed pump that has wetted parts made of 316 SS, Viton® and ceramic. It is rated at >18gpm @ >65 psi.

Automatic Backwashing Filter
Each Skid has two media filters piped in parallel. Each is hydraulically capable of > 10 gpm flow with a clean filter bed. Automatic valves, controlled by the system PLC are provided to backwash one tank at a time. Backwashes are initiated by the PLC based upon the accumulated flow since the previous backwash, by push button at the Operator Interface Panel, or by manually overriding the automatic valves. The flow set point is adjustable at the Operator Interface Panel.

Carbon Filter
Each skid has two carbon tanks piped in parallel. Each tank is hydraulically capable of >12 gpm flow rate. The tanks are constructed of fiberglass with a polyethylene liner and rated for service at less than or equal to 120° Fahrenheit and 125 psi. Each tank is individually valved for manual isolation and backwash of one tank while the other tank remains in service.

Bag Filter
Each skid has two bag filter housings piped in parallel, each rated for >10 gpm. The housings are constructed of reinforced polypropylene and are individually valved so that a filter bag in one housing can be changed while the other housing remains in service. Filter bags are made of polypropylene or other chemical resistant material, and have a nominal rating of 5 microns.

Cation Exchanger
The cation exchanger on each skid is a two-tank unit with a single control valve mechanism that is actuated by a signal from the PLC. The tanks are constructed of fiberglass with a polyethylene liner and rated for service at less than or equal to 120° Fahrenheit and 125 psi. One tank is in downflow service and the other tank is either in regeneration or standby mode. Regenerations are automatically initiated by the PLC, or can be manually initiated at the Operator Interface Panel or by a screwdriver at the top of the control valve. All regenerations are up-flow (countercurrent) for both chemical and rinse water.

Anion Exchanger
The anion exchanger on each skid is a two-tank unit with a single control valve mechanism that is actuated by a signal from the PLC. The tanks are constructed of fiberglass with a polyethylene liner and rated for service at less than or equal to 120° Fahrenheit and 125 psi. One tank is in downflow service and the other tank is either in regeneration or standby mode. Regenerations are automatically initiated by the PLC, or can be manually initiated at the Operator Interface Panel or by a screwdriver at the top of the control valve. All regenerations are up-flow (countercurrent) for both chemical and rinse water.

Deionization Media
The ion exchange system on each skid includes 5.0 cubic feet (2.5 cubic feet per tank) of high-capacity, strong acid, macroporous cation resins, with an exchange capacity of >20,000 grains per cubic foot when regenerated with 4 pounds of hydrochloric acid per cubic foot of resin. The cation resin will have a minimum of 10% cross-linking. The deionizer shall also include 5.0 cubic feet of high-capacity, weak and strong base anion resin, with an exchange capacity of >18,000 grains per cubic foot when regenerated with 6 pounds of sodium hydroxide per cubic foot of resin. The weak and strong base resin bead sizes are designed to keep the two layers separate. Inert plastic beads shall be used to pack the resin tanks, while still allowing the resin minimum space for expansion and contraction.

Chemical Draw System
The control valve will draw regeneration chemicals from a standard 55 gallon chemical drum. The system will provide adjustable valving, allowing the flow of chemical to be regulated from 0-10 pounds per cubic foot. The chemical draw assembly will be compatible with the corrosive chemicals being educted.

DI Water Storage Tank*
The DI storage tank is constructed of high-density polyethylene material. Two-point level control is provided for high level alarm and to prevent the pump from running dry. The bulkhead fittings needed for connection to a PVC pipe are also included with the tank.

Repressurization Pump
The repressurization pump has wetted parts made of 316 SS, Viton® and ceramic. It is rated at >30 gpm @ >45 psi.

Ultraviolet Lamp
A small flow of water from the DI water storage tanks is continuously recirculated through an ultraviolet light to retard biological growth.

System Skids
Each deionizer shall be skid mounted and prewired. Installation hook-ups shall be limited to plumbing and electrical connections. Skid construction shall be from 304 grade stainless steel. Finish shall include cleaning and sandblasting. Approximate skid dimensions are 103.5" long x 35.5" wide x 79.5" high (each skid). Skid design shall include feet for securing skid to the floor. Skid shall include lugs for electrical grounding and shall be properly grounded with all skid mounted electrical components.

Piping
Piping is primarily Schedule 80 PVC with both solvent welded and threaded connections. Chemical lines from the customer-supplied 55 gallon drums to the skid are polyethylene tubing.

System Controls
The system shall use a programmable logic controller (PLC) to control the start of resin regeneration. The PLC shall monitor inlet quality of the feed water and the flow rate being processed by the system. Using these factors, a loading is calculated, and regenerations are performed based on this inlet loading. Regenerations are initiated once the accumulative incoming load exceeds the preset capacity of the resin tank. During normal operation, the PLC will divert off-spec water by opening the system's purge valve and closing the process outlet valve. Water above the set point will be directed back to the feed tank. System operations and alarms can be set at the system's Operator Interface Panel. The OIP shall provide a touchscreen interface for the control of the system. Touchscreen shall provide access to the system's operating history for a minimum of 3 days. All system adjustments can be modified, through a password-protected section of the touchscreen. System controls include inlet and outlet conductivity or resistivity meters and a flow transmitter.

* Tank sizes are selected separately from the Recycling System size.

APPENDIX D

WATER REDUCTION AND COST SAVINGS ESTIMATES

Appendix D
Coast Plating, Inc.
Recirc & $ave Program
Estimated Water Reduction

	Average Annual Water Usage (Mgal/yr)	Average Water Consumption Reduction by Percentage (%)	Estimated Water Saving Volume (Mgal/yr)
Carson Facility	4.6	35%	1.6
Gardena Facility	9.8	90%	8.8
Total	**14.4**		**10.4**
		PERCENT CONSERVED	**73%**

Appendix D
Coast Plating, Inc.
Recirc & $ave Program
Estimated Annual Water Usage and Wastewater Discharge Cost Savings

	Average Annual Water Usage Before Installation of Conversation Technologies	Estimated Annual Water Saving Volume		Average Annual Water Usage After Installation of Conversation Technologies	Estimated Annual Water and Wastewater Savings		Net Potential Annual Water and Wastewater Savings
					Golden State Water Company Quantity Rates (1)	Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2)	
	(Mgal/yr)	(Mgal/yr)	(HCF/yr)	(Mgal/yr)	($2.488 Per HCF)	($571 per Mgal/yr)	
Carson Facility	4.6	1.60	2,140	3.0	$ 5,323	$ 914	$ 6,237
Gardena Facility	9.8	8.84	11,813	1.0	$ 29,391	$ 5,045	$ 34,436
Total	**14.4**	**10.44**	**13,953**	**4.0**	**$ 34,714**	**$ 5,959**	**$ 40,673**

1) Quantity Rates of $2.488 per HCF is effective January 1, 2009. Quantity Rates does not include various surcharges authorized by the California Public Utilities Commission.
2) 2007- 2008 LACSD Wastewater Treatment Surcharges:
a. Total Flow Volume Per Year (Mgal/yr) x $571.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $ 101.00
c. Total Suspended Solids Per Year (1000 of lbs) x $ 285.40
d. Average Peak Flow Rate (gal/min) x $ 75.80
For this estimate, surcharges b, c and d are assumed to be constant and are omitted from the Wastewater Treatment Surcharges calculation.

APPENDIX E

ESTIMATED PROGRAM FUNDING

Appendix E
Coast Plating, Inc.
Recirc & $ave Program
Estimated Program Funding

Potential Program Cash Incentives		
Total Annual Water Savings	**10.4**	
Water Reduction Incentive	Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period.	$ 31,309
Equipment Cost Incentive*	Reimbursement of the equipment cost of up to $5,000 maximum based on the $3.00 per 1,000 gallons saving rate over a one-year period.	$ 5,000
Installation Cost Incentive	Reimbursement of the equipment installation of up to $5,000 maximum based on actual installation costs.	$ 5,000
	Potential Program Cash Incentives	**$ 41,309**

* Minimum of 1.67 Mgal/yr reduction is necessary for the maximum $5,000 Equipment Incentive.

APPENDIX F

CASH FLOW ANALYSIS AND ESTIMATED PAYBACK PERIOD

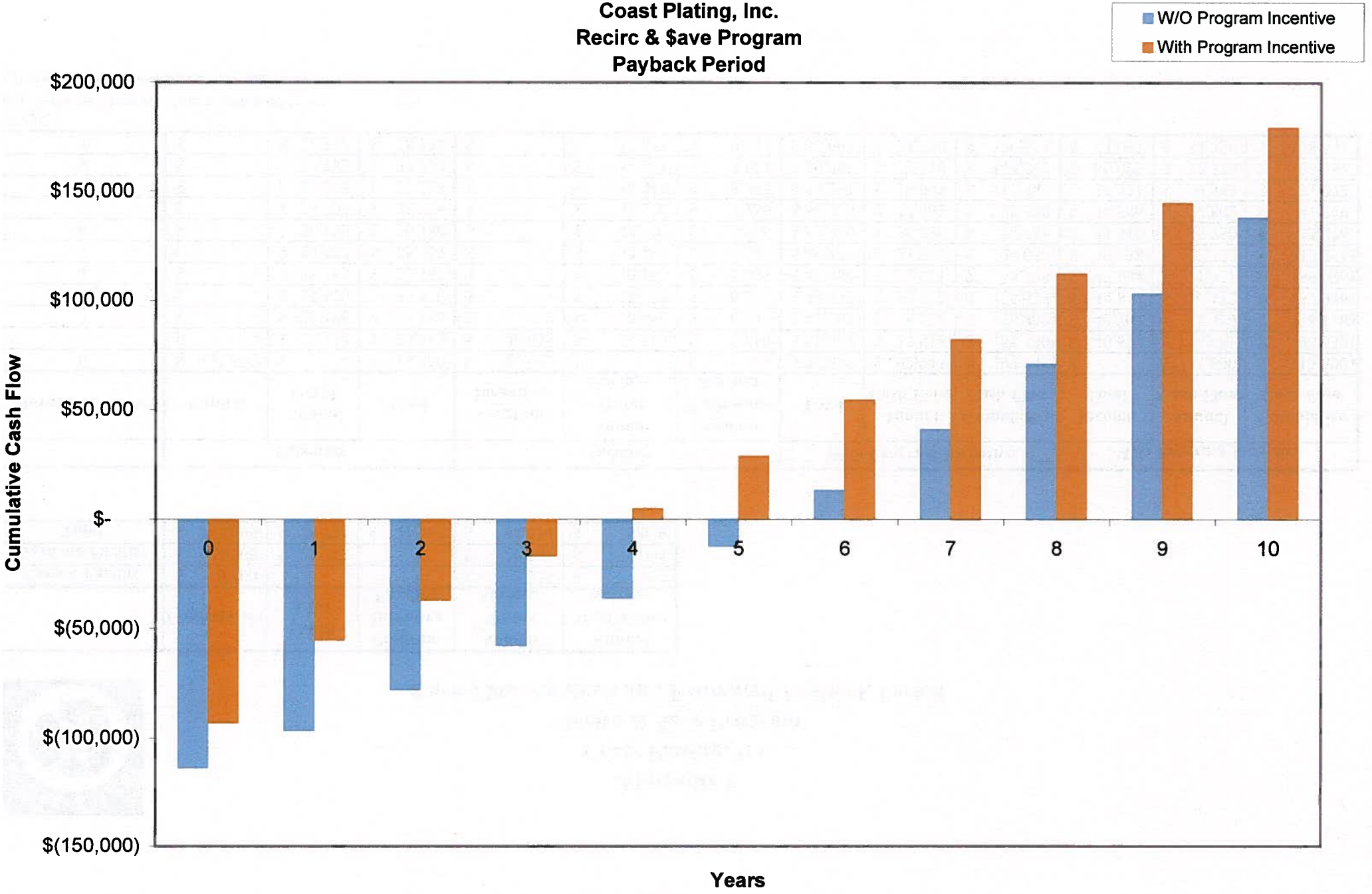
Appendix F
Coast Plating, Inc.
Recirc & $ave Program
Cash Flow Analysis and Estimated Payback Period

	Capital Cost	O&M Cost	Program Incentive Funding	Annual Water Savings	Annual Wastewater Savings
Carson Facility	$ 9,100			$ 5,323	$ 914
Gardena Facility	$ 104,500	$ 23,712		$ 29,391	$ 5,045
Total	**$ 113,600**	**$ 23,712**	**$ 41,309**	**$ 34,714**	**$ 5,959**

	Expenses			Income			With Program Incentive			W/O Program Incentive		
Duration (Years)	**Capital**	**Annual O&M**	**Total**	**Program Incentive**	**Annual Water Savings**	**Annual Wastewater Savings**	**Total**	**Annual Cash Flow**	**Cumulative Cash Flow**	**Income Total**	**Annual Cash Flow**	**Cumulative Cash Flow**
0	$ 113,600	$ -	$ 113,600	$ 20,655	$ -	$ -	$ 20,655	$ (92,945)	$ (92,945)	$ -	$(113,600)	$ (113,600)
1	$ -	$ 23,712	$ 23,712	$ 20,655	$ 34,714	$ 5,959	$ 61,328	$ 37,616	$ (55,330)	$ 40,673	$ 16,961	$ (96,639)
2	$ -	$ 24,186	$ 24,186	$ -	$ 36,450	$ 6,257	$ 42,707	$ 18,520	$ (36,809)	$ 42,707	$ 18,520	$ (78,118)
3	$ -	$ 24,670	$ 24,670	$ -	$ 38,272	$ 6,570	$ 44,842	$ 20,172	$ (16,637)	$ 44,842	$ 20,172	$ (57,946)
4	$ -	$ 25,163	$ 25,163	$ -	$ 40,186	$ 6,899	$ 47,084	$ 21,921	$ 5,284	$ 47,084	$ 21,921	$ (36,026)
5	$ -	$ 25,667	$ 25,667	$ -	$ 42,195	$ 7,243	$ 49,438	$ 23,772	$ 29,055	$ 49,438	$ 23,772	$ (12,254)
6	$ -	$ 26,180	$ 26,180	$ -	$ 44,305	$ 7,606	$ 51,910	$ 25,730	$ 54,786	$ 51,910	$ 25,730	**$ 13,476**
7	$ -	$ 26,704	$ 26,704	$ -	$ 46,520	$ 7,986	$ 54,506	$ 27,802	$ 82,588	$ 54,506	$ 27,802	$ 41,279
8	$ -	$ 27,238	$ 27,238	$ -	$ 48,846	$ 8,385	$ 57,231	$ 29,993	$ 112,581	$ 57,231	$ 29,993	$ 71,272
9	$ -	$ 27,782	$ 27,782	$ -	$ 51,288	$ 8,804	$ 60,093	$ 32,310	$ 144,892	$ 60,093	$ 32,310	$ 103,582
10	$ -	$ 28,338	$ 28,338	$ -	$ 53,853	$ 9,245	$ 63,097	$ 34,759	$ 179,651	$ 63,097	$ 34,759	$ 138,341

Notes:
(1) Nominal Discount Rate is assumed to be 5%
(2) Annual Inflation Rate is assumed to be 2%

Appendix F
Coast Plating, Inc.
Recirc & $ave Program
Payback Period



Coast Plating, Inc.
Recirc & $ave Program
Estimated Program Funding

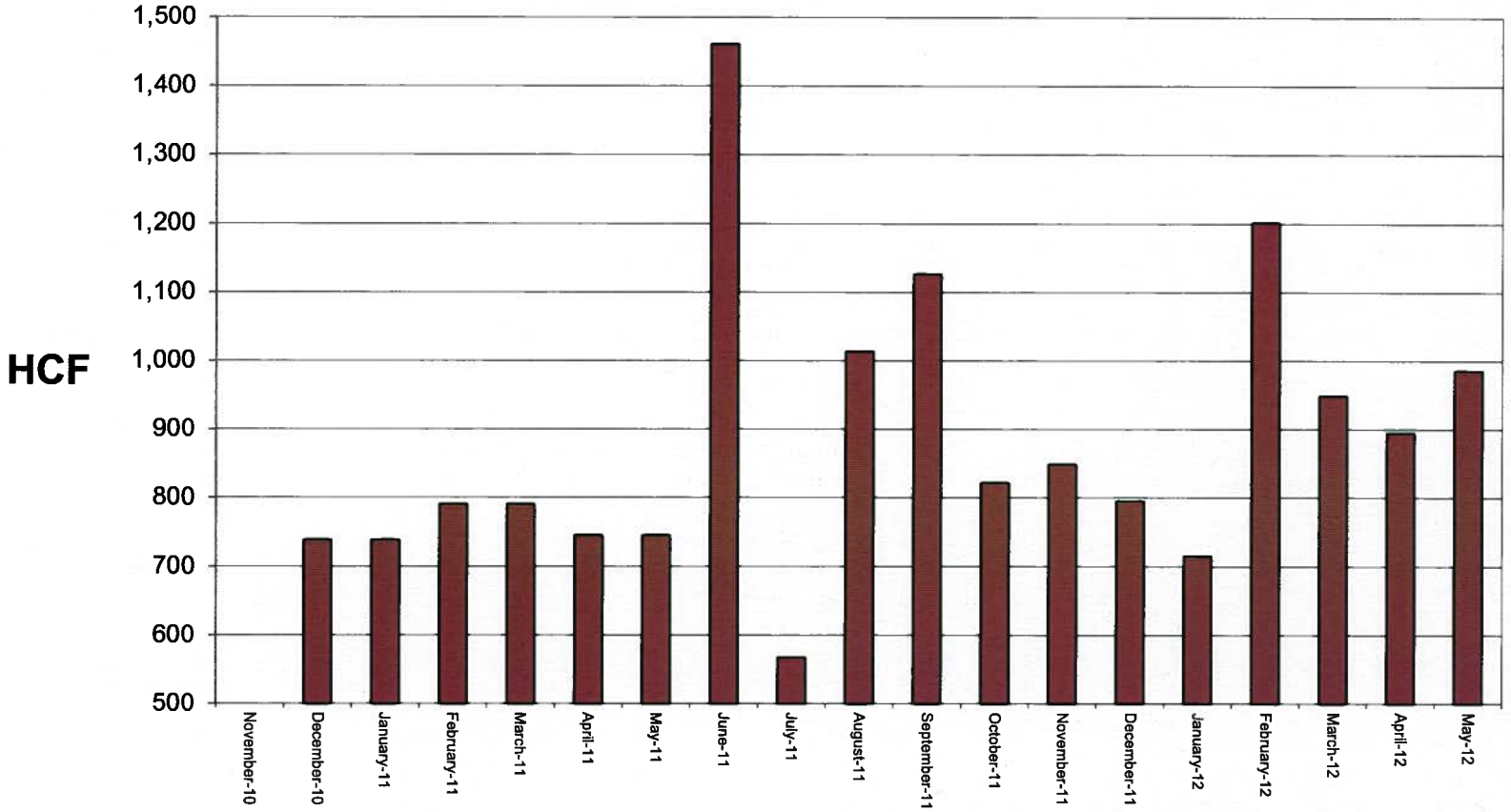
Potential Program Cash Incentives								
Current Annual Water Use (Million Gallons)	**Percent Water Savings**	**65**	**60**	**50**	**40**	**35**	**30**	**20**
6.3	**Total Annual Water Savings (Million Gallons)**	4.1	3.8	3.2	2.5	2.2	1.9	1.3
19.3	**Total Annual Water Savings (Acre-Feet)**	12.6	11.6	9.7	7.7	6.8	5.7	3.9
Water Reduction Incentive	Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period.	$12,285	$11,340	$9,450	$7,560	$6,615	$5,606	$3,780
Equipment Cost Incentive	Reimbursement of the equipment cost of up to $5,000 maximum based on the $3.00 per 1,000 gallons saving rate over a one-year period.	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	**$0**
Installation Cost Incentive	Reimbursement of the equipment installation of up to $5,000 maximum based on actual installation costs.	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Additional Golden State Water Funding Incentive		$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
Total Potential Program Cash Incentives		**$32,285**	**$31,340**	**$29,450**	**$27,560**	**$26,615**	**$25,606**	**$18,780**

NOTE: A minimum of 1.67 Million Gallons per Year of Water Savings is necessary to obtain the Equipment Cost Incentive.

Account 1403500585 Main Meter Reading

Read Date	Days	Reading	Difference HCF
5/24/2012	31	44,805.00	985
4/17/2012		43,820.00	894
3/23/2012	31	42,926.00	948
2/17/2012		41,978.00	1201
1/26/2012	32	40,777.00	715
12/17/2011		40,062.00	795
11/29/2011	39	39,267.00	848
10/17/2011		38,419.00	821
9/28/2011	41	37,598.00	1126
8/17/2011		36,472.00	1013
7/29/2011	32	35,459.00	567
6/17/2011		34,892.00	1461
5/13/2011	57	33,431.00	745
4/17/2011			745
3/18/2011	65	31,941.00	790
2/17/2011			790
1/13/2011	65	30,361.00	738
12/17/2010			738
11/10/2010	59	28,885.00	

Coast Plating
147 West 164th Street
Potable Water Use Data



November 2010 to May 2012 Read Cycle

Recirc & Save Program

COAST PLATING
417 West 164th Steet
Carson, CA 90248
Flow Meter Potable Water Supply Data
Prior to Installation of DI System (NOVEMBER TO JANUARY 2011)

	Day of Meter Read	Day No.	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	11/25/2010	1	27	35	8
	11/27/2010	2	35	46	11
	11/29/2010	3	46	58	12
	11/30/2010	4	58	72	14
	12/1/2010	5	72	98	26
	12/2/2010	6	98	127	29
	12/2/2010	7	127	149	22
	12/3/2010	8	149	172	23
	12/4/2010	9	172	180	8
	12/6/2010	10	180	201	21
	12/7/2010	11	201	225	24
	12/8/2010	12	225	241	16
	12/9/2010	13	241	249	8
	12/10/2010	14	249	271	22
	12/11/2010	15	271	275	4
	12/13/2010	16	275	298	23
	12/14/2010	17	298	318	20
	12/15/2010	18	318	338	20
	12/16/2010	19	338	359	21
	12/17/2010	20	359	381	22
	12/18/2010	21	381	390	9
	12/20/2010	22	390	415	25
	12/21/2010	23	415	441	26
	12/22/2010	24	441	467	26
	12/23/2010	25	467	501	34
	12/24/2010	26	501	516	15
	12/27/2010	27	516	544	28
	12/28/2010	28	544	561	17
	12/29/2010	29	561	596	35
	12/30/2010	30	596	631	35
	12/31/2010	31	631	642	11
	1/3/2011	32	642	676	34
	1/4/2011	33	676	700	24
	1/5/2011	34	700	731	31
	1/6/2011	35	731	764	33
	1/7/2011	36	764	783	19
	1/10/2011	37	783	806	23
	1/11/2011	38	806	824	18
	1/12/2011	39	824	841	17
	1/13/2011	40	841	862	21
	1/14/2011	41	862	871	9
	1/15/2011	42	871	886	15
	1/17/2011	43	886	909	23
	1/18/2011	44	909	934	25
	1/19/2011	45	934	950	16
	1/20/2011	46	950	974	24
	1/21/2011	47	974	981	7
	1/22/2011	48	981	998	17
End of Read Cycle	1/24/2011	49	998	1,020	22

Total Gallons Potable Water Used	993,000
Total Number of Days Meter Records	49
Average Gallons Used per Day	20,265
Total Working Days Per Year (Monday Through Saturday)	312
Average Gallons Used Per Year	6,322,776
Number of Parts Processed	7861
Gallons Used per Part Processed	126

Recirc & $ave Program

COAST PLATING
417 West 164th Steet
Carson, CA 90248

Flow Meter Potable Water Supply Data
After Installation of DI System (APRIL 2011)

	Day of Meter Read	Day No.	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	3/31/11	1	2,154	2,158	4
	4/1/11	2	2,158	2,166	8
	4/2/11	3	2,166	2,175	9
	4/3/11	4	2,175	2,184	9
	4/4/11	5	2,184	2,189	5
	4/5/11	6	2,189	2,208	19
	4/6/11	7	2,208	2,228	20
	4/7/11	8	2,228	2,250	22
	4/8/11	9	2,250	2,254	4
	4/9/11	10	2,254	2,266	12
	4/11/11	11	2,266	2,278	12
	4/12/11	12	2,278	2,292	14
	4/13/11	13	2,292	2,310	18
	4/14/11	14	2,310	2,326	16
	4/16/11	15	2,326	2,339	13
	4/18/11	16	2,339	2,352	13
	4/19/11	17	2,352	2,361	9
	4/20/11	18	2,361	2,381	20
	4/21/11	19	2,381	2,401	20
	4/22/11	20	2,401	2,420	19
	4/23/11	21	2,420	2,439	19
	4/25/11	22	2,439	2,456	17
	4/26/11	23	2,456	2,497	41
	4/27/11	24	2,497	2,502	5
	4/28/11	25	2,502	2,505	3
	4/29/11	26	2,505	2,517	12
	4/30/11	27	2,517	2,528	11
	5/1/11	28	2,528	2,548	20
End of Read Cycle	5/2/11	29	2,548	2,568	20

Total Gallons Potable Water Used	414,000
Total Number of Days Meter Records	29
Average Gallons Used per Day	14,276
Total Working Days Per Year (Monday Through Saturday)	312
Average Gallons Used Per Year	**4,454,069**
Estimated Gallons Saved Per Year	**1,868,707**
Percent Water Savings	**30**
Number of Parts Processed	4560
Est Gallons Used per Production Rate	576,018
Percent Savings per Production Rate	28

Recirc & $ave Program

COAST PLATING
417 West 164th Steet
Carson, CA 90248

Flow Meter Potable Water Supply Data
After Installation of DI System (MAY 2011)

	Day of Meter Read	Day No.	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	5/2/11	1	2,528	2,568	40
	5/3/11	2	2,568	2,606	38
	5/4/11	3	2,606	2,645	39
	5/5/11	4	2,645	2,677	32
	5/6/11	5	2,677	2,708	31
	5/7/11	6	2,708	2,728	20
	5/9/11	7	2,728	2,745	17
	5/10/11	8	2,745	2,778	33
	5/11/11	9	2,778	2,809	31
	5/12/11	10	2,809	2,843	34
	5/13/11	11	2,843	2,872	29
	5/14/11	12	2,872	2,889	17
	5/16/11	13	2,889	2,921	32
	5/17/11	14	2,921	2,940	19
	5/18/11	15	2,940	2,981	41
	5/19/11	16	2,981	3,011	30
	5/20/11	17	3,011	3,054	43
	5/21/11	18	3,054	3,083	29
	5/23/11	19	3,083	3,097	14
	5/24/11	20	3,097	3,131	34
	5/25/11	21	3,131	3,160	29
	5/26/11	22	3,160	3,193	33
	5/27/11	23	3,193	3,226	33
	5/31/11	24	3,226	3,266	40

Total Gallons Potable Water Used	738,000
Total Number of Days Meter Records	24
Average Gallons Used per Day	30,750
Total Working Days Per Year (Monday Through Saturday)	312
Average Gallons Used Per Year	**9,594,000**
Estimated Gallons Saved Per Year	**-3,271,224**
Percent Water Savings	**-52**
Number of Parts Processed	5073
Est Gallons Used per Production Rate	640,820
Percent Savings per Production Rate	-15

Recirc & $ave Program

COAST PLATING
417 West 164th Steet
Carson, CA 90248

Flow Meter Potable Water Supply Data
After Installation of DI System (JUNE 2011)

	Day of Meter Read	Day No.	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	6/1/2011	1	3,266	3,281	15
	6/2/2011	2	3,281	3,330	49
	6/3/2011	3	3,330	3,368	38
	6/4/2011	4			
	6/6/2011	5	3,368	3,412	44
	6/7/2011	6	3,412	3,451	39
	6/8/2011	7	3,451	3,491	40
	6/9/2011	8	3,491	3,534	43
	6/10/2011	9	3,534	3,564	30
	6/11/2011	10			
	6/13/2011	11	3,564	3,605	41
	6/14/2011	12	3,605	3,637	32
	6/15/2011	13	3,637	3,668	31
	6/16/2011	14	3,668	3,698	30
	6/17/2011	15	3,698	3,712	14
	6/18/2011	16			
	6/20/2011	17	3,712	3,735	23
	6/21/2011	18	3,735	3,757	22
	6/22/2011	19	3,757	3,778	21
	6/23/2011	20	3,778	3,800	22
	6/24/2011	21	3,800	3,817	17
	6/25/2011	22			
	6/27/2011	23	3,817	3,839	22
	6/28/2011	24	3,839	3,856	17
	6/29/2011	25	3,856	3,874	18
	6/30/2011	26	3,874	3,891	17

Total Gallons Potable Water Used	625,000
Total Number of Days Meter Records	26
Average Gallons Used per Day	24,038
Total Working Days Per Year (Monday Through Saturday)	312
Average Gallons Used Per Year	**7,500,000**
Estimated Gallons Saved Per Year	**-1,177,224**
Percent Water Savings	**-19**
Number of Parts Processed	4888
Est Gallons Used per Production Rate	617,451
Percent Savings per Production Rate	-1

Recirc & $ave Program

COAST PLATING
417 West 164th Steet
Carson, CA 90248

Flow Meter Potable Water Supply Data
After Installation of DI System (JULY 2011)

	Day of Meter Read	Day No.	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	7/1/2011	1	3,891	3,911	20
	7/2/2011	2			
	7/5/2011	3	3,911	3,941	30
	7/6/2011	4	3,941	3,964	23
	7/72011	5	3,964	3,988	24
	7/8/2011	6	3,988	4,009	21
	7/9/2011	7			
	7/11/2011	8	4,009	4,034	25
	7/12/2011	9	4,034	4,057	23
	7/13/2011	10	4,057	4,080	23
	7/14/2011	11	4,080	4,103	23
	7/15/2011	12	4,103	4,126	23
	7/16/2011	13			
	7/18/2011	14	4,126	4,146	20
	7/19/2011	15	4,146	4,190	44
	7/20/2011	16	4,190	4,221	31
	7/21/2011	17	4,221	4,248	27
	7/22/2011	18	4,248	4,276	28
	7/23/2011	19			
	7/25/2011	20	4,276	4,311	35
	7/26/2011	21	4,311	4,331	20
	7/27/2011	22	4,331	4,359	28
	7/28/2011	23	4,359	4,383	24
	7/29/2011	24	4,383	4,414	31
	7/30/2011	25			

Total Gallons Potable Water Used	523,000
Total Number of Days Meter Records	25
Average Gallons Used per Day	20,920
Total Working Days Per Year (Monday Through Saturday)	312
Average Gallons Used Per Year	**6,527,040**
Estimated Gallons Saved Per Year	**-204,264**
Percent Water Savings	**-3**
Number of Parts Processed	4637
Est Gallons Used per Production Rate	585,745
Percent Savings per Production Rate	11

Recirc & $ave Program

COAST PLATING
417 West 164th Steet
Carson, CA 90248

Flow Meter Potable Water Supply Data
After Installation of DI System (JANUARY 2012)

	Day of Meter Read	Day No.	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	1/3/2012	1	7365	7391	26
	1/4/2012	2	7,391	7,417	26
	1/5/2012	3	7,417	7,443	26
	1/6/2012	4	7,443	7,474	31
	1/9/2012	5	7,474	7,498	24
	1/10/2012	6	7,498	7,526	28
	1/11/2012	7	7,526	7,552	26
	1/12/2012	8	7,552	7,579	27
	1/13/2012	9	7,579	7,607	28
	1/16/2012	10	7,607	7,626	19
	1/17/2012	11	7,626	7,644	18
	1/18/2012	12	7,644	7,720	76
	1/19/2012	13	7,720	7,744	24
	1/20/2012	14	7,744	7,768	24
	1/23/2012	15	7,768	7,799	31
	1/24/2012	16	7,799	7,828	29
	1/25/2012	17	7,828	7,860	32
	1/26/2012	18	7,860	7,878	18
	1/27/2012	19	7,878	7,896	18
	1/30/2012	20	7,896	7,921	25

Total Gallons Potable Water Used	556,000	
Total Number of Days Meter Records	24	Includes 4 Saturdays
Average Gallons Used per Day	23,167	
Total Working Days Per Year (Monday Through Saturday)	312	
Average Gallons Used Per Year	**7,228,000**	
Estimated Gallons Saved Per Year	**-905,224**	
Percent Water Savings	**-14**	
Number of Parts Processed	4653	
Est Gallons Used per Production Rate	587,766	
Percent Savings per Production Rate	5	

Recirc & $ave Program

COAST PLATING
417 West 164th Steet
Carson, CA 90248

Flow Meter Potable Water Supply Data
After Installation of DI System (FEBRUARY 2012)

	Day of Meter Read	Day No.	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	2/2/2012	1	8044	8081	37
	2/3/2012	2	8,081	8,105	24
	2/6/2012	3	8,105	8,143	38
	2/7/2012	4	8,143	8,171	28
	2/8/2012	5	8,171	8,212	41
	2/9/2012	6	8,212	8,252	40
	2/10/2012	7	8,252	8,292	40
	2/13/2012	8	8,292	8,328	36
	2/14/2012	9	8,328	8,373	45
	2/15/2012	10	8,373	8,411	38
	2/16/2012	11	8,411	8,445	34
	2/17/2012	12	8,445	8,478	33
	2/20/2012	13	8,478	8,519	41
	2/21/2012	14	8,519	8,560	41
	2/22/2012	15	8,560	8,587	27
	2/23/2012	16	8,587	8,612	25
	2/24/2012	17	8,612	8,642	30
	2/27/2012	18	8,642	8,668	26
	2/28/2012	19	8,668	8,702	34
	2/29/2012	20	8,702	8,728	26

Total Gallons Potable Water Used	684,000	
Total Number of Days Meter Records	24	Includes 4 Saturdays
Average Gallons Used per Day	28,500	
Total Working Days Per Year (Monday Through Saturday)	312	
Average Gallons Used Per Year	**8,892,000**	
Estimated Gallons Saved Per Year	**-2,569,224**	
Percent Water Savings	**-41**	
Number of Parts Processed	4878	
Est Gallons Used per Production Rate	616,188	
Percent Savings per Production Rate	-11	

Recirc & $ave Program

COAST PLATING
417 West 164th Steet
Carson, CA 90248

Flow Meter Potable Water Supply Data
After Installation of DI System (MARCH 2012)

	Day of Meter Read	Day No.	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	3/1/2012	1	8728	8754	26
	3/2/2012	2	8,754	8,782	28
	3/5/2012	3	8,782	8,810	28
	3/6/2012	4	8,810	8,840	30
	3/7/2012	5	8,840	8,870	30
	3/8/2012	6	8,870	8,906	36
	3/9/2012	7	8,906	8,937	31
	3/12/2012	8	8,937	8,974	37
	3/13/2012	9	8,974	9,011	37
	3/14/2012	10	9,011	9,038	27
	3/15/2012	11	9,038	9,068	30
	3/16/2012	12	9,068	9,097	29
	3/19/2012	13	9,097	9,130	33
	3/20/2012	14	9,130	9,162	32
	3/21/2012	15	9,162	9,185	23
	3/22/2012	16	9,185	9,218	33
	3/23/2012	17	9,218	9,242	24
	3/26/2012	18	9,242	9,277	35
	3/27/2012	19	9,277	9,307	30
	3/28/2012	20	9,307	9,336	29
	3/29/2012	21	9,336	9,364	28

Total Gallons Potable Water Used	636,000	
Total Number of Days Meter Records	26	Includes 5 Saturdays
Average Gallons Used per Day	24,462	
Total Working Days Per Year (Monday Through Saturday)	312	
Average Gallons Used Per Year	**7,632,000**	
Estimated Gallons Saved Per Year	**-1,309,224**	
Percent Water Savings	**-21**	
Number of Parts Processed	5241	
Est Gallons Used per Production Rate	662,042	
Percent Savings per Production Rate	4	

Recirc & $ave Program

COAST PLATING
417 West 164th Steet
Carson, CA 90248

Flow Meter Potable Water Supply Data
After Installation of DI System (APRIL 2012)

	Day of Meter Read	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	4/3/2012	9,390	9,450	60
	4/4/2012	9,450	9,472	22
	4/6/2012	9,472	9,523	51
	4/10/2012	9,523	9,608	85
	4/11/2012	9,608	9,630	22
	4/12/2012	9,630	9,678	48
	4/13/2012	9,678	9,727	49
	4/19/2012	9,727	9,785	58
	4/23/2012	9,785	9,831	46
	4/24/2012	9,831	9,861	30
	4/25/2012	9,861	9,897	36
	4/26/2012	9,897	9,923	26
	4/27/2012	9,923	9,962	39
	4/30/2012	9,962	9,987	25

Total Gallons Potable Water Used	597,000	
Total Number of Days Meter Records	25	Includes 4 Saturdays
Average Gallons Used per Day	23,880	
Total Working Days Per Year (Monday Through Saturday)	312	
Average Gallons Used Per Year	**7,450,560**	
Estimated Gallons Saved Per Year	**-1,127,784**	
Percent Water Savings	**-18**	
Number of Parts Processed	4181	
Est Gallons Used per Production Rate	528,143	
Percent Savings per Production Rate	-13	

Recirc & $ave Program

COAST PLATING
417 West 164th Steet
Carson, CA 90248

Flow Meter Potable Water Supply Data
After Installation of DI System (MAY 2012)

	Day of Meter Read	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	5/1/2012	9,987	10,013	26
	5/2/2012	10,013	10,038	25
	5/3/2012	10,038	10,062	24
	5/4/2012	10,062	10,090	28
	5/5/2012	10,090	10,116	26
	5/8/2012	10,116	10,151	35
	5/9/2012	10,151	10,175	24
	5/10/2012	10,175	10,189	14
	5/11/2012	10,189	10,208	19
	5/12/2012	10,208	10,230	22
	5/14/2012	10,230	10,242	12
	5/15/2012	10,242	10,259	17
	5/16/2012	10,259	10,280	21
	5/17/2012	10,280	10,300	20
	5/22/2012	10,300	10,392	92
	5/23/2012	10,392	10,482	90
	5/24/2012	10,482	10,496	14
	5/25/2012	10,496	10,506	10
	5/26/2012	10,506	10,533	27
	5/29/2012	10,533	10,544	11
	5/30/2012	10,544	10,563	19
	5/31/2012	10,563	10,587	24

Total Gallons Potable Water Used	313,000	
Total Number of Days Meter Records	27	Includes 4 Saturdays
Average Gallons Used per Day	11,593	
Total Working Days Per Year (Monday Through Saturday)	312	
Average Gallons Used Per Year	**3,616,889**	
Estimated Gallons Saved Per Year	**2,705,887**	
Percent Water Savings	**43**	
Number of Parts Processed	3968	
Est Gallons Used per Production Rate	501,237	
Percent Savings per Production Rate	38	

Elise Goldman

From:	Steven Ward <steven_ward@waterinnovations.net>
Sent:	Thursday, August 21, 2014 11:27 AM
To:	Elise Goldman
Cc:	jmerritt@coastplating.com
Subject:	Re: Coast Plating
Attachments:	1A_Coast Plating_Site Plan.pdf; 2A_Coast Plating_Equipment Layout.pdf; 3A_Coast Plating_System P&ID.pdf

Elise, sorry for the delay in getting back to you. Yes, Coast will be installing our HFX115d ion exchange system that will closed-loop recycle a 1/2-dozen rinses to which they'd otherwise be sending approximately 115 gpm of DI water that would be once used and discharged. If you're curious, see attached illustrations detailing the system.

6 rinses = 115 gallons per minute normally discharged

Kind regards,

Steven A. Ward MPH - Vice President - Water Innovations, Inc.

Phone: 760.271.6113
Email: steven_ward@waterinnovations.net
Website: http://waterinnovations.net
Address: 350 Engel St, Escondido, CA, 92029

On Fri, Jul 25, 2014 at 12:00 PM, Elise Goldman <eliseg@westbasin.org> wrote:
Hi Steve, I met with John Merritt last month and was pleasantly surprised to see they are expanding the system.

Would you have some time in the next couple of weeks to chat with me about how they are reconfiguring? I would like to include a synopsis in my final reports to both DWR and USBR.

Thanks very much!

Hope all is well.

Elise

Elise M. Goldman

Commercial, Industrial and Institutional

Water Efficiency Specialist

West Basin Municipal Water District

17140 S. Avalon Blvd, Suite 210

Carson, CA 90746

phone 310.660.6253

mobile 310.713.1339

fax 310. 217.2414

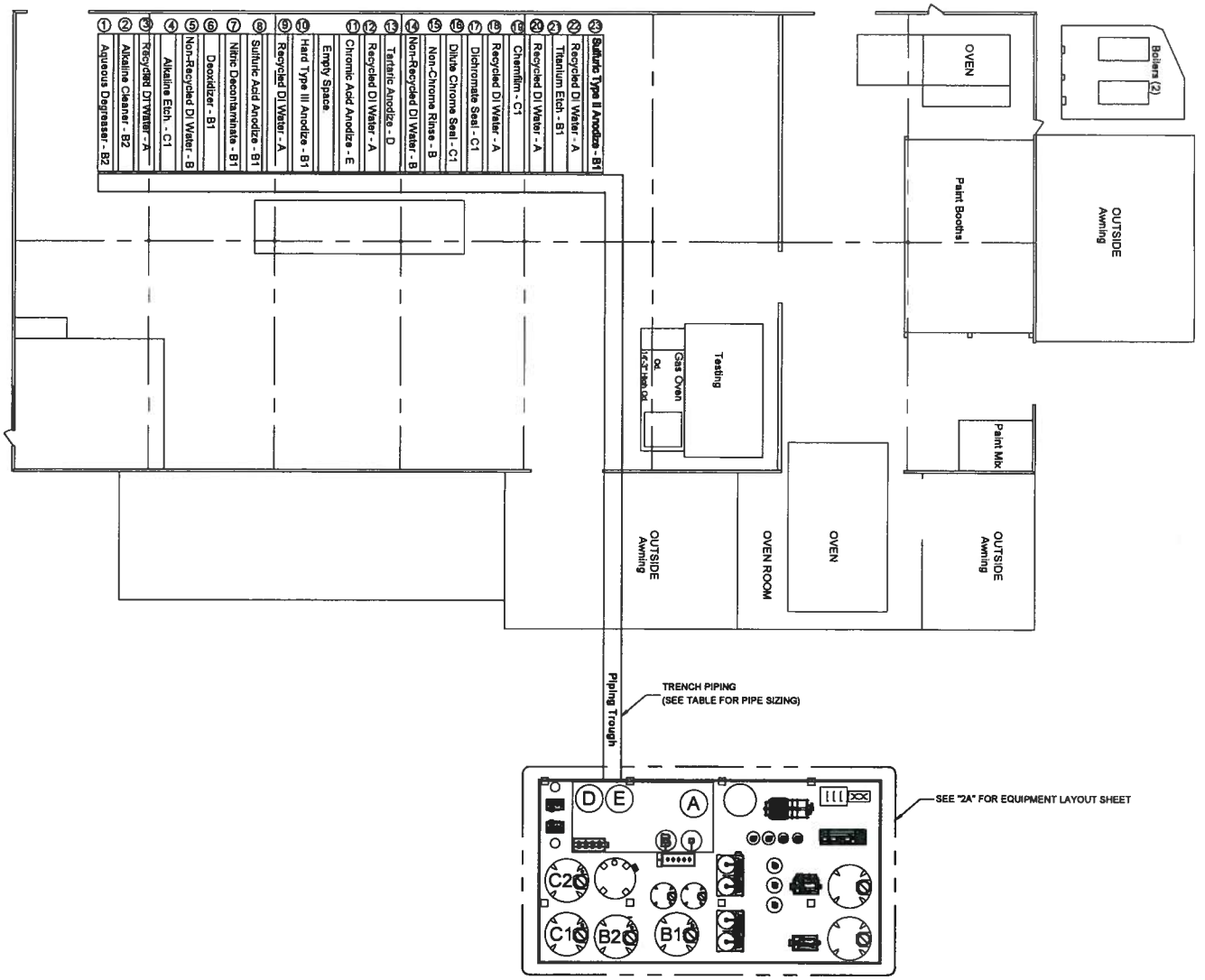
www.westbasin.org

WASTE SEGREGATION		PIPE SIZE
A	RECYCLED DI WATER	6" PVC
B	PH ADJUST DIRECT DISCHARGE	6" PVC
B1	PH ADJUST METERED DISCHARGE ACID	*
B2	PH ADJUST METERED DISCHARGE ALKALINE	*
C1	BATCH TREATMENT ACID	#
C2	BATCH TREATMENT ALKALINE	NA
D	TARTARIC ACID UNPURIFIED	1" PVC
E	CHROMIC ACID UNPURIFIED	1" PVC
F	TARTARIC ACID PURIFIED	1" PVC
G	CHROMIC ACID PURIFIED	1" PVC
H	PRE-TREATED WASTE WATER TO POTW	6" PVC

* ALTERNATIVELY MANUALLY PUMPED TO TANK WT-T1 OR WT-T2

\# MANUALLY PUMPED TO TANK BT-T1

POTABLE WATER DESIGNATIONS	
I	CITY WATER
J	REVERSE OSMOSIS PERMEATE
K	REVERSE OSMOSIS CONCENTRATE
L	DEIONIZED WATER



WATERINNOVATIONS INC
350 Engel Street Escondido, CA 92029
waterinnovations.net – 760.294.1888

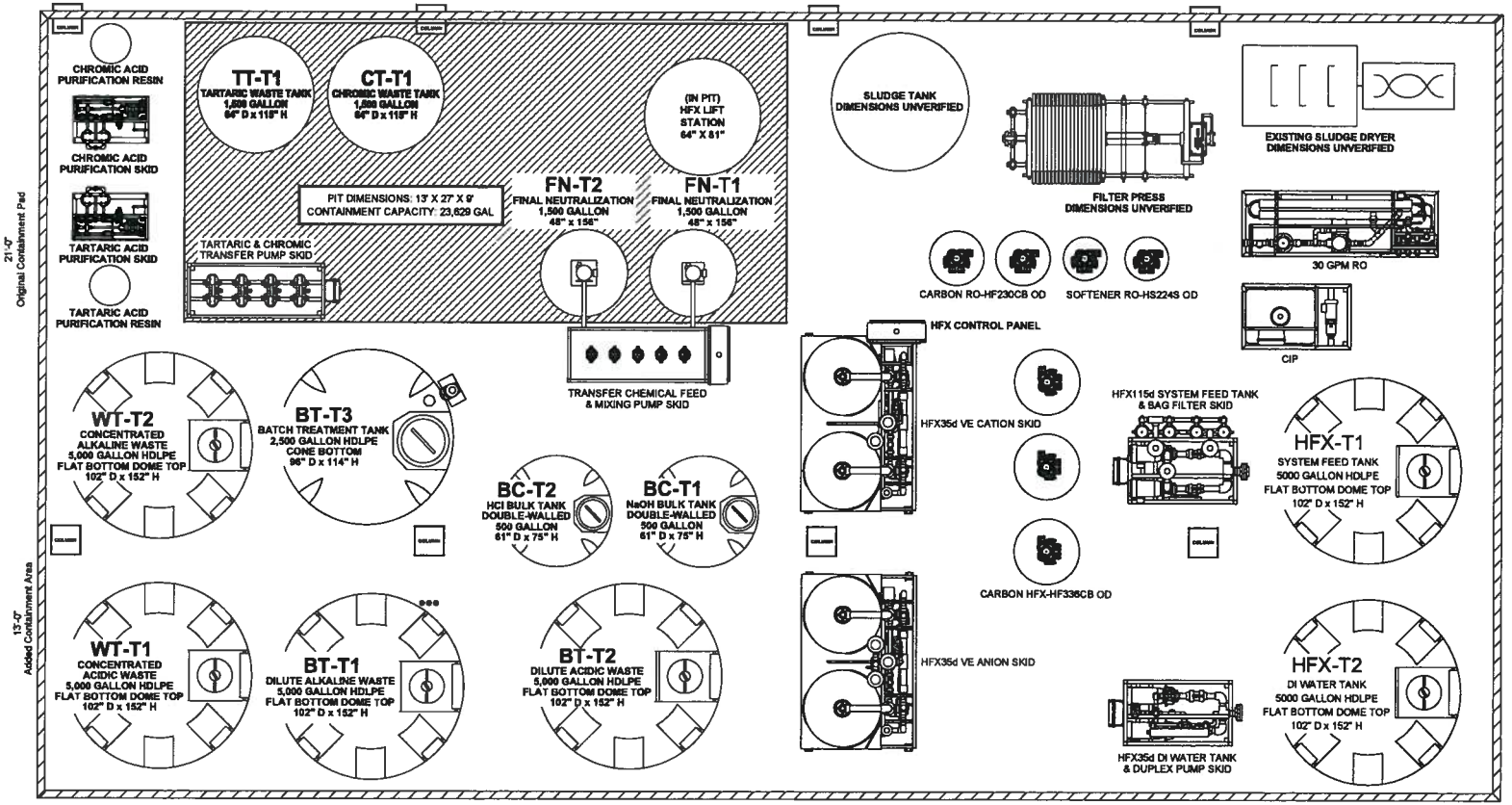
DRAWN BY : LD	DATE : 8/4/2014	
CHECKED BY : SW	DATE : 8/4/2014	
SCALE : 3/32" = 1' - 0"	SIZE : D	

PROJECT
VST-COAST PLATING
417 W 164th street
Gardena, Ca. 92048

SUBJECT
SITE PLAN

DWG# 1A

SHEET 1 OF 16



WATERINNOVATIONS inc
350 Engel Street Escondido, CA 92029
waterinnovations.net – 760.294.1988

DRAWN BY:	LD	DATE : 8/4/2014	
CHECKED BY:	SW	DATE : 8/4/2014	
SCALE:	3/8" = 1' - 0"	SIZE : D	

PROJECT
VST-COAST PLATING
417 W 164th street
Gardena, Ca. 92048

SUBJECT
EQUIPMENT LAYOUT

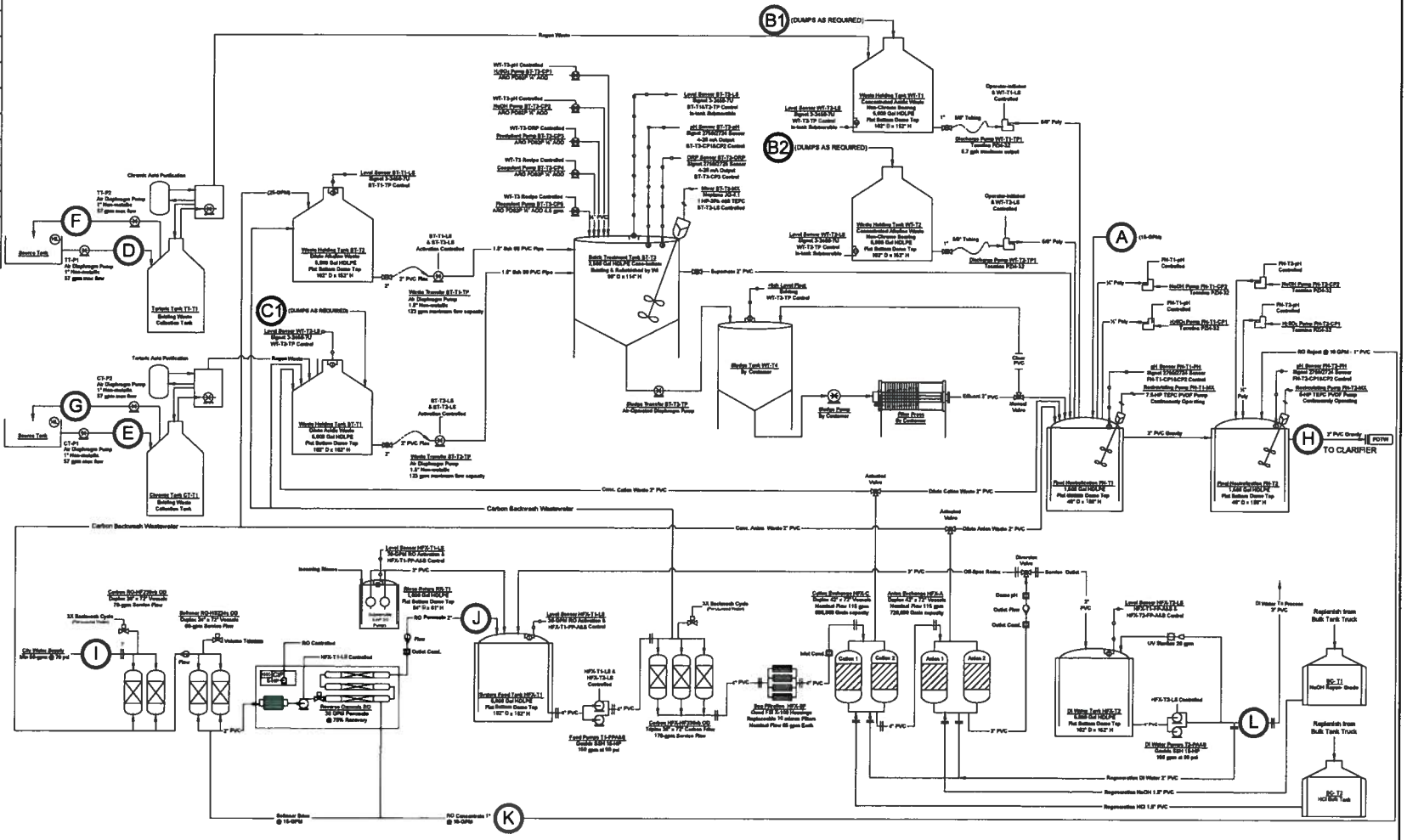
DWG# 2A

WASTE SEGREGATION		PIPE SIZE
A	RECYCLED DI WATER	6" PVC
B	PH ADJUST DIRECT DISCHARGE	6" PVC
B1	PH ADJUST METERED DISCHARGE ACID	*
B2	PH ADJUST METERED DISCHARGE ALKALINE	*
C1	BATCH TREATMENT ACID	#
C2	BATCH TREATMENT ALKALINE	NA
D	TARTARIC ACID UNPURIFIED	1" PVC
E	CHROMIC ACID UNPURIFIED	1" PVC
F	TARTARIC ACID PURIFIED	1" PVC
G	CHROMIC ACID PURIFIED	1" PVC
H	PRE-TREATED WASTE WATER TO POTW	6" PVC

* ALTERNATIVELY MANUALLY PUMPED TO TANK WT-T1 OR WT-T2

\# MANUALLY PUMPED TO TANK BT-T1

POTABLE WATER DESIGNATIONS	
I	CITY WATER
J	REVERSE OSMOSIS PERMEATE
K	REVERSE OSMOSIS CONCENTRATE
L	DEIONIZED WATER



WATERINNOVATIONS inc
350 Engel Street Escondido, CA 92029
waterinnovations.net – 760.294.1888

DRAWN BY : LD	DATE : 8/20/2014	PROJECT	VST-COAST PLATING WWT SYSTEM UPGRADES 417 W 184th street Gardena, Ca. 92048
CHECKED BY : SW	DATE : 8/20/2014	SUBJECT	SYSTEM PLUMBING & INTERCONNECT DRAWING (P&ID)
SCALE : NONE	SIZE : D	DWG# 3A	SHEET 3 OF 16

17140 South Avalon Boulevard, Suite 210, Carson, CA 90746-1296, 310.217.2411, www.westbasin.org

INDUSTRIAL PROCESS WATER AND COOLING TOWER WATER REDUCTION PROGRAM

FIELD SURVEY REPORT

prepared for:

Alcoa Fastening Systems

900 Watson Center Road
Carson, California

Prepared by:

URS Corporation
2020 East First St., Suite 400
Santa Ana, CA 92705

PROGRAM DESCRIPTION

The West Basin Municipal Water District (West Basin), in cooperation with the Metropolitan Water District of Southern California (MET), has developed the **RECIRC & $AVE** Program (Program) for large users of water in industrial process operations and cooling towers. The Program provides funding to West Basin Customers for installing equipment that captures, treats, saves, and reuses water that is normally discharged to the sewer. The Program is made possible through funding from the California Department of Water Resources, the U.S. Department of the Interior Bureau of Reclamation, and your local water agency. West Basin is assisted in conducting this Program by URS Corporation (URS), Maureen Erbeznik & Associates, and Water 3 - RMC.

Qualifications for participating in the Program include:

- Must be a Customer of West Basin or one of its water retailers;
- Must have enrolled in the Program before water savings improvements have been made at the facility;
- Install and operate the water savings equipment; and
- Obtain a measured water savings over a monitored period.

This report summarizes the results of a Field Survey (Survey) conducted at Alcoa Fastening Systems in Carson, California by URS on June 7, 2011. The goal of the Survey is to identify targeted businesses that possess the highest potential for significant water reduction in their facilities and that meet the qualifications to participate in the Program.

This Survey is limited in its scope to collecting basic information via interviews and a brief site visit. No independent measurements were made and the accuracy of the information provided was not verified, except as is possible by the site visit. The Survey is not intended to be a detailed investigation and data have been voluntarily provided by the Customer. Recommendations made in this report are based on the data collected during the site visit and a review of limited facility water records.

FACILITY DESCRIPTION

Alcoa Fastening Systems is a manufacturer of specialty fastening systems, components, and installation tools for aerospace and industrial applications. It produces a variety of precision self-locking nuts, threaded inserts and studs, panel fasteners, latching systems, bolts and installation systems. Alcoa Fastening Systems (Alcoa) operates a facility in the City of Carson, California that includes administrative offices and manufacturing operations.

POTABLE WATER USE

The California Water Service Company is the local water purveyor for Alcoa. California Water Service Company provided potable water supply data over a two-year period from July 2009 to June 2011. Potable water supplied to the Alcoa facility is measured by the following two meters:

- Meter No. X525608 (Administration, facility restrooms, and site irrigation); and
- Meter No. P030296 (Manufacturing).

A table and a graph of the facility's potable water use data used in manufacturing are provided in Appendix B. Alcoa operates from Monday through Saturday, which equals to approximately 312 days per year (52 weeks x 6 workdays per week).

A review of the water supply data for manufacturing indicates that Alcoa used an average of approximately 40,560 gallons per work day (gpd) or 12.7 million gallons per year (Mgal/yr) of potable water during the twenty-four months period from July 2009 to June 2011.

Alcoa currently does not have any secondary water meters within the facility to track the potable water use per individual equipment or processes.

DESCRIPTION OF EQUIPMENT USING SIGNIFICANT WATER VOLUME

The following operations are performed at the facility, which use significant amounts of potable water:

- Metal parts washing machine, fifteen various size machines operates throughout the facility (approximately 20% of total water use);
- Metal parts heat treatment process, two process lines (approximately 30% of total water use) ;
- Metal parts plating process, eight process lines (approximately 40% of total water use); and
- Administration, facility restrooms, and site irrigation (approximately 10% of total water use).

DESCRIPTION OF POTENTIAL WATER SAVINGS TECHNOLOGIES

The three main manufacturing processes at the Carson facility include metal parts fabrication, heat treatment, and plating. Under the fabrication process, metal parts are cleaned by passing the parts through a washing machine. Currently, Alcoa operates fifteen various washing machines throughout the facility. A typical metal parts washer utilizes a three stages system of soap wash followed by two clean water rinses.

For the heat treatment process, the facility operates one metal parts washing machine and two cleaning tank lines. The metal parts washing machine for the heat treatment process utilizes five stages consisting of two washing stages and three clean water rinse stages. Materials in the cleaning tank lines are currently dipped by hand and carried from tank to tank. One cleaning line has a deionized (DI) water rinse tank and is monitored by a conductivity controller.

Alcoa also operates various anodizing and plating lines that utilize a combination of chemical baths, electroplating baths, and rinse tanks. All materials are currently dipped by hand and carried from tank to tank. A significant amount of water is used from the continuous flow of rinse water in the baths operating during each production run. Frequent plenum flushing or tank dumping and refilling also contribute to unnecessary water usage. Conductivity controllers have been installed in some of the lines for regulating the addition of fresh water into the rinse tanks.

All rinse tanks in the facility's washing machines and process lines use a counter-current flow arrangement with the overflow water discharging into the Sanitation Districts of Los Angeles County's (LACSD) industrial sewer system.

Water conservation technologies proposed for the facility include the following:

- Install high-efficiency sprayers to reduce drag-out, with curtains added as necessary to prevent spray carryover to other process areas;
- Install conductivity meter-controllers to monitor Total Dissolved Solids (TDS) levels and to automatically control fresh water supply;
- Install air blowers to agitated rinse water for improve efficiency of the rinsing process;
- Use DI water for increase purity of rinse water;
- Install an ion exchange system for and the potential recycling of the contaminated rinse water.

Installation of conductivity sensors in the rinse tank is a viable water conservation option. The conductivity sensors will monitor TDS levels in the rinse tanks and will only add fresh water when the TDS levels are above unacceptable preset level.

There are additional methods for maximizing the water quality of the rinse tanks and to reduce the frequency of fresh water addition. The methods include increasing the purity of the rinse water by using DI water; agitate the rinse tank by the use of air blowers; and reduce drag-out by the use of high-efficiency sprayers and curtains. These control measures are especially applicable in finishing and rinsing operations using batch operations and when the amount and type of work varies from day to day.

An additional option is to consider recycling of the waste water to reduce the amount of potable water used and disposed. This would require an evaluation of the contaminant loading and the volume of water used to determine the level of treatment that may applied. Alcoa's existing wastewater treatment system will need to be reviewed and possibly replaced with a treatment system that is more suited for recycling the waste stream.

Estimated Annual Water Volume Savings

The total estimated water savings for installation of above technologies, including the operation of an DI water recycling system, is approximately 50% of the current volume, based on study of installations at similar facilities. Based on the assumption of a 50% water reduction, the potable water savings in the manufacturing operations is estimated to be approximately 20,280 gal per workday or 6.3 Mgal per year for 312 workdays.

Estimated Annual Cost Savings

The total estimated water usage cost savings for Alcoa is approximately $23,464 per year, based on an estimated annual water use reduction and California Water Service Company's 2011 Quantity Rates of $2.7738 per hundred cubic feet (HCF). Quantity Rates does not include various surcharges authorized by the California Public Utilities Commission.

The total estimated wastewater treatment surcharge cost savings for Alcoa Fastening Systems is approximately $4,720 per year, based on an estimated annual water use reduction and LACSD's 2010-2011 Wastewater Treatment Surcharge Statement. For this estimate, surcharges for Chemical Oxygen Demand, Suspended Solids, and Average Peak Flow Rate are assumed to be constant and are omitted from the total estimated wastewater treatment surcharge cost savings.

Based on estimated water volume savings discussed earlier, the potential annual cost savings for Alcoa is approximately $28,184. Additional details can be found on Appendix C.

POTENTIAL PROGRAM CASH INCENTIVE

Based on actual monitored water savings, the potential Program cash incentive for Alcoa Fastening Systems is approximately $28,982. The Program incentive is based on the following three payments:

- Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period;
- Reimbursement of the equipment cost of up to $5,000 maximum based on the $3.00 per 1,000 gallons saving rate over a one-year period; and
- Reimbursement of the equipment installation of up to $5,000 maximum based on actual installation costs.

A minimum of 1.67 Mgal/yr of water savings is necessary to obtain the Equipment Cost Incentive. Additional details are provided in Appendix C.

PROGRAM APPLICATION

After reviewing the proposed modifications, Alcoa Fastening Systems is considered as a viable candidate to proceed with a more detailed Equipment Survey and apply for incentive funding.

The Equipment Survey will include a more thorough review of the existing manufacturing line operations and the proposed changes in the rinse water bath arrangements. The Equipment Survey will also include a refined cost-benefit analysis and further evaluation on all estimated water savings. The goal of the Equipment Survey will be to determine the appropriate flow monitoring points required to confirm the anticipated water savings over a one-year period and Alcoa's participation in the Program.

ADDITIONAL UTILITY INCENTIVE PROGRAMS AVAILABLE

In addition to the Program under West Basin, other utility incentive programs are also available for industrial customers.

The Southern California Gas Company and Southern California Edison (SCE) are offering potential cash incentives to qualifying industrial users for reduction in gas and electricity usage. The South Bay Environmental Services Center (SBESC) serves as a regional clearing house for information about programs offered by the Southern California Gas Company and Southern California Edison. Visit www.sbesc.com or call (310) 271-7222 for further information.

The MET's Save Water, Save-A-Buck Program also provides rebates to industrial customers for commonly used plumbing fixtures, such as toilets and urinals. Call Elise Goldman at West Basin (310) 660-6253 or visit www.mwdsaveabuck.com for more information on these and other water saving devices.

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Appendix A: Alcoa Fastening Systems
Recirc & $ave Program: Site Inspection Survey

Company:	**Alcoa Fastening Systems**
Address:	900 Watson Center Road
City:	Carson
Zip Code:	90745
Type of Business:	Manufacturer of Bolts/Screws/Rivets
Name of Facility Contact:	Shewta Kabre
Title:	Environmental Engineer
Direct Telephone Number:	(310) 847-8103
Email Address:	shweta.kabre@alcoa.com
Facility Hours of Operation:	17-Hours
Number of Work Shifts per Day:	2 Shifts
Facility Days of Operation per Week:	6 days a week

Process Water Reduction

What manufacturing processes use potable water and what percent of total water use?

Metal parts washing machine, fifteen various size machines throughout the facility	20 %
Metal parts heat treatment, two process lines	30 %
Metal parts plating, eight process lines	40 %
Administration, facility restrooms, and site irrigation	10 %
	%

Does Facility have an existing potable water reduction program? ☐ **Yes** ☒ **No**

Describe conservation technologies installed or considered to be installed at facility including what level of planning has already been undertaken.

The facility currently uses DI water, counter-current flow tanks, and conductivity controllers. The use of DI water and conductivity controllers is limited to a few tanks.

Is there any on-site water treatment? ☒ **Yes** ☐ **No**

Briefly describe what streams are treated.

Portable DI resin units are currently being used in one of the heat treatment process line.

Appendix A: Swift-Cor Aerospace
Recirc & $ave Program: Site Inspection Survey

Is there any on-site recycling of water? ☐ **Yes** ☒ **No**
Briefly describe what streams are recycled.
NA

Does Facility measure water use for each manufacturing process? ☐ **Yes** ☒ **No**
NA

Does Facility measure wastewater discharged to the industrial sewer? ☒ **Yes** ☐ **No**
Approximate amount of water discharged to the sewer? 35,000 gal/day

Are the processes using industrial water the same as facility hours of operation? ☒ **Yes** ☐ **No**

How long has the Facility been at the current location? 1965

Who would be responsible for implementing process changes within the facility? Shewta Kabre

How long could the Facility allow implementing and installing a process change? Depends on the extend of the process change.

What time frame is required to make the decision to proceed with a process change? Depends on the extend of the process change.

Cooling Tower Controls
How many active Cooling Towers are at the Facility? Two (1 active and 1 back-up)

Model Number and Type? Delta

Flow capacity of Cooling Tower(s)? 500 gal

What kind of controller is used? Conductivity controller

Has Facility used of considered other controllers in the past? Controller was recently installed.

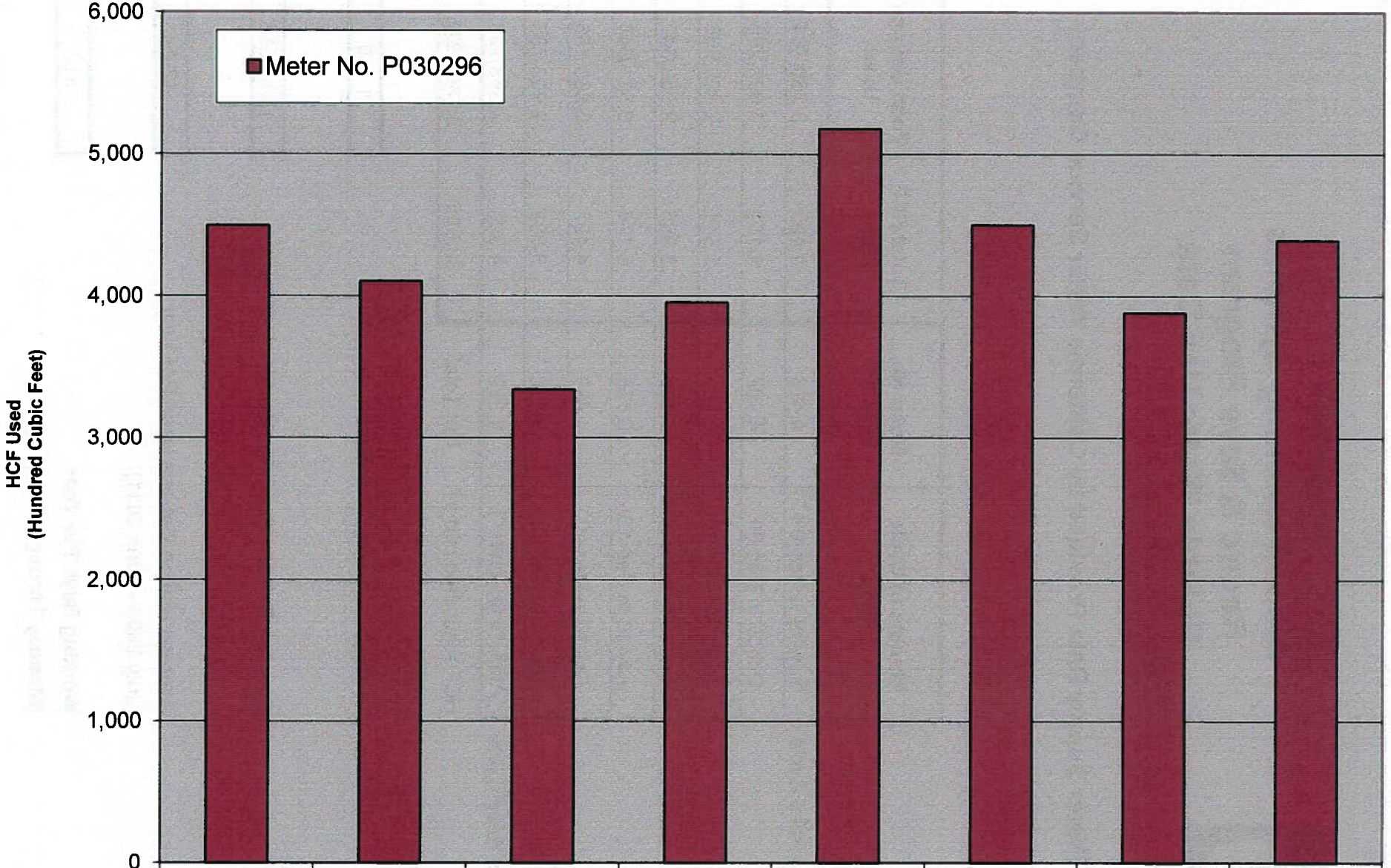
Appendix B
Alcoa Fastening Systems
Recirc & $ave Program
Potable Water Use Data

Water Supply Data Provided by California Water Service Company

	Months of Cycle Read	Meter No. P030296	Total HCF Used	Total Gallons Used
Start of Read Cycle	July-09 to Sep-09	4,493	4,493	3,360,764
	Oct-09 to Dec-09	4,102	4,102	3,068,296
	Jan-10 to Mar-10	3,341	3,341	2,499,068
	April-10 to June-10	3,955	3,955	2,958,340
	July-10 to Sep-10	5,176	5,176	3,871,648
	Oct-10 to Dec-10	4,497	4,497	3,363,756
	Jan-11 to Mar-11	3,882	3,882	2,903,736
End of Read Cycle	April-11 to June-11	4,390	4,390	3,283,720
	HCF = hundred cubic f	Net Total	33,836	25,309,328

Average HCF Used Per Month	1,410
Average Gallons Used Per Month	1,054,555
Average Million Gallons Used Per Year (July 2009 - June 2011)	12.7
Working Days Per Year (Monday Through Saturday)	312
Average Gallons Per Working Day	40,560

Appendix B
Alcoa Fastening Systems
Recirc & $ave Program
Potable Water Use Data



	July-09 to Sep-09	Oct-09 to Dec-09	Jan-10 to Mar-10	April-10 to June-10	July-10 to Sep-10	Oct-10 to Dec-10	Jan-11 to Mar-11	April-11 to June-11
Meter No. P030296	4,493	4,102	3,341	3,955	5,176	4,497	3,882	4,390

Months of Cycle Read

Appendix C
Alcoa Fastening Systems
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: California Water Service Company Quantity Rates (1) ($2.7738 per HCF/yr)	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) ($746 per Mgal/yr)	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	40,560	12.65	16,918	1,410	$ 46,927	$ 9,440	$ 56,368
Estimated Water Volume Savings	20,280	6.33	8,459	705	$ 23,464	$ 4,720	**$ 28,184**

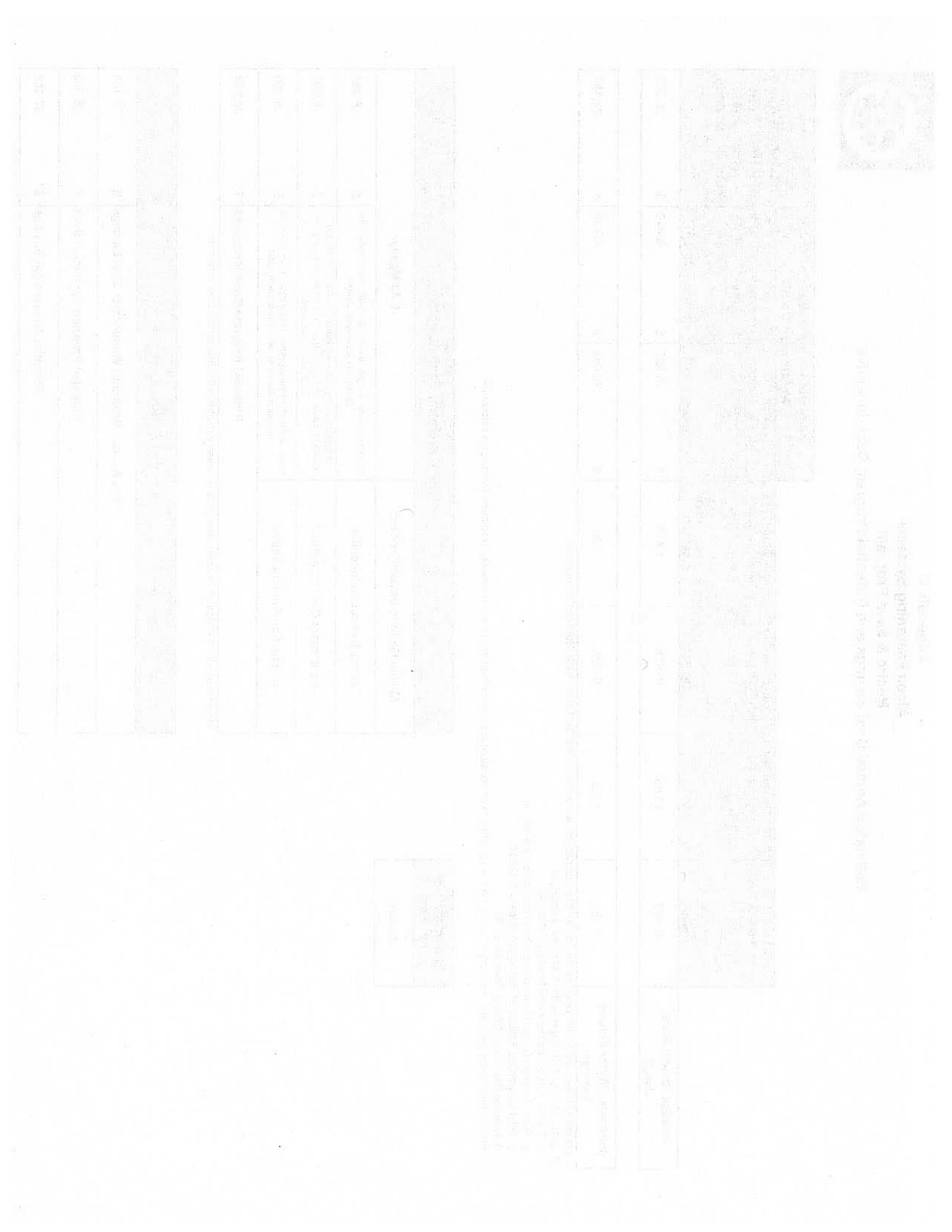
(1) Quantity Rates of $2.7738 does not include various surcharges authorized by the California Public Utilities Commission.
(2) 2010- 2011 LACSD Wastewater Treatment Surcharges:
a. Total Flow Volume Per Year (Mgal/yr) x $746.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $ 131.90
c. Total Suspended Solids Per Year (1000 of lbs) x $ 372.70
d. Average Peak Flow Rate (gal/min) x $ 98.90
For this preliminary estimate, surcharges b, c and d are assumed to be constant and are omitted from the Wastewater Treatment Surcharges calculation.

Total Work Days Per Year
312 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	**6.33 Mgal/yr**	
Water Reduction Incentive	Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period.	$ 18,982
Equipment Cost Incentive*	Reimbursement of the equipment cost of up to $5,000 maximum based on the $3.00 per 1,000 gallons saving rate over a one-year period.	$ 5,000
Installation Cost Incentive	Reimbursement of the equipment installation of up to $5,000 maximum based on actual installation costs.	$ 5,000
	Potential Program Cash Incentives	**$ 28,982**

*A minimum of 1.67 Mgal/yr of water savings is necessary to obtain the Equipment Cost Incentive.

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 28,184
Potential Program Cash Incentives	$ 28,982
Potential Annual Cost Savings	**$ 57,166**



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INDUSTRIAL PROCESS WATER AND COOLING TOWER WATER REDUCTION PROGRAM

EQUIPMENT SURVEY REPORT

Prepared for:

Alcoa Fastening Systems

900 Watson Center Road
Carson, California

Prepared by:

URS Corporation
2020 East First St., Suite 400
Santa Ana, CA 92705

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APPENDICES

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1.0 REPORT SUMMARY

1.1 RETROFITS AND UPGRADES

Alcoa Fastening Systems (Alcoa) of Carson, California is considering upgrades to their processing lines to reduce potable water usage. The proposed modifications include the installation of a conductivity control system to automatically add fresh water to their rinse tanks when the conductivity (or contamination) of the rinse water exceeds a set value.

1.2 CHANGES TO OPERATIONAL PRACTICES

A conductivity system will provide automatic addition of fresh water into the processing line rinse tanks instead of using manual control. Operation of a conductivity control system will require regular monitoring of the conductivity of the rinse water to determine an appropriate set point, identify potential valve malfunctions, or adjust operational parameters.

1.3 POTENTIAL WATER AND SEWER COST SAVINGS

After installation of the proposed conductivity control system, the total estimated water and sewer cost savings for Alcoa will be approximately $9,087 per year. Estimated water savings will be approximately 2.0 million gallons (Mgal) per year based on the current potable water usage of 12.7 Mgal per year in the manufacturing operations.

1.4 POTENTIAL PROGRAM INCENTIVE

Based on retrofit water savings monitored for up to a one-year period and the West Basin Municipal Water District's "RECIRC & $AVE" Program (Program) financial incentives available (i.e., $3.00 per 1,000 gallons of actual water saved for a one-year period), the potential Program incentive for Alcoa is approximately $16,120.

2.0 INTRODUCTION

The West Basin Municipal Water District (West Basin), in cooperation with the Metropolitan Water District of Southern California (MET), has developed the "RECIRC & $AVE" Program for large users of water in industrial process operations and cooling towers. The Program provides funding to West Basin customers for installing equipment that captures, treats, saves and reuses water that is normally discharged to the sanitary sewer system. The Program is made possible through funding from the California Department of Water Resources, the U.S. Department of the Interior Bureau of Reclamation and the local water agency. West Basin is assisted in conducting this Program by URS, Maureen Erbeznik & Associates and RMC.

Qualifications for participating in the Program include:

- Must be a customer of West Basin or one of its water retailers;
- Must have enrolled in the Program before water savings improvements have been made at the facility;
- Install and operate the water savings equipment; and
- Obtain a measured water savings over a monitored period.

Based on a Field Survey conducted on June 7, 2011, URS identified Alcoa as a potential candidate for this Program. In order for Alcoa to qualify for monetary incentives, an Equipment Survey of Alcoa's facility was conducted to obtain additional operational information. This Equipment Survey Report provides a summary of the site investigation and the application of Alcoa to the Program.

2.1 FACILITY DESCRIPTION

Alcoa is a manufacturer of specialty fastening systems, components and installation tools for aerospace and industrial applications. It produces a variety of precision self-locking nuts, threaded inserts and studs, panel fasteners, latching systems, bolts and installation systems. Alcoa operates a facility in the City of Carson, California that includes administrative offices and manufacturing operations. A site vicinity map is provided as Figure 1 in Appendix A. The facility currently consists of four separate areas. Area 1 includes offices and administration. Area 2 is dedicated to parts fabrication. Area 3 is used for cleaning of the fabricated parts using a salt

bath cleaning process. Area 4 is the production area containing various chemical processing lines. An overall site plan of Area 4 is provided as Figure 2 in Appendix A.

2.2 Description of Equipment Using Significant Water Volume

The following operations performed at Alcoa use significant amounts of potable water:

- Metal parts fabrication; includes fifteen recirculating washing machines that are operated throughout the facility;
- Metal parts salt bath cleaning process; includes two process lines;
- Metal parts chemical process; includes ten process lines; and
- Administration; includes facility restrooms and site irrigation.

2.3 Potable Water Usage and Sewer Discharge Rate

The California Water Service Company (Cal Water) is the local water purveyor for Alcoa. Cal Water provided potable water supply data over a two-year period from July 2009 to June 2011. Potable water supplied to the Alcoa facility is measured by the following two meters:

- Meter No. P030296 (Manufacturing).
- Meter No. X525608 (Administration, facility restrooms, and site irrigation).

A table and a graph of the facility's potable water use data used in manufacturing are provided in Appendix B. Alcoa operates from Monday through Saturday, which equals to approximately 312 days per year (52 weeks x 6 workdays per week).

A review of the water supply data for manufacturing indicates that Alcoa used an average of approximately 40,560 gallons per work day (gpd) or 12.7 Mgal per year of potable water during the twenty-four months period from July 2009 to June 2011.

Other than a cadmium plating line (No. 98-102), Alcoa does not have any additional internal flow meters to measure potable water use within the manufacturing area.

Alcoa currently treats its rinse water through its on-site wastewater treatment units prior to discharging into the industrial sewer system of the Los Angeles County Sanitation District (LACSD). The facility currently does not measure the amount of wastewater discharged to the LACSD.

3.0 PROPOSED CONSERVATION TECHNOLOGY

3.1 DESCRIPTION OF COMMON CONSERVATION TECHNOLOGIES

The three main manufacturing processes at the Carson facility include metal parts fabrication, salt bath cleaning, and chemical processing. The salt bath cleaning and chemical processing operations use immersion baths to rinse the manufactured parts. The water baths are either supplied by potable (i.e., city) or deionized (DI) water. A majority of the rinse baths currently operate under a counter-current arrangement or as a stagnant water bath.

The facility produces metal parts (e.g., screws, nuts, bolts) that range in size from ¼ inch to 4 inches in length. As a result, all parts are process within perforated baskets and in a bulk quantity. The fresh water supply lines have an estimated flow rate of 4 gallons per minute (gpm). There are a total of 91 separate baths for the processing operations, of which 32 baths are for chemical process, 38 baths are for city water rinses, and 21 baths are for DI water rinses.

Under the metal parts fabrication, metal parts are fabricated and cleaned by passing the parts through a washing machine. Currently, Alcoa operates fifteen washing machines throughout the facility. A typical washing machine utilizes a three-stage process of a soap wash followed by two separate water rinses. The wash and rinse water used in the washing machine operation is a closed recirculating system.

Under the salt bath cleaning process, the facility operates one metal parts washing machine and two cleaning tank lines. The metal parts washing machine for the salt bath cleaning process utilizes five stages consisting of two washing stages and three clean water rinse stages. For the cleaning tank lines, parts are manually dipped and carried by hoist from tank to tank. Alcoa also operates various chemical processing lines that utilize a combination of chemical baths and water-based rinses. All parts are currently dipped in a basket and manually carried from tank to tank.

Current rinse tank operations appear to use a significant amount of fresh water due to a continuous flow of supply water to maintain low TDS, or feed valves that are left open by accident. Frequent tank flushing, dumping, and refilling contributes to unnecessary water usage. However, conductivity controllers and solenoid valves have been installed in the chemical process lines for regulating the addition of fresh water into some rinse tanks.

Parts processed in baskets can potentially create more dragout since they hold more solution. Although the baskets are perforated, complete drainage can be difficult which results in more rapid contamination of the subsequent rinse baths. A drain time (hang time) of at least 10 seconds has been demonstrated to reduce drag-out. Longer drain time over the process solution tank will allow more dragout to be returned to the bath.

For additional reduction in dragout, the correct basket perforation size should be used for the parts being processed. For example, if the average part is 2 inches in diameter and the basket contains holes that are too small (less than ½ inch) drainage can be too slow, resulting in significant dragout. In general, using a basket with the largest possible holes will minimize chemical dragout.

Water conservation technologies proposed for the Alcoa facility include the following:

- Installation of conductivity meters and controllers to monitor TDS levels in the rinse tanks and to automatically control the fresh water supply.

- Installation of flow meters to monitor the feed water flow rates for each process line. Flow meters will also determine how much water is typically added when the conductivity system set point is reached. This will provide a better understanding of the individual process line with point of use water data for high use and lower use processes.

- Increase drain time by posting minimum drain times at the manual process lines as a reminder to employees or by building in delays on automatic process lines.

- Minimize dragout by using baskets of various perforation sizes available for processing.

Alcoa is also considering additional methods to reduce their potable water use:

- Installation of tank-specific DI treatment systems that would recirculate the spent wastewater in a DI rinse tank through a series of vessels to remove the contaminants and return the treated water back into the rinse tank. Make-up water would only be needed for evaporative losses. Potential water savings would depend upon the number of rinse baths converted to this arrangement.

- Installation of a facility-wide wastewater recycling and DI treatment system that would collect spent rinse water from a majority of the baths. Although requiring a significant capital expense, large-scale recycling systems have the potential for significant reduction in potable water use and wastewater discharge rates.

3.2 Proposed Installation of Conductivity Controllers

There are numerous environmental and cost benefits that result from using an automated conductivity control system to control water quality in the Alcoa rinse tanks, as compared to manual control. Using real-time conductivity readings to manage water additions provides a much tighter control of contaminant levels in the rinse tanks, thus adding only as much water needed to maintain quality. This is especially applicable in metal finishing and rinsing operations where batches or processes are discontinuous and the amount and type of work varies from day to day.

Up to 22 current potable and DI rinse tanks (Tanks 82, 85, 74, 80, 18, 15, 1, 30C, 32B, 34B, 35C, 37B, 44B, 50B, 54B, 63B, 62, 59A, 58, 67 and 69B) at the Alcoa facility are recommended to be monitored and controlled by a conductivity system. The system may consist of six or more conductivity controllers. Each controller has the capability of receiving up to eight digital inputs from individual sensors installed in the rinse tanks and up to twelve analog outputs for controlling solenoid valves installed on the respective rinse tank water feed lines. An example of a proposed conductivity controller is provided in Appendix C. Preliminary design layouts that show the proposed locations of the conductivity sensors and the conductivity controllers for the Alcoa facility are provided in Figures 4 thru 8 in Appendix A.

3.3 Proposed Locations of Monitoring Devices

Prior to installation and operation of the conductivity controllers, monitoring of the current water usage will be required to develop a baseline value and calculate the potential potable water savings and Program incentives. Additional advantages for measuring the water usage in the rinse tanks includes a rapid indication of excessive water losses from system failures, piping leaks, evaporation, failure of water flow controls, or other problems.

It is recommended that seven water meters be installed by Alcoa that will accurately record how much potable water is supplied to the salt bath cleaning and chemical processing lines. Site drawings describing the proposed monitoring locations are provided in Figures 2 and 3 in Appendix A.

The new meters should display a non-resettable total gallons reading (totalizer) and be sized for the specific line diameter at each location. Each new flow meter should also be installed with sufficient straight pipe lengths upstream per the manufacturer's recommendations to provide accurate readings.

4.0 ESTIMATES ON WATER REDUCTION, COST SAVINGS AND PROGRAM FUNDING

4.1 ESTIMATED WATER REDUCTION

A detailed analysis of the existing processing operations at Alcoa was conducted to further refine the anticipated water savings originally estimated in the Field Survey. URS personnel met with Alcoa facility staff to evaluate the 12 active salt bath cleaning and chemical processing lines. Each process line was reviewed to identify the individual water rinse baths, flow configuration (i.e., direct flow-through, counter-current or stagnant bath), flow rate and type of rinse water (i.e., city or DI). The current net water usage estimates for the existing processing lines are shown in Figures 3 thru 10 in Appendix A.

As calculated in Appendix B, the manufacturing operations at Alcoa used an average of 12.7 Mgal of potable water per year over the two-year period from July 2009 to June 2011. The estimated breakdown of water usage for the Alcoa manufacturing operations is as follows:

- Parts Fabrication: 2.5 Mgal per year (20 %)
- Salt Bath Cleaning Process: 4.4 Mgal per year (35 %)
- Chemical Process: 5.8 Mgal per year (45 %)

The total estimated water usage for the salt bath cleaning and chemical processes is approximately 10.2 Mgal per year. Installing the proposed conductivity control system in the salt bath cleaning and chemical processing lines is estimated to reduce potable water consumption by approximately 20% based on study of installations at similar facilities. This would result in an estimated savings of approximately 2.0 Mgal of potable water per year.

4.2 ESTIMATED COST SAVINGS

After installation of the proposed water reduction technologies, the potential annual cost savings is approximately $9,087 per year. This is based on an estimated annual total water savings of approximately 2.0 Mgal. The estimated annual savings are $7,565 in potable water supply costs and approximately $1,522 in sewer disposal surcharges. Detailed calculations are shown in Appendix D.

It should be noted that the water usage savings rate is based on the Cal Water's 2011 Quantity Rates of $2.7738 per hundred cubic feet of potable water. Quantity rates do not include various surcharges authorized by the California Public Utilities Commission. Savings on sewer disposal charges is based on the LACSD's 2010-2011 Wastewater Treatment Surcharge Statement. For this estimate, surcharges for Chemical Oxygen Demand, Suspended Solids and Average Peak Flow Rate are assumed to be constant and are omitted from the total estimated wastewater treatment surcharge cost savings.

4.3 Estimated Gas and Electricity Savings

Installation of the proposed conductivity control system is not expected to result in additional gas and electricity savings.

The conductivity control system will reduce the wastewater volume that is treated and may, therefore, slightly reduce chemical usage and pumping costs. However, the conductivity control system may experience a slight increase in the electrical usage at the facility. Therefore, it is assumed that there will be no overall change in the gas and electricity costs at the Alcoa facility.

4.4 Estimated Program Funding

Based on retrofit and water savings over a monitored period, qualified participants in the Program may receive the following three payments:

- Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period.
- Reimbursement of the equipment cost of up to $5,000 maximum based on the $3.00 per 1,000 gallons saving rate over a one-year period.
- Reimbursement of the equipment installation of up to $5,000 maximum based on actual installation costs.

The estimated Program funding for Alcoa is shown in Appendix E. Based on a water savings of approximately 2.0 Mgal per year after installation and monitoring, the estimated water reduction incentive payment would be $6,120 based on a reimbursement rate of $3.00 per 1,000 gallons saved. Reimbursements for the equipment cost and the equipment installation would be the maximum allowable reimbursement of $5,000 each. Thus, the net potential Program incentive for Alcoa is approximately $16,120.

5.0 POTENTIAL IMPACTS

5.1 IMPACT OF PRODUCTION CHANGES ON ESTIMATED WATER SAVINGS

The nature of Alcoa's business is quick turnaround production of fastening systems that contain pieces that range widely in shape and size. Although the size of each workpiece varies, a majority of Alcoa's manufacturing involves small work pieces with relatively small surface areas that require long rinse periods. The fluctuation in production may affect the volume of water used at the facility and also may mask any potential water savings if business increases. Therefore, the amount of water used per work piece under current operations is recommended as an appropriate benchmark to assess future water savings.

In order to establish a baseline for current potable water usage in the processing lines, manufacturing data on the number pieces processed over a 12-month period in 2011 will be needed to determine the average number of gallons required per work piece processed.

After the installation of the recommended improvements and a period of monitoring, the number of pieces manufactured will be tabulated from Alcoa's billing records and compared to the water usage rates recorded by the new water meters. The water savings will be calculated as the difference between the total gallons of potable water recorded and the product of the number of pieces processed multiplied by the average number of gallons require per work piece processed. This factor will adjust the water savings accordingly if there is an increase or decline in production at the Alcoa facility.

5.2 IMPACT OF PROCESS CHANGE ON SEWER DISCHARGE

Alcoa discharges industrial wastewater through a Permit with the LACSD. All wastewater will continue to be treated by the existing wastewater treatment system prior to disposal to the industrial sewer. The proposed conductivity control system will potentially reduce the current volume of water discharged to the industrial sewer by approximately 20%. This will increase the concentration of wastewater stored in the equalization tank that feeds the treatment system. The treatment plant should operate more efficiently with more concentrated wastewater, especially in improved flocculation and sludge development. However, the ultimate mass loading to the wastewater treatment plant should remain unchanged.

5.3 Impact of Process Change on Product Quality

Rinse tank controls based on conductivity measurement are a standard practice in the metal parts fabrication industry and can be implemented at the Alcoa facility without lowering product quality. The implementation of the proposed conductivity control system should be conducted on a tank-by-tank basis and care should be taken so that the conductivity sensor operation is not impacted by temperature, air bubbles, sludge formation, and corrosion.

Operation of a conductivity control system will require regular monitoring of the conductivity of the rinse water to determine an appropriate set point, identify potential valve malfunctions, or adjust operational parameters. In addition, on a quarterly basis, the operator should use a portable conductivity meter or lab analysis to measure the conductivity of rinse water near the sensor and compare it to the control system data to ensure accurate calibration.

6.0 PROGRAM APPLICATION AND IMPLEMENTATION

Based on a review of the proposed modifications, Alcoa is considered as a viable candidate to apply for incentive funding under this Program.

The next step is for Alcoa to contact West Basin to initiate their application into the Program. The responsible Program contact at West Basin is Elise Goldman, Conservation Program Specialist (eliseg@westbasin.org).

Following acceptance and inclusion to the Program, Alcoa will receive 50% of the Program incentive calculated in this Equipment Survey Report. Alcoa can utilize the funding to install the recommended equipment and notify West Basin when the system is fully operational. A monitoring period will then begin. Alcoa will collect flow data on a monthly basis. Upon confirmation of the anticipated water savings, Alcoa may receive up to the remaining balance of the Program incentive as justified by the recorded flow data.

7.0 ADDITIONAL UTILITY INCENTIVE PROGRAMS

In addition to the Program under West Basin, other utility incentive programs are also available for industrial customers.

The Southern California Gas Company and Southern California Edison (SCE) are offering potential cash incentives to qualifying industrial users for reduction in gas and electricity usage. The South Bay Environmental Services Center (SBESC) serves as a regional clearing house for information about programs offered by the Southern California Gas Company and Southern California Edison.

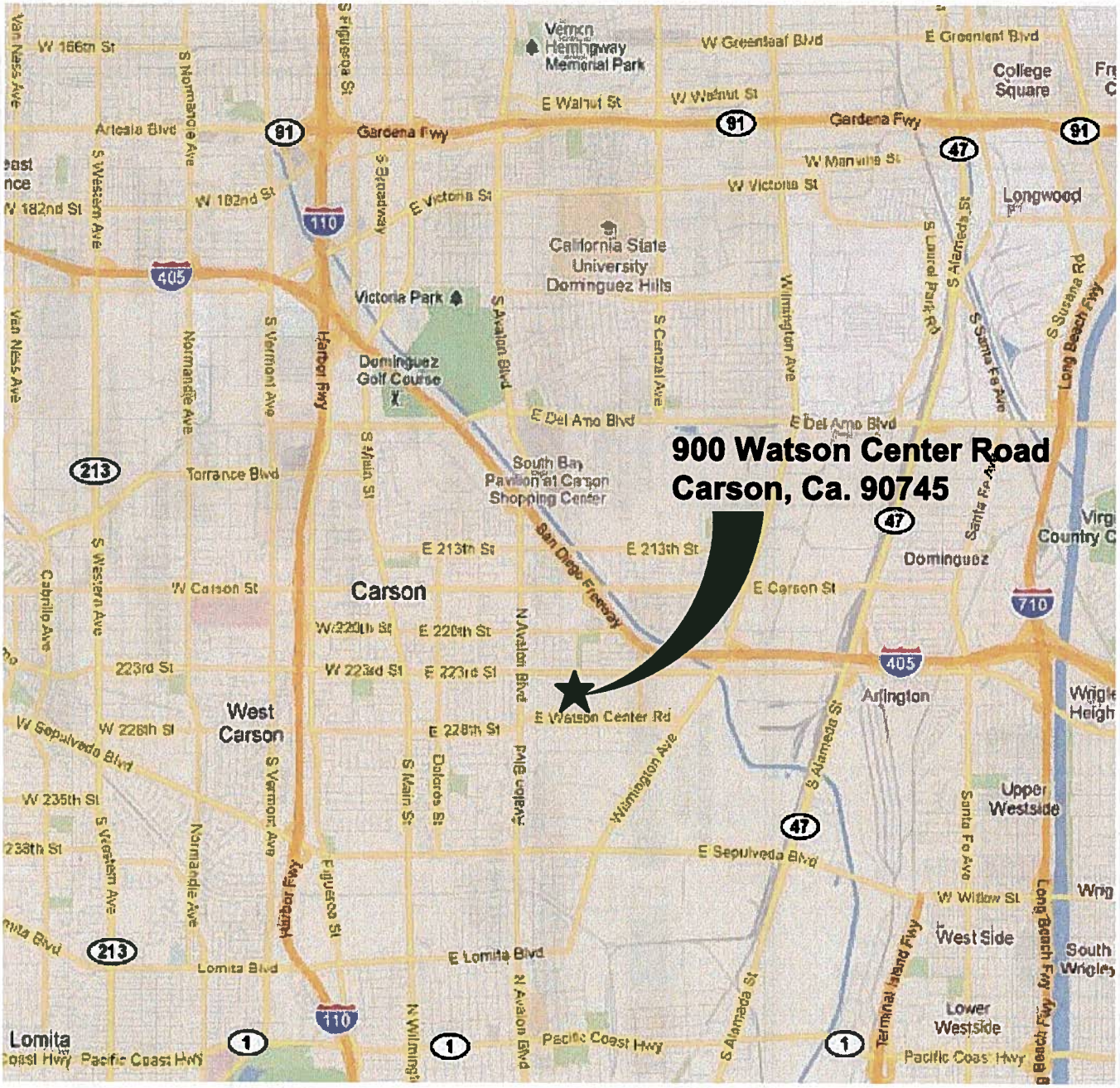
The MET's Save Water, Save-A-Buck Program also provides rebates to industrial customers for commonly used plumbing fixtures, such as toilets and urinals.

For more information on these associated programs, please contact the following:

- Southern California Edison (www.sbesc.com) (310) 271-7222
- Save Water/Save-A-Buck Program (www.mwdsaveabuck.com) (310) 660-6253

APPENDIX A

FIGURES



ALCOA FASTENING SYSTEMS
900 Watson Center Road
Carson, Ca. 90745

Reference: Google Map

Alcoa Fastening Systems Equipment Survey Report

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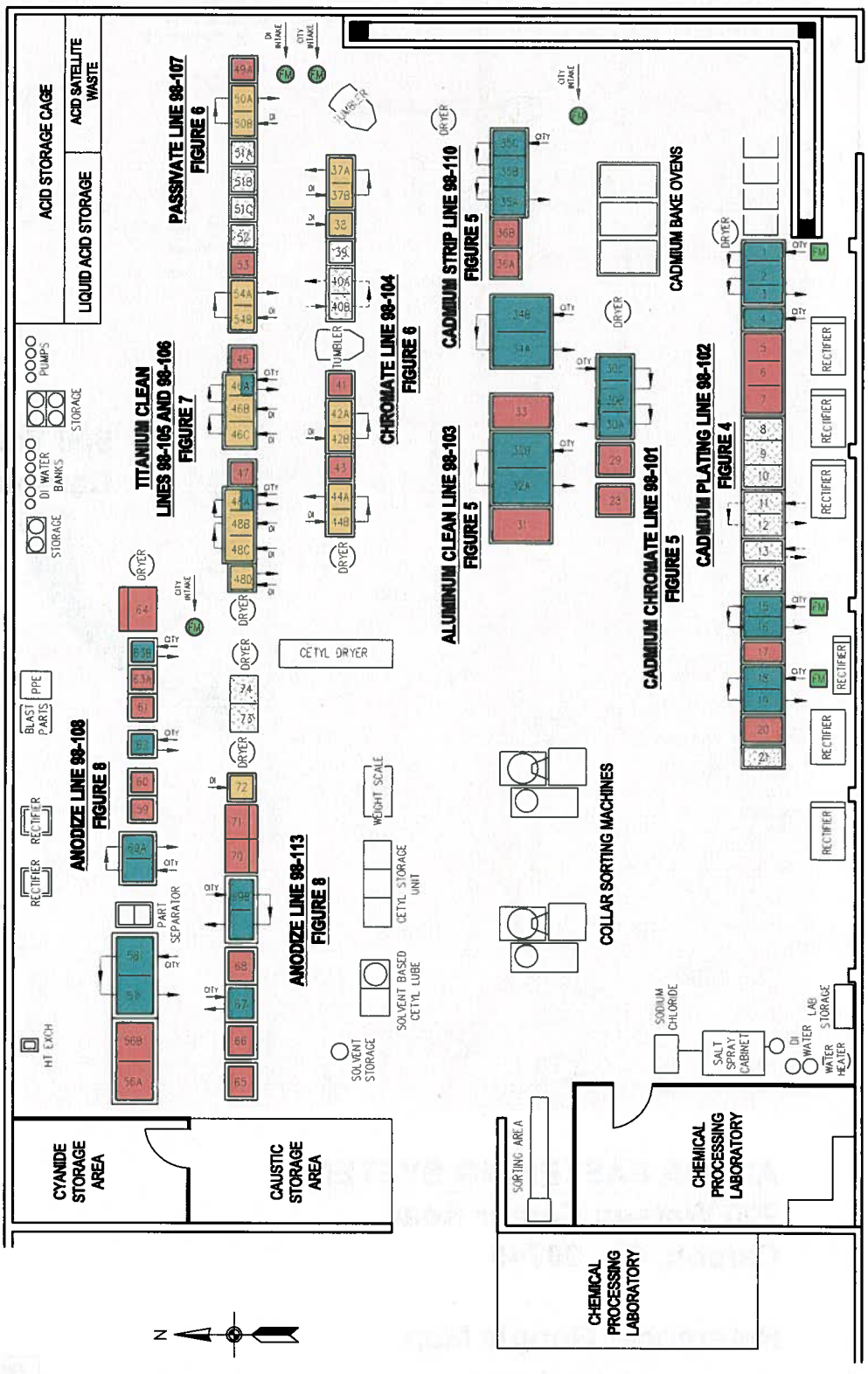
FIGURE 1
SITE VICINITY MAP

Proj. No.: 29880043		Date: MARCH 2012
Project: West Basin Municipal Water District Recirc & Save Program		Customer: Alcoa Fastening Systems
Drawn by: AC	Checked by: SK	Figure: 1



LEGEND

- DIRECTION OF FLOW
- CITY WATER BATHS
- DI WATER BATHS
- CHEMICAL BATHS
- NOT IN USE
- FM — EXISTING FLOW METER
- FM — PROPOSE FLOW METER

NOTES

1. SEE FIGURE 3 FOR LINE DIAGRAMS FOR HOT SALT LINE 24-031 AND HOT SALT LINE 24-032.
2. TOTAL OF SEVEN NEW IN-LINE FLOW METERS ARE PROPOSED FOR THE OVERALL FACILITY. PROPOSED METER LOCATIONS FOR HOT SALT LINE 24-031 AND HOT SALT LINE 24-032 ARE SHOWN IN FIGURE 3.

N

Not To Scale

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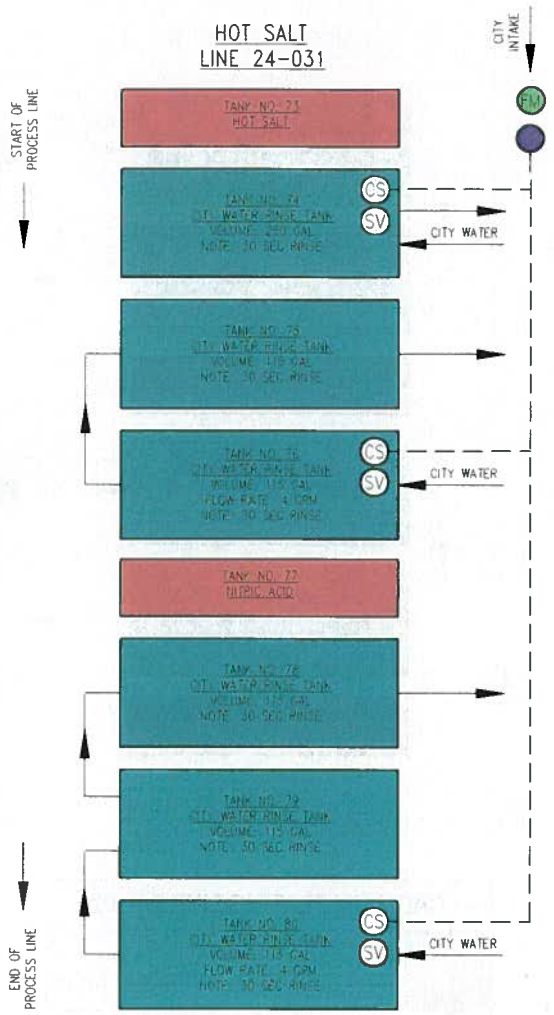
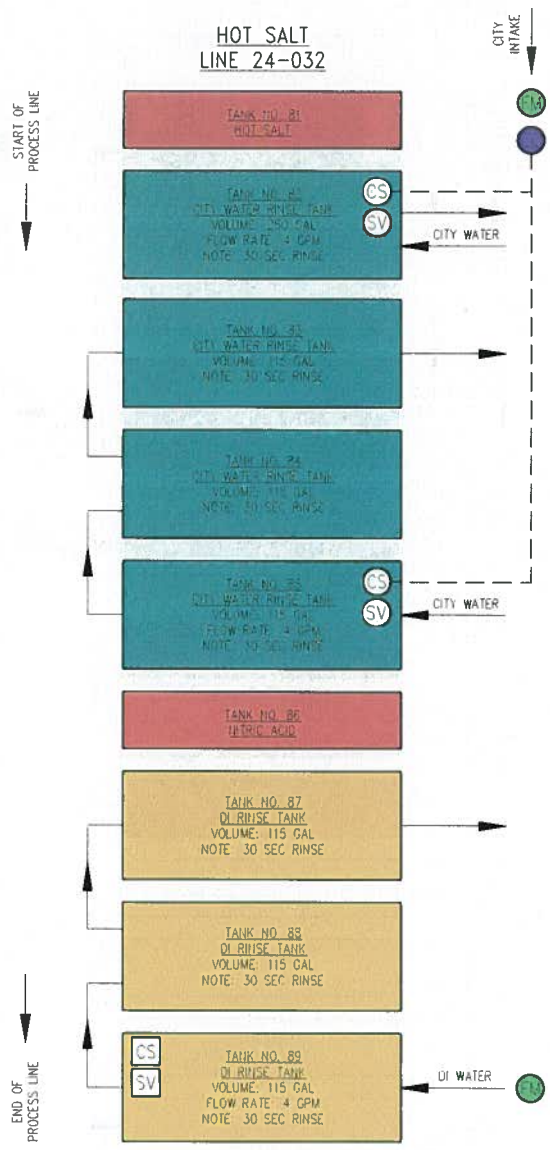
FIGURE 2
CHEMICAL PROCESSING LINES

Proj. No.: 29880043		Date: MARCH 2012
Project: West Basin Municipal Water District Recirc & Save Program		Customer: Alcoa Fastening Systems
Drawn by: AC	Checked by: SK	Figure: 2





HOT SALT LINE 24-031	
CITY WATER BATHS	6
DI WATER BATHS	0
CHEMICAL BATHS	2
NOT IN USE	0
TOTAL NUMBER OF BATHS	8

NET WATER USAGE ESTIMATE

ESTIMATED NET WATER USAGE
3 ACTIVE BATH SETS X 4 GPM = 12 GPM
(2 COUNTER CURRENT TANK SETS AND 1 FLOW THROUGH TANK)

HOT SALT LINE 24-032	
CITY WATER BATHS	4
DI WATER BATHS	3
CHEMICAL BATHS	2
NOT IN USE	0
TOTAL NUMBER OF BATHS	9

NET WATER USAGE ESTIMATE

ESTIMATED NET WATER USAGE
3 ACTIVE BATH SETS X 4 GPM = 12 GPM
(2 COUNTER CURRENT TANK SETS AND 1 FLOW THROUGH TANK)

LEGEND

- DIRECTION OF FLOW
- CS — EXISTING CONDUCTIVITY SENSOR
- SV — EXISTING SOLENOID VALVE
- ST — PROPOSED CONVERT TO SPRAYERS TANK
- CS — PROPOSED CONDUCTIVITY SENSOR
- SV — PROPOSED SOLENOID VALVE
- FM — PROPOSED FLOW METER
- PROPOSED CONDUCTIVITY CONTROLLER

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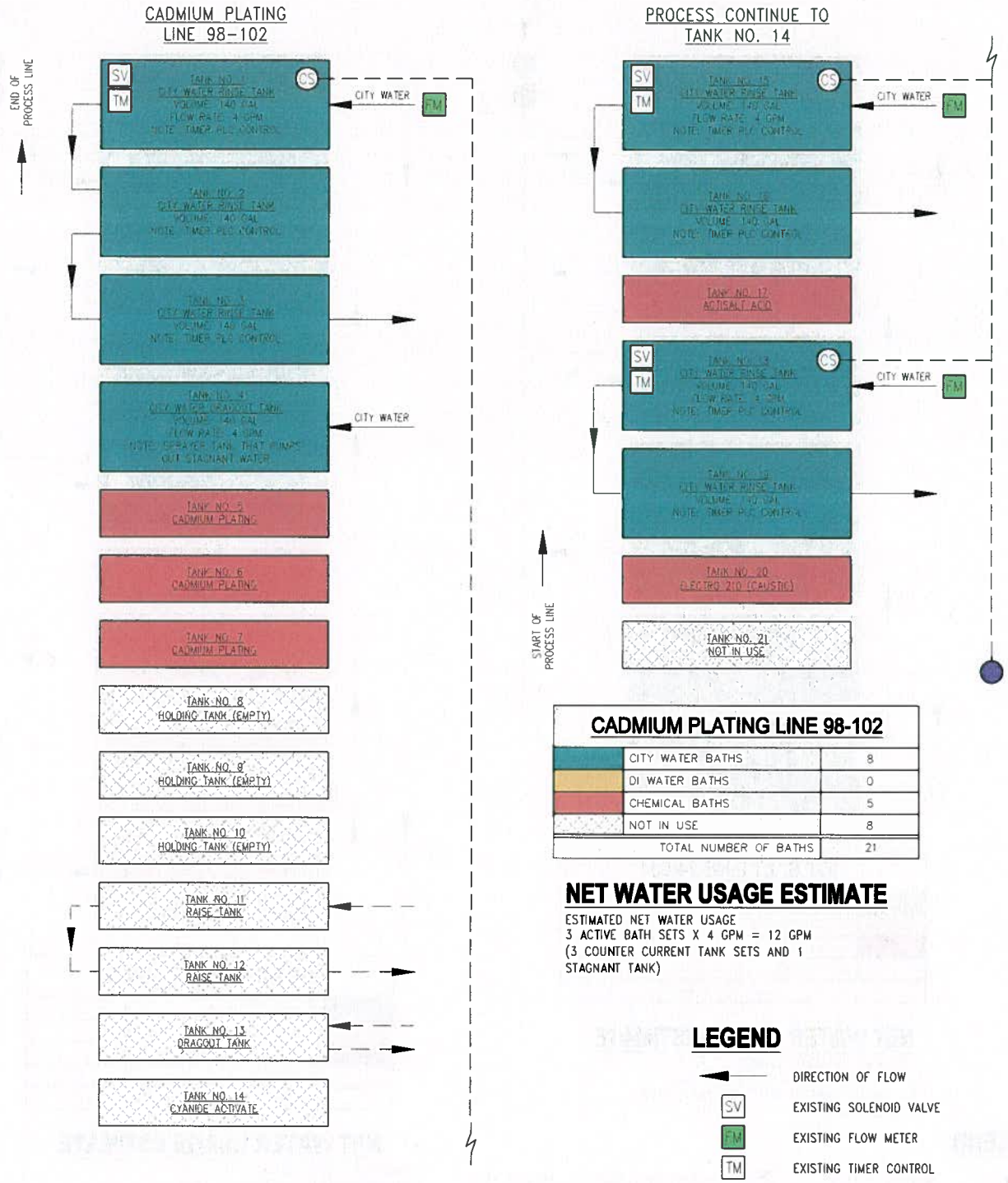
FIGURE 3
HOT SALT LINES
24-031 AND 24-032

Proj. No.: 29880043		Date: MARCH 2012
Project: West Basin Municipal Water District Recirc & Save Program		Customer: Alcoa Fastening Systems
Drawn by: AC	Checked by: SK	Figure: 3



CADMIUM PLATING LINE 98-102	
CITY WATER BATHS	8
DI WATER BATHS	0
CHEMICAL BATHS	5
NOT IN USE	8
TOTAL NUMBER OF BATHS	21

NET WATER USAGE ESTIMATE

ESTIMATED NET WATER USAGE
3 ACTIVE BATH SETS X 4 GPM = 12 GPM
(3 COUNTER CURRENT TANK SETS AND 1 STAGNANT TANK)

LEGEND

- DIRECTION OF FLOW
- SV — EXISTING SOLENOID VALVE
- FM — EXISTING FLOW METER
- TM — EXISTING TIMER CONTROL
- CS — PROPOSED CONDUCTIVITY SENSOR
- PROPOSED CONDUCTIVITY CONTROLLER

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FIGURE 4
CADMIUM PLATING LINE 98-102

Proj. No.: 29880043			Date: MARCH 2012
Project: West Basin Municipal Water District Recirc & Save Program			Customer: Alcoa Fastening Systems
Drawn by: AC	Checked by: SK		Figure: 4

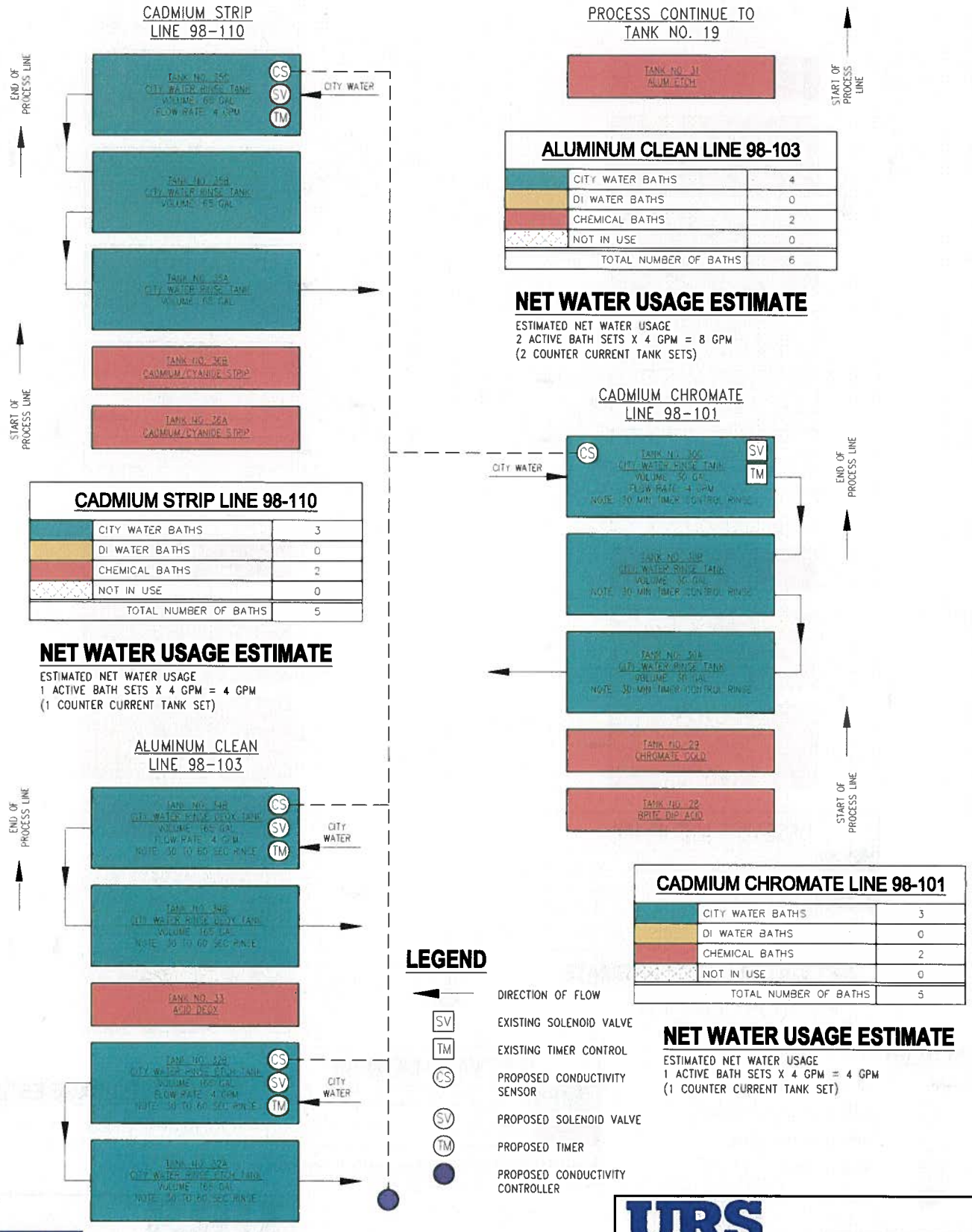

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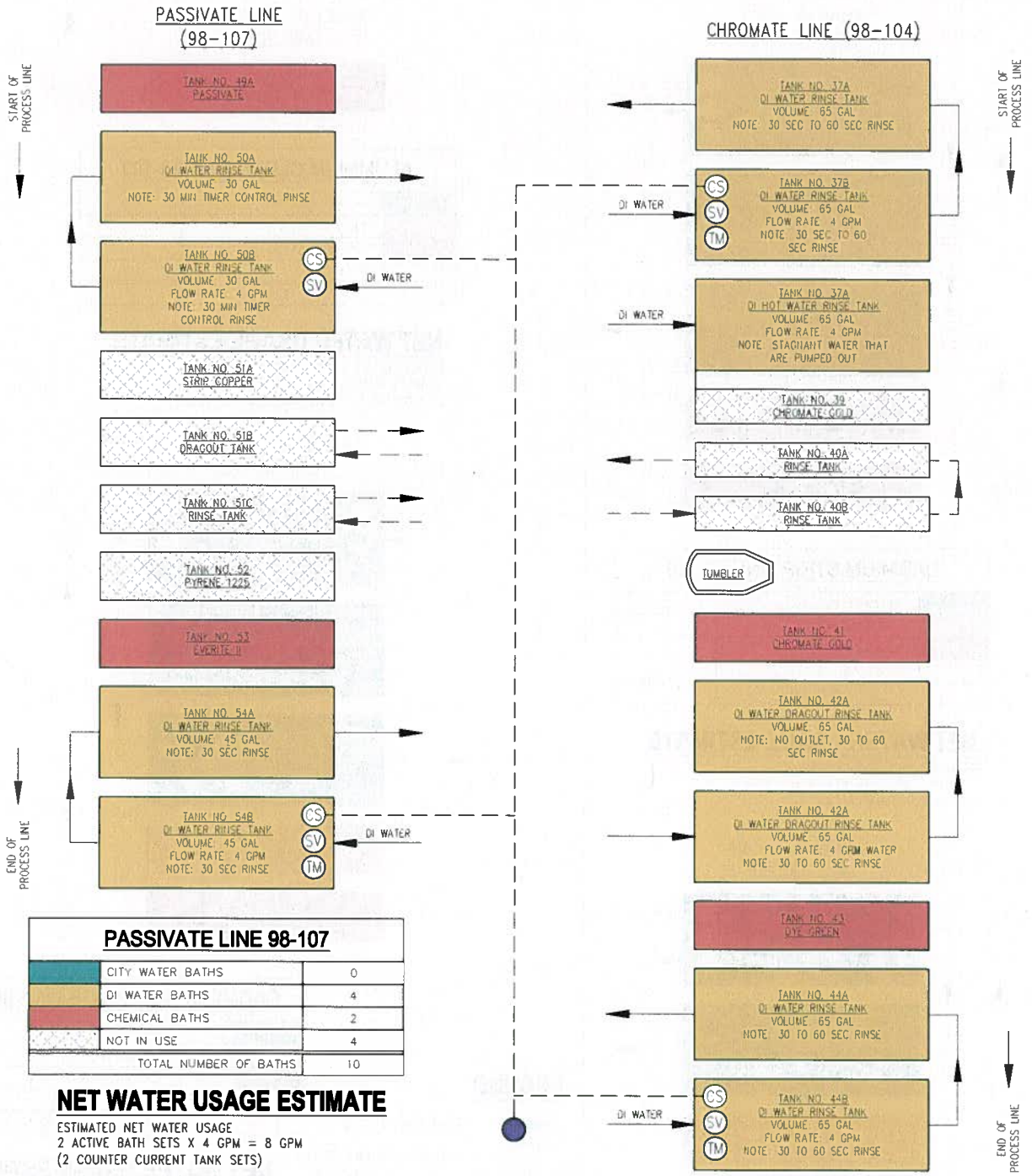
FIGURE 5
CADMIUM STRIP LINE 98-110, ALUMINUM CLEAN LINE 98-103, AND CADMIUM CHROMATE 98-101

Proj. No.: 29880043		Date: MARCH 2012
Project: West Basin Municipal Water District Recirc & Save Program		Customer: Alcoa Fastening Systems
Drawn by: AC	Checked by: SK	Figure: 5



PASSIVATE LINE 98-107	
CITY WATER BATHS	0
DI WATER BATHS	4
CHEMICAL BATHS	2
NOT IN USE	4
TOTAL NUMBER OF BATHS	10

NET WATER USAGE ESTIMATE

ESTIMATED NET WATER USAGE
2 ACTIVE BATH SETS X 4 GPM = 8 GPM
(2 COUNTER CURRENT TANK SETS)

LEGEND

- DIRECTION OF FLOW
- (CS) PROPOSED CONDUCTIVITY SENSOR
- (SV) PROPOSED SOLENOID VALVE
- (TM) PROPOSED TIMER
- PROPOSED CONDUCTIVITY CONTROLLER

CHROMATE LINE 98-104	
CITY WATER BATHS	0
DI WATER BATHS	7
CHEMICAL BATHS	2
NOT IN USE	0
TOTAL NUMBER OF BATHS	9

NET WATER USAGE ESTIMATE

ESTIMATED NET WATER USAGE
3 ACTIVE BATH SETS X 4 GPM = 12 GPM
(3 COUNTER CURRENT TANK SETS AND 1
STAGNANT TANK)

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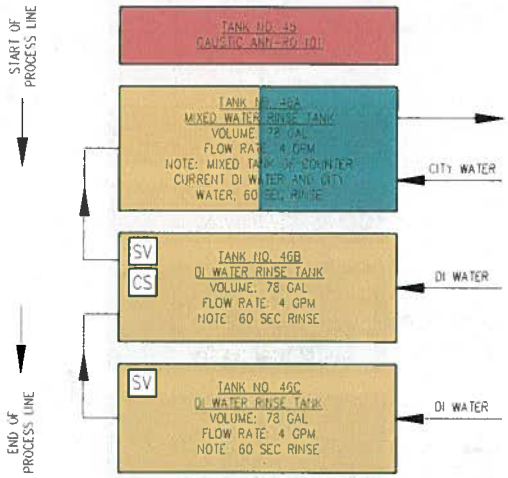
FIGURE 6
CHROMATE LINE 98-104 AND
PASSIVATE LINE 98-107

Proj. No.: 29880043		Date: MARCH 2012
Project: West Basin Municipal Water District Recirc & Save Program		Customer: Alcoa Fastening Systems
Drawn by: AC	Checked by: SK	Figure: 6

TITANIUM CLEAN LINE
(98-106)

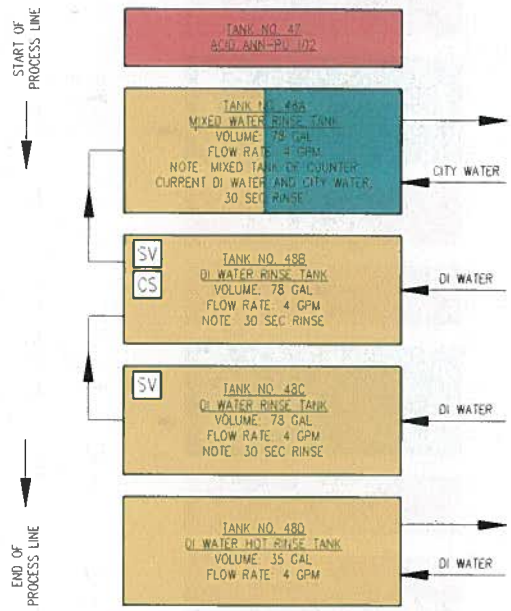


TITANIUM CLEAN LINE 98-106	
CITY WATER BATHS	0.5
DI WATER BATHS	2.5
CHEMICAL BATHS	1
NOT IN USE	0
TOTAL NUMBER OF BATHS	4

NET WATER USAGE ESTIMATE

ESTIMATED NET WATER USAGE
3 ACTIVE BATH SETS X 4 GPM = 12 GPM
(1 COUNTER CURRENT TANK SET AND 1 MIXED TANK OF COUNTER CURRENT AND CITY WATER)

TITANIUM CLEAN LINE
(98-105)



TITANIUM CLEAN LINE 98-105	
CITY WATER BATHS	0.5
DI WATER BATHS	3.5
CHEMICAL BATHS	1
NOT IN USE	0
TOTAL NUMBER OF BATHS	5

NET WATER USAGE ESTIMATE

ESTIMATED NET WATER USAGE
4 ACTIVE BATH SETS X 4 GPM = 16 GPM
(1 COUNTER CURRENT TANK SET, 1 MIXED TANK OF COUNTER CURRENT AND CITY WATER AND 1 FLOW THROUGH TANK)

LEGEND

- DIRECTION OF FLOW
- CS — EXISTING CONDUCTIVITY CONTROLLER
- SV — EXISTING SOLENOID VALVE

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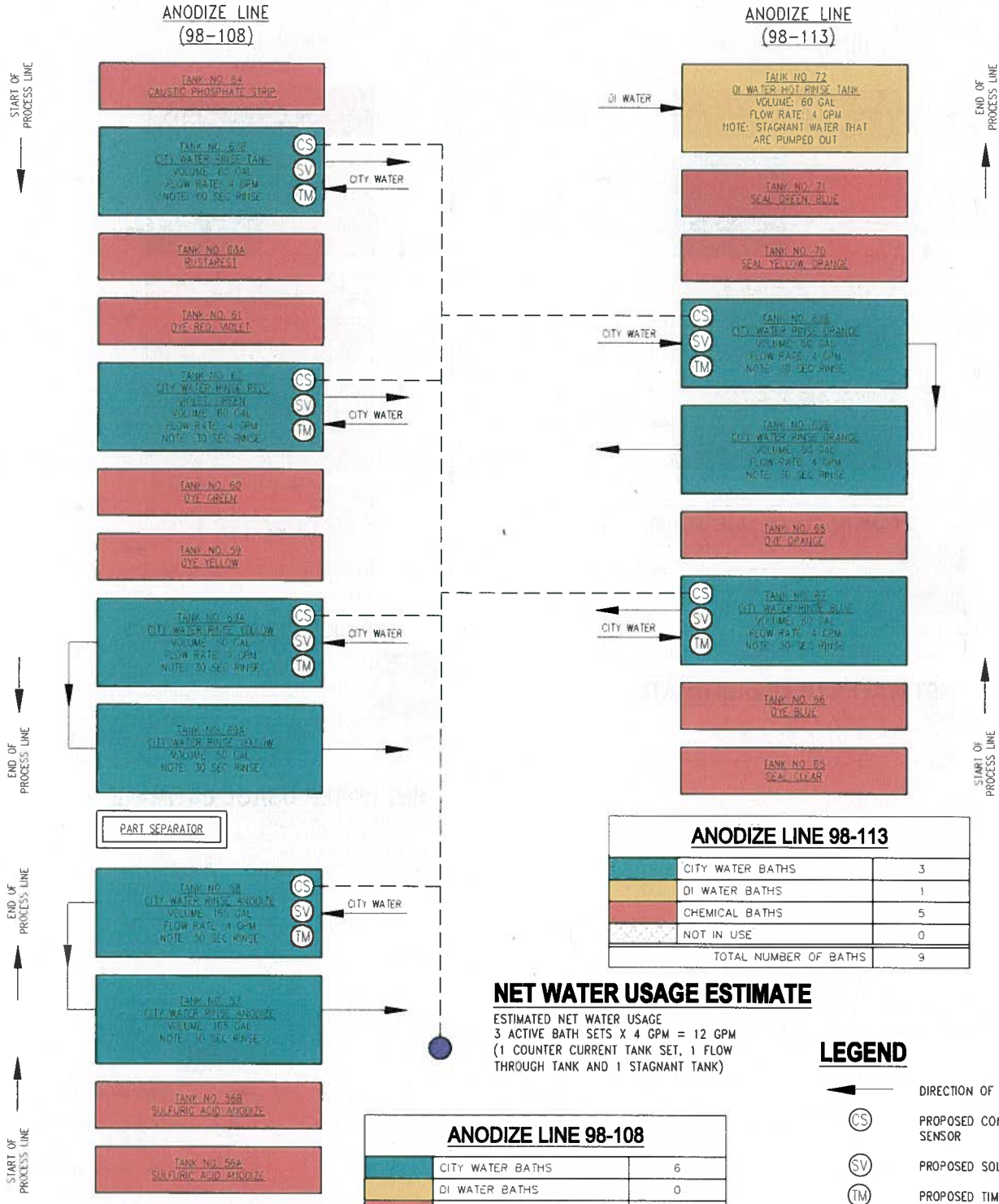
FIGURE 7
TITANIUM CLEAN LINES
98-105 AND 98-106

Proj. No.: 29880043		Date: MARCH 2012
Project: West Basin Municipal Water District Recirc & Save Program		Customer: Alcoa Fastening Systems
Drawn by: AC	Checked by: SK	Figure: 8



ANODIZE LINE 98-113	
CITY WATER BATHS	3
DI WATER BATHS	1
CHEMICAL BATHS	5
NOT IN USE	0
TOTAL NUMBER OF BATHS	9

NET WATER USAGE ESTIMATE

ESTIMATED NET WATER USAGE
3 ACTIVE BATH SETS X 4 GPM = 12 GPM
(1 COUNTER CURRENT TANK SET, 1 FLOW THROUGH TANK AND 1 STAGNANT TANK)

ANODIZE LINE 98-108	
CITY WATER BATHS	6
DI WATER BATHS	0
CHEMICAL BATHS	7
NOT IN USE	0
TOTAL NUMBER OF BATHS	13

NET WATER USAGE ESTIMATE

ESTIMATED NET WATER USAGE
4 ACTIVE BATH SETS X 4 GPM = 16 GPM
(2 COUNTER CURRENT TANK SETS AND 2 FLOW THROUGH TANKS)

LEGEND

- DIRECTION OF FLOW
- (CS) PROPOSED CONDUCTIVITY SENSOR
- (SV) PROPOSED SOLENOID VALVE
- (TM) PROPOSED TIMER
- PROPOSED CONDUCTIVITY CONTROLLER

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FIGURE 8
ANODIZE LINES 98-108 AND 98-113

Proj. No.: 29880043		Date: MARCH 2012
Project: West Basin Municipal Water District Recirc & Save Program		Customer: Alcoa Fastening Systems
Drawn by: AC	Checked by: SK	Figure: 9

APPENDIX B

PORTABLE WATER USAGE DATA

Appendix B
Alcoa Fastening Systems
Recirc & $ave Program

Potable Water Use Data

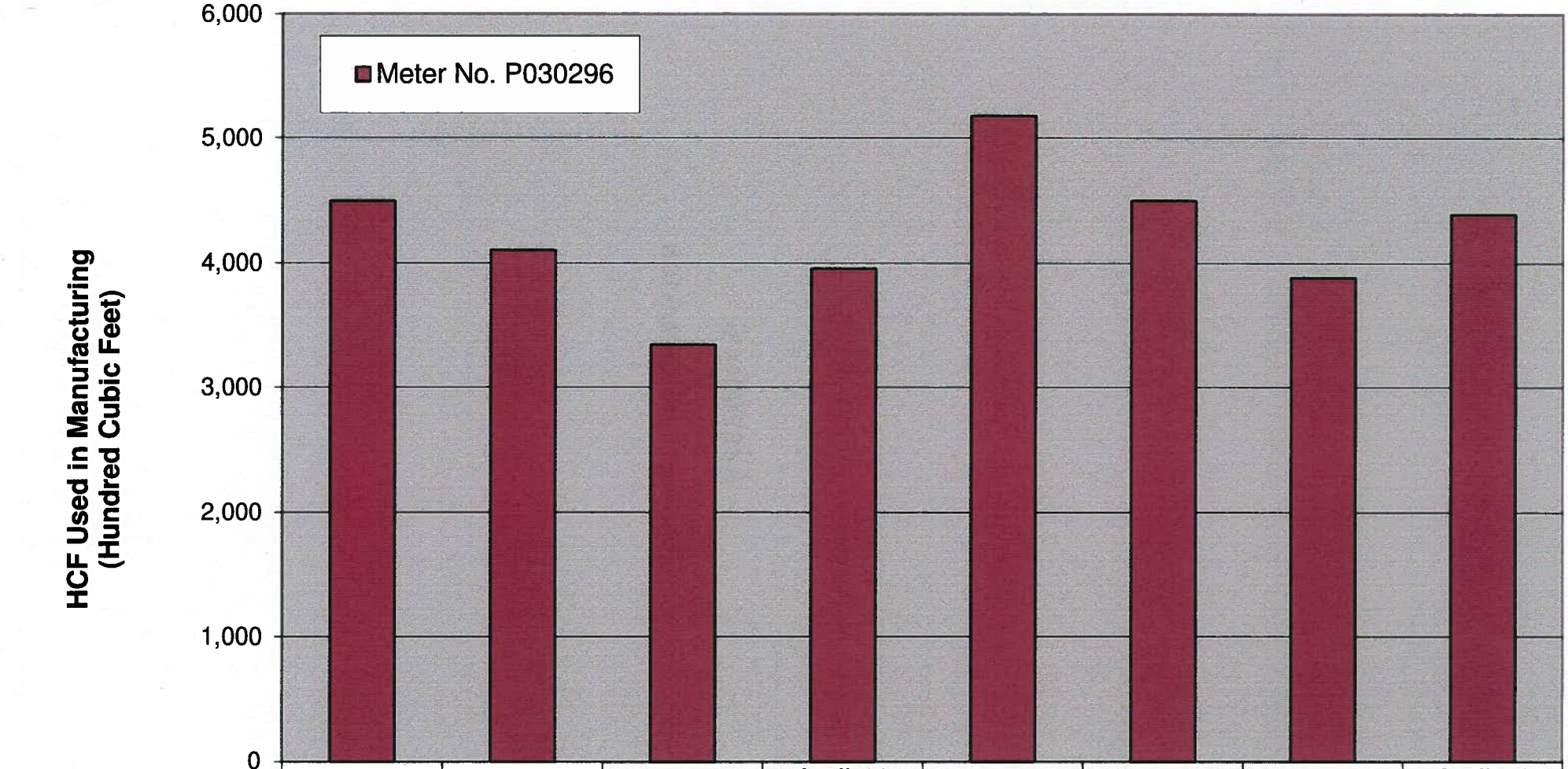
	Months of Cycle Read	Total HCF Used Meter No. P030296	Total Gallons Used
Start of Read Cycle	July-09 to Sep-09	4,493	3,360,764
	Oct-09 to Dec-09	4,102	3,068,296
	Jan-10 to Mar-10	3,341	2,499,068
	April-10 to June-10	3,955	2,958,340
	July-10 to Sep-10	5,176	3,871,648
	Oct-10 to Dec-10	4,497	3,363,756
	Jan-11 to Mar-11	3,882	2,903,736
End of Read Cycle	April-11 to June-11	4,390	3,283,720
	Net Total	33,836	25,309,328

Notes:
- Meter No. P030296 is for manufacturing (i.e., parts fabrication, salt bath cleaning process and chemical process). Potable water use by Administration, facility restrooms and site irrigation measured on a separate meter.
- HCF = hundred cubic feet, 1 HCF = 748 Gallons

Average HCF Used Per Month in Manufacturing Operations	1,410
Average Gallons Used Per Month in Manufacturing Operations	1,054,555
Average Million Gallons Used Per Year (July 2009 - June 2011)	12.7
Working Days Per Year (Monday through Saturday)	312
Average Gallons Per Working Day	40,560

Appendix B
Alcoa Fastening Systems
Recirc & $ave Program

Potable Water Use Data



	July-09 to Sep-09	Oct-09 to Dec-09	Jan-10 to Mar-10	April-10 to June-10	July-10 to Sep-10	Oct-10 to Dec-10	Jan-11 to Mar-11	April-11 to June-11
Meter No. P030296	4,493	4,102	3,341	3,955	5,176	4,497	3,882	4,390

Months of Cycle Read

APPENDIX C

PRODUCT INFORMATION

sc1000™ Multi-parameter Universal Controller

The Hach Model sc1000 Multi-parameter Universal Controller is a state-of-the-art modular controller system. Use it directly with 8 sensors or network several together to accommodate many more sensors and parameters. It is completely compatible with Hach's full range of digital sensors.

Features and Benefits

Modular System

The Hach sc1000 Multi-parameter Universal Controller is a fully modular system consisting of a Display Module and one or more Probe Modules.

Display Module—The sc1000 Display Module is intuitive, with an easy to use interface and large color touch-screen display that can be used for any number of parameters. One Display Module controls one or several Probe Modules connected by a digital network. The Display Module is fully portable, and can be disconnected and moved anywhere within the network. The Display Module is also available with GSM capability.

Probe Module—Each sc1000 Probe Module provides power to the system and can accept up to 8 digital sensors/expansion boards. Probe Modules can be networked together to accommodate up to 32 digital sensors/expansion boards attached to the same network.

"Plug and Play" Operation

There's no complicated wiring or set up procedures with the sc1000 controller. Just plug the sensor into a Probe Module and it's ready for use. No special ordering or software configuration is needed.

Mix and Match Digital Sensors

Any Hach digital sensor can be plugged into the sc1000 Probe Module in any combination. Available parameters include—but are not limited to—dissolved oxygen, pH, ORP, conductivity, turbidity, suspended solids, nitrate, chlorine, ammonia, phosphate, etc.

Calculations Capabilities

The user can define many functions with the sc1000 controller that is necessary to complete useful calculations. This value is displayed as a probe reading and can be output and/or used to control processes. Each calculated value takes up one 4-20 mA signal.

Flexible Input/Output Options

Communication and relay options for the sc1000 controller can be configured to suit any situation. Available configurations for a single Probe Module include:

- *up to 4 relay contacts for alarm and control functions,*
- *up to 12 analog outputs for measured values,*
- *up to 12 analog or digital inputs from non-digital sensors (i.e., flow or pressure sensors),*
- *up to 8 digital inputs from digital sensors,*
- *select from multiple network card options such as MODBUS®, PROFIBUS DP, and more. (Contact your Hach representative for available network options.)*

Additional relays and analog inputs/outputs can be added by networking additional Probe Modules or optional DIN-rail communication modules.

Advanced Communication Options

Use the sc1000 controller for hassle-free communications. Advanced communication features include:

- *Ethernet port (standard)—attach a computer directly to the sc1000 controller to operate the system from the computer. Download data logs and upload software updates.*
- *GSM wireless modem (optional; SIMM card purchased separately)—integrated into the Display Module. Use it for remote operation of the controller and sensors, including data log transfer and software updates. Text message errors, warnings, and process events can be sent to up to four user-selectable recipients and a Hach Company service number. (FCC and IC approved.)*

Digital Reliability and Integration

Digital signals between the sc1000 controller and attached sensors assure data integrity and immunity from signal interference. Digital outputs from the sc1000 make it easy to integrate the controller into an existing network.

Expandable and Upgradeable

The Hach sc1000 Controller can adapt to your needs. Change probes without changing the controller. With a single Display Module, additional Probe Modules can be added or removed depending on operational needs. Fully upgradeable software ensures that this system will not be obsolete. Hach service plans are available.

DW
WW
PW
IW

DW = drinking water WW = wastewater municipal **PW = pure water / power**
IW = industrial water **E = environmental** C = collections **FB = food and beverage**

HACH®

Be Right™

Specifications*

Ambient Conditions
Operation: -20 to 55°C (-4 to 131°F);
0 to 95% relative humidity, non-condensing

Storage: -20 to 70°C (-4 to 158°F);
0 to 95% relative humidity, non-condensing

Power Requirements
100 to 230 Vac, 50/60 Hz

Power: 75 W

Optional: 24 Vdc

Display
1/4 VGA graphical backlit TFT color touch screen

Size: 11.4 x 8.6 cm (4.5 x 3.4 in.)

Resolution: 320 x 240 pixels

Relays
Up to four SPDT, user-configurable contacts rated 100 to 230 Vac, 5 Amp resistive maximum, per probe module. Additional relays are available with additional probe modules.

Outputs
Up to 12 analog 0/4-20 mA, maximum impedance 500 Ohms per probe module.

Additional analog outputs with additional probe modules.

Optional digital communications via MODBUS® (RS-485) or PROFIBUS DP.

Inputs
Up to 12 analog 0-20 mA, maximum impedance 500 Ohms per probe module.

Additional inputs are available with additional probe modules.

Control
PID, high/low phasing, setpoint, deadband, overfeed timer, off delay, and on delay

Alarms
Low alarm point, low alarm point deadband, high alarm point, high alarm point deadband, off delay, and on delay

Communication (Optional)
MODBUS® (RS-485): Advanced communications/networking with PLC or SCADA system directly from analyzer.

PROFIBUS DP

GSM cellular module (FCC and IC approved)

Ethernet service port (standard)

Memory Backup
All user settings are retained indefinitely in memory (non-volatile) (EEPROM)

Mounting Configurations
Surface, panel, and pipe (horizontal and vertical)

Optional sun shield

Enclosure
IP65; ABS (display module) and metal (probe module) enclosure with corrosion-resistant finish

Dimensions
Probe module with attached display module:
315 x 250 x 142 mm (12.4 x 9.8 x 5.6 in.)

Weight
Approximately 6.5 kg (14.3 lbs.) depending on configuration

Certifications
North American Certifications:
cTUVus to UL 61010A-1 and CSA C22.2 No. 1010.1
FCC ID QIPMC56 / IC ID 267W-MC56

European Certifications:
CE per 73/23/EEC and 89/336/EEC
TUV-GS to EN 61010-1
EN 61326 Amd's 1 & 2

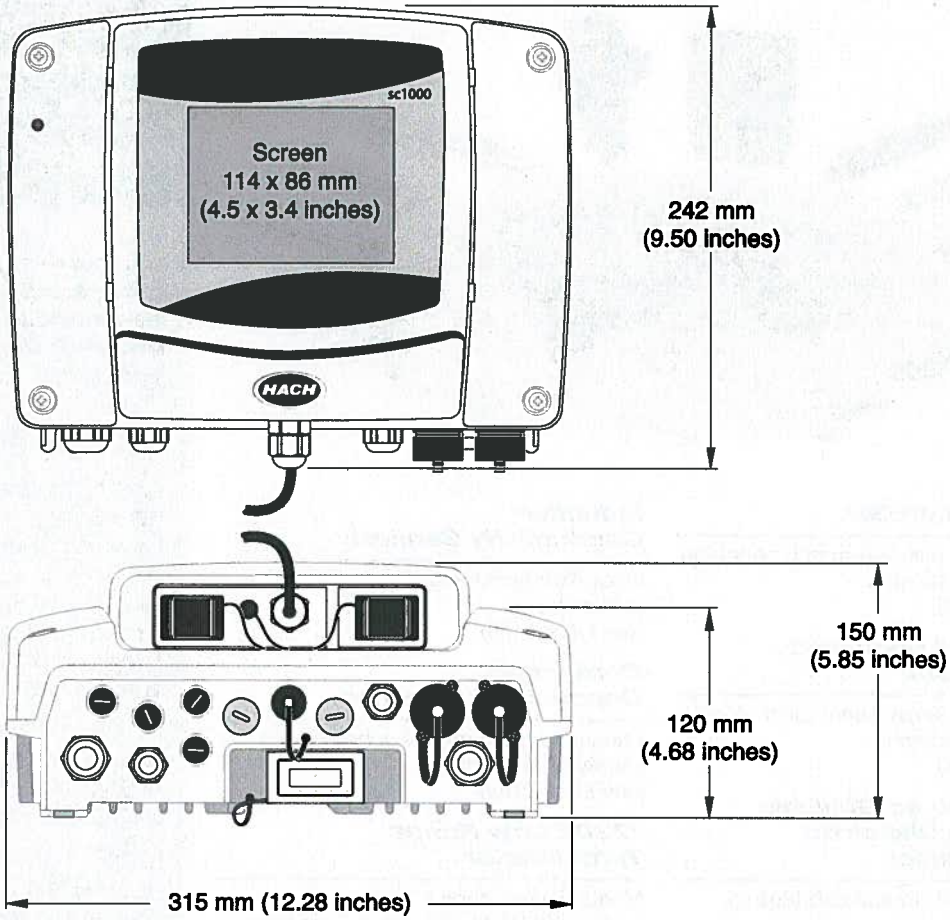
**Specifications subject to change without notice.*

Engineering Specifications

1. The controller shall consist of a portable display module connected to one or more probe modules.
2. The portable display module shall have a color graphical touch-screen display.
3. Connections between the sensors and the controller shall be "plug and play."
4. The controller shall have the option for MODBUS or PROFIBUS DP communication.
5. The interface unit shall allow operators to control sensor and interface functions with menu-driven software.
6. The controller shall have up to four potential free relays, twelve analog outputs and twelve analog inputs per probe module (all expandable via the controller's internal network).
7. The controller shall have an Ethernet service port for direct connection to a personal computer for transfer of data and software updates.
8. The controller shall be housed in an IP65 enclosure. An optional sun shield shall be available.
9. The controller shall be mounted horizontally or vertically on surface or pipe. An optional sun shield shall be available.
10. The AC power supply shall be housed in the interface unit and automatically accept input in the range of 100 to 230 Vac, 50/60 Hz. A 24 Vdc probe module shall be available as an option.
11. All system components shall be certified as follows. North American Certifications: cTUVus to UL 61010A-1 and CSA C22.2 No. 1010.1; FCC ID QIPMC56 / IC ID 267W-MC56. European Certifications: CE per 73/23/EEC and 89/336/EEC; TUV-GS to EN 61010-1; EN 61326 Amd's 1 & 2.
12. The controller shall be warranted for 12 months against defects in material and workmanship.
13. The controller shall be Hach Company Model sc1000 Multiparameter Universal Controller.

Dimensions

The sc1000 controller unit can be installed on a pole, wall, or a floor stand. No tools are needed to connect the controller unit to any Hach digital sensor.



Ordering Information

LXV402.99.00002 sc1000 Display Module

LXV402.99.01002 sc1000 Display Module with GSM

LXV400.99.1R572 sc1000 Probe Module, 4 Sensors, 4 mA Out, 4 mA In, 4 Relays, 110-230V

LXV400.99.1B572 sc1000 Probe Module, 4 Sensors, 4 mA Out, 4 mA In, 4 Relays, RS-485 (MODBUS), 110-230V

LXV400.99.1F572 sc1000 Probe Module, 4 Sensors, 4 mA Out, 4 mA In, 4 Relays, PROFIBUS DP, 110-230V

LXV400.99.1R582 sc1000 Probe Module, 6 Sensors, 4 mA Out, 4 mA In, 4 Relays, 110-230V

Additional combinations are available. Contact your Hach representative or call 1-800-227-4224 for more information.

Power Cords

5448800 Power Cord with strain relief, 125 Vac, American-style plug

5448900 Power Cord with strain relief, 230 Vac, European-style plug

Accessories

6169900 sc1000 Panel Mount Kit

LZX958 Sun Shield, for sc1000 controller

LZX918 sc1000 internal network connector

LZX988 sc1000 internal network cable, 100 m (328 ft.)

LZX989 sc1000 internal network cable, 500 m (1640 ft.)

To complete your digital measurement system, choose from Hach's family of digital products...

sc100™ Controller

Plug-and-play, mix-and-match operation for one or two sensors
(see Lit. # 2463)

Hach LDO™ Dissolved Oxygen Probe

Break-through luminescent technology for dissolved oxygen
(see Lit. # 2455)

Model 5740 sc Galvanic Membrane Dissolved Oxygen Sensor

Replaceable membrane cartridge for simple maintenance
(see Lit. # 2469)

Differential pH and ORP Sensors

Three electrodes for increased measurement accuracy
(see Lit. # 2467)

3/4-Inch Combination pH and ORP Sensor Kits

Designed specifically for immersion or in-line mounting
(see Lit. # 2470)

Inductive Conductivity Sensors

Innovative technology for harsh environments
(see Lit. # 2465)

Contacting Conductivity Sensors

Enhanced performance sensors for a variety of applications
(see Lit. # 2468)

1720E Low Range Turbidimeter

Meets performance criteria established by the USEPA for regulatory reporting
(see Lit. # 2457)

SOLITAX® sc Turbidity and Suspended Solids Sensors

Accurate, color-independent measurement in any application
(see Lit. # 2472)

NITRATAX™ UV Nitrate Sensors

Simple and accurate technology for low cost of operation
(see Lit. # 2464)

At Hach, it's about learning from our customers and providing the right answers. It's more than ensuring the quality of water—it's about ensuring the quality of life. When it comes to the things that touch our lives...

Keep it pure.

Make it simple.

Be right.

For current price information, technical support, and ordering assistance, contact the Hach office or distributor serving your area.

In the United States, contact:

HACH COMPANY World Headquarters
P.O. Box 389
Loveland, Colorado 80539-0389
U.S.A.
Telephone: 800-227-4224
Fax: 970-669-2932
E-mail: orders@hach.com
www.hach.com

U.S. exporters and customers in Canada, Latin America, sub-Saharan Africa, Asia, and Australia/New Zealand, contact:

HACH COMPANY World Headquarters
P.O. Box 389
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APPENDIX D

WATER REDUCTION AND COST SAVINGS ESTIMATES

Appendix D
Alcoa Fastening Systems
Recirc & $ave Program

Estimated Water Reduction

The following manufacturing operations are performed at the facility, which use significant amounts of potable water:

- Parts fabrication, fifteen various size washing machines operates throughout the facility (approximately 25% of total water use of Meter P030296);
- Salt bath cleaning process, two process lines (approximately 35% of total water use of Meter P030296);
- Chemical process, ten process lines (approximately 45% of total water use of Meter P030296); and
- Administration, facility restrooms and site irrigation are metered off Meter X525608.

	Percentage of Water Consumption off Meter P030296	Water Use per Day	Annual Water Usage
	(%)	(gal/day)	(Mgal/yr)
Parts Fabrication	20%	8,112	2.5
Salt Bath Cleaning Process	35%	14,196	4.4
Chemical Process	45%	18,590	5.8
Total Water Usage for Salt Bath Cleaning Process and Chemical Process		**32,786**	**10.2**

	Annual Water Usage	Average Water Consumption Reduction by Percentage	Estimated Water Saving Volume
	(Mgal/yr)	(%)	(Mgal/yr)
Total Water Usage for Salt Bath Cleaning Process and Chemical Process	10.2	20%	**2.0**

Appendix D
Alcoa Fastening Systems
Recirc & $ave Program

Potential Annual Water and Wastewater Cost Savings

	Average Annual Water Usage for Salt Bath Cleaning Process and Chemical Process Before Installation of Conservation Technologies	Estimated Annual Water Saving Volume		Average Annual Water Usage After Installation of Conservation Technologies	Estimated Annual Water and Wastewater Savings		Net Potential Annual Water and Wasterwater Costs Savings
					California Water Service Company Quantity Rates[1]	Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges[2]	
	(Mgal/yr)	(Mgal/yr)	(HCF/yr)	(Mgal/yr)	($2.7738 per HCF)	($746 per Mgal)	
Total Water Usage for Salt Bath Cleaning Process and Chemical Process	10.2	2.0	2,727	8.2	$ 7,565	$ 1,522	$ 9,087

(1) Quantity Rates of $2.7738 does not include various surcharges authorized by the California Public Utilities Commission.

(2) 2010- 2011 LACSD Wastewater Treatment Surcharges:

a. Total Flow Volume Per Year (Mgal/yr) x $746.00

b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $ 131.90

c. Total Suspended Solids Per Year (1000 of lbs) x $ 372.70

d. Average Peak Flow Rate (gal/min) x $ 98.90

For this preliminary estimate, surcharges b, c and d are assumed to be constant and are omitted from the Wastewater Treatment Surcharges calculation.

APPENDIX E

ESTIMATED PROGRAM FUNDING

Appendix E
Alcoa Fastening Systems
Recirc & $ave Program

Estimated Program Funding

Potential Program Cash Incentives			
Average Annual Water Usage After Installation of Conservation Technologies	**2.0 Mgal/yr**		
Water Reduction Incentive	Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period.	$	6,120
Equipment Cost Incentive*	Reimbursement of the equipment cost of up to $5,000 maximum based on the $3.00 per 1,000 gallons saving rate over a one-year period.	$	5,000
Installation Cost Incentive	Reimbursement of the equipment installation of up to $5,000 maximum based on actual installation costs.	$	5,000
	Potential Program Cash Incentives	**$**	**16,120**

*A minimum of 1.67 Mgal/yr of water savings is necessary to obtain the Equipment Cost Incentive.

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INDUSTRIAL PROCESS WATER AND COOLING TOWER WATER REDUCTION PROGRAM

FIELD SURVEY REPORT
prepared for:

Enterprise Rent-A-Car

9020 Aviation Blvd.
Inglewood, CA 90301
Multiple Locations

Prepared by:

RMC Water and Environment
15510-C Rockfield Blvd., Suite 200
Irvine, CA 92618

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PROGRAM DESCRIPTION

The West Basin Municipal Water District (West Basin) in cooperation with the Metropolitan Water District of Southern California (MET) has developed the **RECIRC & $AVE** Program (Program) for large users of water in industrial process operations and cooling towers. The Program provides funding to West Basin Customers for installing equipment that captures, treats, saves, and reuses water that is normally discharged to the sewer. The Program is made possible through funding from the California Department of Water Resources, the U.S. Department of the Interior Bureau of Reclamation, and your local water agency. West Basin is assisted in conducting the Program by URS Corporation (URS), RMC Water and Environment (RMC), and Maureen Erbeznik and Associates.

Qualifications for participating in the Program include:

- Must be a Customer of West Basin Municipal Water District or one of its water retailers;
- Enroll in the Program before water savings improvements have been made at the facility;
- Install and operate the water savings equipment; and
- Obtain a measured water savings over a monitoring period of mutually agreed upon duration such as six months.

This report summarizes the results of a Field Survey (Survey) conducted at Enterprise Rent-A-Car (Enterprise) in Inglewood, California by RMC on Friday, November 6th, 2012. The goal of the Survey process is to identify targeted businesses that possess the potential for significant water reduction in their facilities and that meet the qualifications to participate in the Program.

This Survey is limited in its scope to collecting basic information via interviews, a brief site visit, and review of follow-up information provided by the facility owner. No independent measurements had been made at the time of drafting this report and the accuracy of the information provided was not verified, except as is possible by the site visit. The Survey is not intended to be a detailed investigation and data have been voluntarily provided by the Customer. Recommendations made in this report are based on the data collected during the site visit and a review of limited facility water records.

FACILITY DESCRIPTION

Enterprise Holdings has multiple locations and owns Alamo, National and Enterprise rental cars. The main location is located in Inglewood, California and provides rental cars. This facility has four carwash bays, large parking lots with minimal landscape, and a large administrative office.

POTABLE WATER USE

The City of Inglewood is the local water retailer for Enterprise at the Aviation location. **Appendix B** of this report summarizes the water use records provided by the City of Inglewood. Enterprise operates seven days a week 24 hours per day, but water usage fluctuates with seasonal and weekly car rental

patterns. For the purpose of this report, it is assumed that Enterprise operates 365 days per year and water use is averaged uniformly over this period.

Based on water use data provided, Enterprise used an average of 8.4 million gallons (MG) per year of potable water for process operations during the 12-month period beginning November 2011. The average daily process water use for the Enterprise facility calculates to approximately 23,100 gallons per working day (GPD).

Enterprise sewer services are provided by the Sanitation Districts of Los Angeles County. It is assumed that the sewer discharge rate is approximately equal to the water use rate. Based on this assumption, Enterprise discharges approximately 23,100 GPD to the sewer and the annual sewage discharge is around 8.4 MG.

DESCRIPTION OF EQUIPMENT USING SIGNIFICANT WATER VOLUME

Enterprise operates a rental car company and the majority of the water usage is in the carwash process. Water is also used in restrooms in the car wash area and for landscape irrigation. Compared to the carwash usage, water used in the car wash area restrooms and for landscape irrigation is negligible. The rental car customer area restrooms are served through a separate water meter.

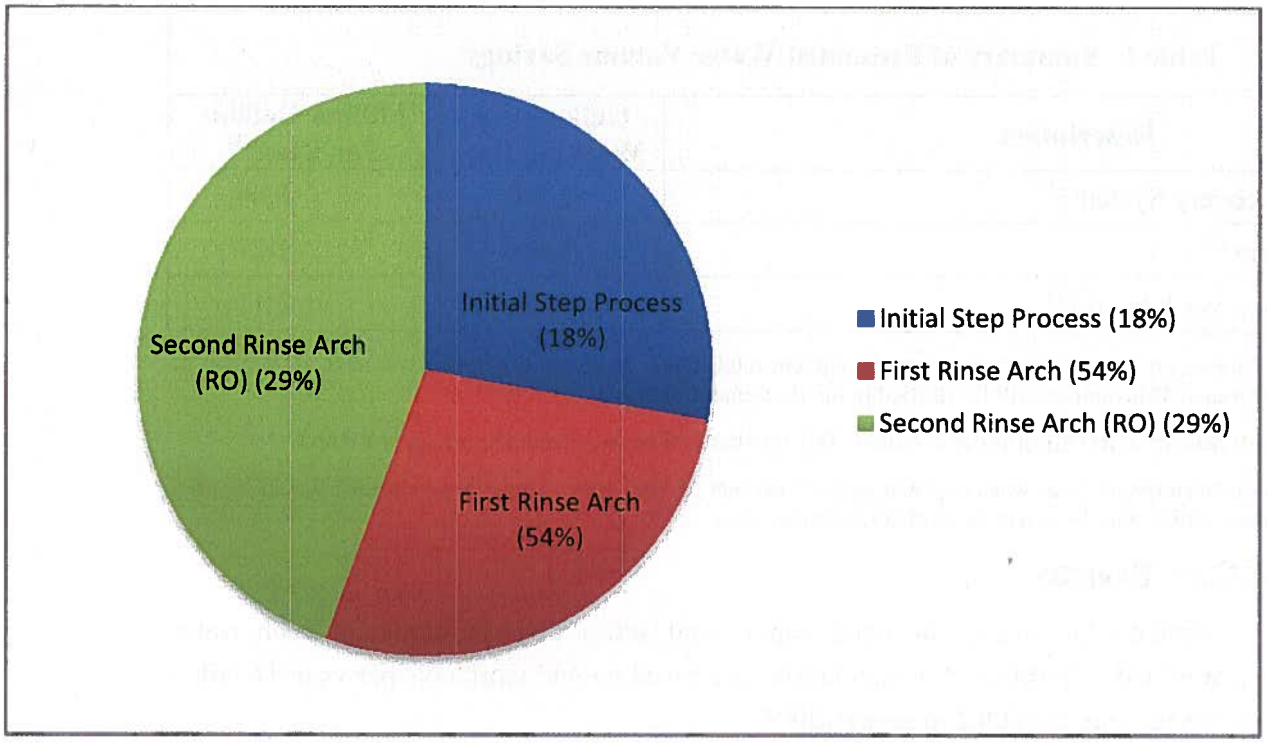
Each car wash bay uses three types of water:

1) Water draining from the car wash bays is collected and reused in the initial wash step of the process.

2) The car wash system uses a mixture of potable water and a drying agent in the "first rinse arch". The first rinse arch, which is fresh water mixed with a drying agent, uses approximately 10 gpm.

3) An RO treatment system located at the Enterprise site produces RO water from potable water for use in the final rinse "RO arch". RO treatment system reject water is discharged to sewer. The RO arch (second arch) uses approximately 16 gpm. A rinse cycle for a minimum of 20 seconds is recommended.

An estimate of water use by process is presented in the following chart. The Enterprise Facility has installed flowmeters on the supply piping within one of the car wash bays to refine the assumptions for water use by car wash step.



Note: Based on communication with Bill Bettison, Operations Manager (January 2, 2013), the first rinse uses 10 gpm and the second rinse arch uses 16 gpm. It is assumed 10 gpm is used for the initial step process.

Description of Potential Water Savings Technologies

Three potential projects were identified for water conservation:

1. Installation of a Water Recovery System to supply the first rinse step and RO system feed water
2. Modify the RO process to reduce reject water
3. Replace one or more car wash bays with more water efficient systems.

Estimated Annual Water Volume Savings

A summary of the estimated water volume savings in water supply and sewer disposal for each water conservation options is provided in **Table 1**. All calculations are based on 365 workdays per year.

Table 1. Summary of Estimated Water Volume Savings		
Description	**Gallons per Working Day**	**Million Gallons Per Year [1]**
Option 1: Water Recovery System [1]	2,310	0.84
Option 2: RO System [2]	3,470	1.27
Option 3: Replace car wash bay(s) [3]	5,780	2.11

(1) Calculated based on 365 workdays per year, 10 percent total usage. Assumes Enterprise will save 10 percent of total water usage. This number will be verified in the Equipment Report.

(2) Assumed 50 percent of RO reject water is reused. This number will be verified in the Equipment Report.

(3) Assumed replacement of 1 car wash bay will save 25 percent of total water usage. New carwash would be used most frequent while other bays will be used during busier time.

ESTIMATED ANNUAL COST SAVINGS

A summary of the estimated cost savings in water supply and sewer disposal costs for each water conservation option is provided in **Table 2**. All calculations are based on 365 workdays per year. Detailed calculations of the cost savings are provided in **Appendix C**.

Table 2. Summary of Estimated Cost Savings		
Description	**Estimated Annual Water Savings [4]**	**Estimated Annual Sewer Savings [5]**
Option 1: Water Recovery System [1]	$5,072	$644
Option 2: RO System [2]	$7,620	$968
Option 3: Replace car wash bay [3]	$12,692	$1,612

Notes:
(1) Calculated based on 365 workdays per year, 10 percent total usage.
(2) Calculated based on 365 workdays per year, 50 percent of RO reject water (15 percent of total usage).
(3) Calculated based on 365 workdays per year, 25 percent total usage.
(4) Water savings estimate is based on City of Inglewood Quantity Rates of $4.50 per HCF is effective October 1, 2012.
(5) Sewer savings estimate is based on 2012 - 2013 LACSD Wastewater Treatment Surcharge Rate of Total Flow Volume of $764 per Mgal. This estimate does not include charges associated with Total Chemical Oxygen Demand and Total Suspended Solids.

The total estimated water usage cost savings for Enterprise is estimated based on an estimated annual water use reduction and City of Inglewood's Quantity Rates of $4.50 per hundred cubic feet (HCF).

The total estimated wastewater treatment surcharge cost savings for Enterprise is based on an estimated annual water use reduction and LACSD's 2012-2013 Wastewater Treatment Surcharge Statement. For this estimate, surcharges for Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), and Average Peak Flow Rate are assumed to be constant and are omitted from the total estimated wastewater treatment surcharge cost savings. Although the concentration of these constituents may increase with the reduction of water usage, the total mass (lbs) of COD and TSS would remain the same.

PROGRAM APPLICATION

Enterprise Rent-A-Car is considered a viable candidate to proceed with a more detailed Equipment Survey and to participate in the **RECIRC & $AVE** Program. The water recovery system is a technology already implemented at other company facilities. Based on operating results, the most suitable type of reuse system can be selected and implementation experience from other facilities will facilitate the implementation at Enterprise. Enterprise is recommended for participation in the Program.

The next step in the Program is for the Engineer to conduct an Equipment Survey of the Enterprise facility. This survey will include additional review of the process system's available drainage layout schematics, impact of the proposed process on wastewater discharge, more detailed cost analysis and identification of next steps for implementation. During the Equipment Survey, an appropriate flow monitoring point will be identified to confirm the anticipated water savings over a one-year period as required for participation in the Program.

ADDITIONAL UTILITY INCENTIVE PROGRAMS AVAILABLE

In addition to the Program under West Basin, other utility incentive programs are also available for industrial customers.

The Southern California Gas Company and Southern California Edison are offering potential cash incentives to qualifying industrial users for reduction in gas and electricity usage. The South Bay Environmental Services Center serves as a regional clearing house for information about programs offered by the Southern California Gas Company and Southern California Edison. Visit www.sbesc.com or call (310) 371-7222 for further information.

The MET's So Cal Water Smart also provides rebates to industrial customers for commonly used plumbing fixtures, such as toilets and urinals. Call Elise Goldman at West Basin (310) 660-6253 or visit socalwatersmart.com for more information on these and other water saving devices.

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Appendix A: Enterprise Rent-A-Car
Recirc & $ave Program: Site Inspection Survey

Company:	**Enterprise Rent-A-Car**
Address:	9020 Aviation Blvd
City:	Inglewood
Zip Code:	CA 90301
Type of Business:	Car Rental with car washing on site
Name of Facility Contact:	**Al Chilimidos**
Title:	Account Manager
Direct Telephone Number:	(323) 234-2001
Email Address:	Al.Chilimidos@abm.com
Facility Hours of Operation:	24 hours a day
Number of Work Shifts per Day:	N/A
Facility Days of Operation per Week:	7 days a week

Process Water Reduction

What manufacturing processes use potable water and what percent of total water use?

Nearly all of the potable water is used for the washing the rental cars. Administration is minimal and there is very minimal landscape irrigation.

Does Facility have an existing potable water reduction program? ☒ **Yes** ☐ **No**

Describe conservation technologies installed or considered to be installed at facility including what level of planning has already been undertaken.

Enterprise has an RO System in place which treats the water for the final rinse, and also reuses water in the first rinse.

Is there any on-site water treatment? ☒ **Yes** ☐ **No**

Briefly describe what streams are treated.

Enterprise has an RO System in place which treats the water for the final rinse and uses a settling basin to separate sediments prior to reuse of drain water in first rinse.

Appendix A: Enterprise Rent-A-Car
Recirc & $ave Program: Site Inspection Survey

Is there any on-site recycling of water? ☒ **Yes** ☐ **No**
Briefly describe what streams are recycled.
Water draining from the car wash bays is collected and reused in the initial wash step.

Does Facility measure water use for each manufacturing process? ☐ **Yes** ☒ **No**

Does Facility measure wastewater discharged to the industrial sewer? ☐ **Yes** ☒ **No**
Approximate amount of water discharged to the sewer? _____

Are the processes using industrial water the same as facility hours of operation? ☒ **Yes** ☐ **No**

How long has the Facility been at the current location?
Over 20 years

Who would be responsible for implementing process changes within the facility?
Al Chilimidos

How long could the Facility allow implementing and installing a process change?
One car wash bay can be taken out of service during low rental volume times for the time needed to install the proposed modifications.

What time frame is required to make the decision to proceed with a process change?
One month or sooner.

How many active Cooling Towers are at the Facility? None

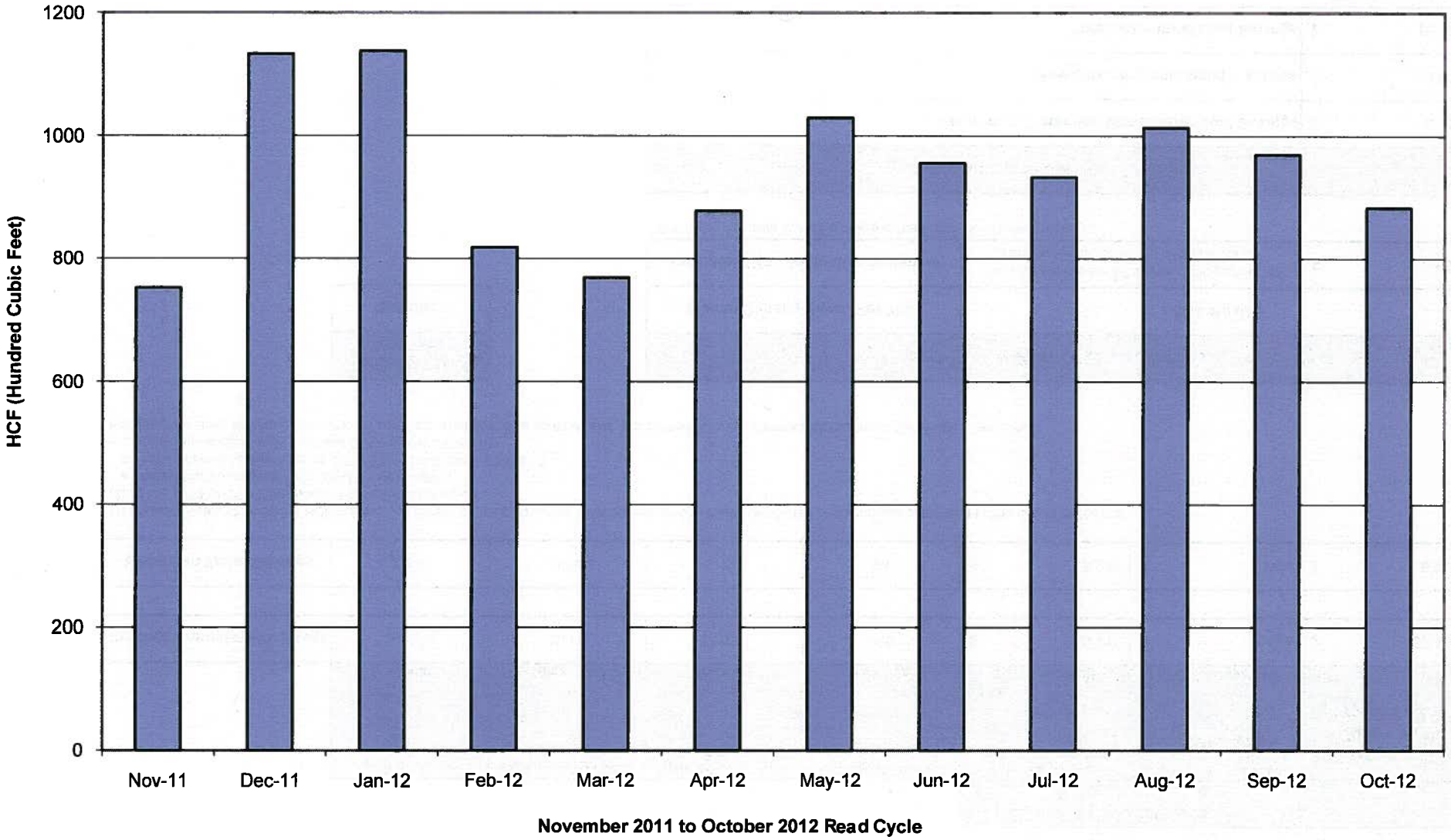
Model Number and Type? _____

Flow capacity of Cooling Tower(s)? _____

What kind of controller is used? _____

Has Facility used of considered other controllers in the past? _____

Appendix B
Enterprise Rent-A-Car
Recirc & $ave Program
Potable Water Use Data



Appendix C
Enterprise Rent-A-Car
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive
Option 1: Installation of Water Recovery System

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: City of Inglewood Quantity Rates (1) $4.500 Per HCF	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) $764 Per Mgal/yr	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	23,096	8.43	11,270	939	$ 50,715	$ 6,440	$ 57,155
Estimated Water Savings	2,310	0.84	1,127	94	$ 5,072	$ 644	**$ 5,717**

(1) Quantity Rates of $4.50 per HCF is effective October 1, 2012. Quantity Rates do not include meter service fee or surcharges authorized by the City of Inglewood.
(2) 2012 - 2013 LACSD Wastewater Treatment Surcharges:
a. Total Flow Volume Per Year (Mgal/yr) x $764.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $135.10
c. Total Suspended Solids Per Year (1000 of lbs) x $382.10
For this preliminary estimate, surcharges b and c are assumed to be constant and are omitted from the Wastewater Treatment Surcharges Calculation

Total Work Days Per Year
365 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	**0.84 Mgal/yr**	
Potential Water Reduction Incentive	Incentive payment of $6.00 per 1,000 gallons* of actual water saved over a one-year period.	**$ 5,059**

* Maximum incentive available based on performance of new system

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 5,717
Potential Program Cash Incentives	$ 5,059
Potential Annual Cost Savings	**$ 10,775**

Appendix C
Enterprise Rent-A-Car
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive
Option 2: Modification of RO System

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: City of Inglewood Quantity Rates (1) $4.500 Per HCF	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) $764 Per Mgal/yr	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	23,096	8.43	11,270	939	$ 50,715	$ 6,440	$ 57,155
Estimated Water Savings	3,470	1.27	1,693	141	$ 7,620	$ 968	**$ 8,587**

(1) Quantity Rates of $4.50 per HCF is effective October 1, 2012. Quantity Rates do not include meter service fee or surcharges authorized by the City of Inglewood.
(2) 2012 - 2013 LACSD Wastewater Treatment Surcharges:
a. Total Flow Volume Per Year (Mgal/yr) x $764.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $135.10
c. Total Suspended Solids Per Year (1000 of lbs) x $382.10
For this preliminary estimate, surcharges b and c are assumed to be constant and are omitted from the Wastewater Treatment Surcharges Calculation

Total Work Days Per Year
365 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	**1.27 Mgal/yr**	
Potential Water Reduction Incentive	Incentive payment of $6.00 per 1,000 gallons* of actual water saved over a one-year period.	**$ 7,599**

* Maximum incentive available based on performance of new system

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 8,587
Potential Program Cash Incentives	$ 7,599
Potential Annual Cost Savings	**$ 16,187**

Appendix C
Enterprise Rent-A-Car
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive
Option 3: Replacement of Car Wash Bay(s)

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: City of Inglewood Quantity Rates (1) $4.500 Per HCF	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) $764 Per Mgal/yr	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	23,096	8.43	11,270	939	$ 50,715	$ 6,440	$ 57,155
Estimated Water Savings	5,780	2.11	2,820	235	$ 12,692	$ 1,612	**$ 14,304**

(1) Quantity Rates of $4.50 per HCF is effective October 1, 2012. Quantity Rates do not include meter service fee or surcharges authorized by the City of Inglewood.
(2) 2012 - 2013 LACSD Wastewater Treatment Surcharges:
a. Total Flow Volume Per Year (Mgal/yr) x $764.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $135.10
c. Total Suspended Solids Per Year (1000 of lbs) x $382.10
For this preliminary estimate, surcharges b and c are assumed to be constant and are omitted from the Wastewater Treatment Surcharges Calculation

Total Work Days Per Year
365 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	2.11 Mgal/yr	
Potential Water Reduction Incentive	Incentive payment of $6.00 per 1,000 gallons* of actual water saved over a one-year period.	$ 12,658

* Maximum incentive available based on performance of new system

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 14,304
Potential Program Cash Incentives	$ 12,658
Potential Annual Cost Savings	**$ 26,962**

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INDUSTRIAL PROCESS WATER AND COOLING TOWER WATER REDUCTION PROGRAM

EQUIPMENT SURVEY REPORT

prepared for:

Enterprise Holdings

9020 Aviation Blvd.
Inglewood, CA 90301
Multiple Locations

Prepared by:

RMC Water and Environment
15510-C Rockfield Blvd., Suite 200
Irvine, CA 92618

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REPORT SUMMARY

RETROFITS AND UPGRADES

Enterprise Holdings (Enterprise) has a carwash facility for the Alamo car rental location in Inglewood. The car wash facility is equipped with four carwash bays, each with three rinse steps called "arches". The facility also houses an RO water treatment system and two water reuse storage and pumping systems. Enterprise is considering implementing upgrades to the carwash facility to reduce potable water use.

CHANGES TO OPERATIONAL PRACTICES

Enterprise provides car rental services to travelers nationwide and has multiple locations in the Southern California area. The Alamo car rental office in the City of Inglewood has a carwash facility with four carwash bays that use a significant amount of water. Implementing the proposed upgrades including the nozzles and spray jets upgrades, RO system replacement, and/or installation of the Reuse Water Treatment System will reduce water usage significantly.

POTENTIAL COST SAVINGS

RMC has worked with Enterprise to identify four upgrade options to reduce potable water use. Enterprise would replace nozzles and spinning jets on the rinse arches under Option A. Under Option B, Enterprise would replace the RO water treatment system. Option C would install a Water Reuse Treatment System and replace the pre-prep spinning jets. Option D would replace the two carwash bays having the greatest number of service hours. The approximate annual estimated cost savings under Option A is $28,600 , Option B is $5,700 , Option C is $17, 200 , and Option D is $29,700 , based on potable water and sewer disposal costs.

POTENTIAL PROGRAM INCENTIVE

Based on water savings monitored for a one-year period, and considering the West Basin's **RECIRC & $AVE** Program's (Program's) financial incentives available (i.e., maximum $6 per 1,000 gallons of actual water saved for a one-year period, up to the total capital improvement cost), the potential Program cash incentive for Enterprise is approximately $16,000 for Option A, $5,000 for Option B, $15,200 for Option C, and $26,300 for Option D.

Introduction

The West Basin Municipal Water District (West Basin) in cooperation with the Metropolitan Water District of Southern California (MET) has developed the **RECIRC & $AVE** Program (Program) for large users of water in industrial process operations and cooling towers to save water, reduce sewer discharge, and save energy. The Program provides funding to West Basin Customers for installing equipment that captures, treats, saves, and reuses water that is normally discharged to the sewer. The Program is made possible through funding from the California Department of Water Resources, the U.S. Department of the Interior Bureau of Reclamation, and your local water agency. West Basin is assisted in conducting the Program by URS Corporation (URS), RMC Water and Environment (RMC), and Maureen Erbeznik and Associates.

Qualifications for participating in the Program include:

- Must be a Customer of West Basin Municipal Water District or one of its water retailers;
- Enroll in the Program before water savings improvements have been made at the facility;
- Install and operate the water savings equipment; and
- Obtain a measured water savings over a monitoring period of mutually agreed upon duration such as six months.

Based on the results of a Field Survey Report issued on March 6, 2013, RMC identified Enterprise Holdings (Enterprise) in Inglewood, California as a potential candidate for this Program. The goal of the Equipment Survey of the facility is to obtain additional operational information for projects with the greatest potential for significant water reduction in associated facilities and that meet the qualifications to participate in the Program. The Equipment Survey Report provides a summary of the site investigation and the application of the Enterprise facility to the Program.

Facility Description

Enterprise Holdings provides car rental services to travelers and owns Alamo, National and Enterprise rental cars. Enterprise Holdings has multiple locations in the Southern California area. The main location is in Inglewood, California and provides rental car services. This facility has four carwash bays, large parking lots with minimal landscape, and a large administrative office. The location of Enterprise facility is shown on Figure 1 in Appendix A. The Enterprise facility uses approximately 11,270 hundred cubic feet of potable water per year. An initial site visit was conducted on November 6th, 2012. Further information was obtained at a subsequent meeting at the facility on March 6, 2013.

DESCRIPTION OF EXISTING EQUIPMENT USING SIGNIFICANT WATER VOLUME

Enterprise operates a rental car company and the majority of the water usage is in the carwash process. Water is also used in restrooms in the car wash area and for landscape irrigation. Compared to the carwash usage, water used in the car wash area restrooms and for landscape irrigation is negligible. The rental car customer area restrooms are served through a separate water meter.

Refer to Figure 2 in Appendix A for an illustration of the car wash bay layout. Each car wash bay uses three types of water:

1) The initial "pre-prep" wash step process reuses a portion of drain water collected from the car wash bays. Solids settle in a drain sump, and clarified water flows through a screen into a small sump located next to the reuse water storage tanks.

   The drain water from the small sump is pumped into the reuse water storage tanks. There are two 1,600 gallon reuse water tanks providing reuse water supply to pre-prep wash step. Currently the reuse water tanks are configured with an equalization connection at the lower portion of the tanks, and an automatic valve to supply make-up potable water when the water level in the tanks reaches a low level and the sump pump is not in operation.

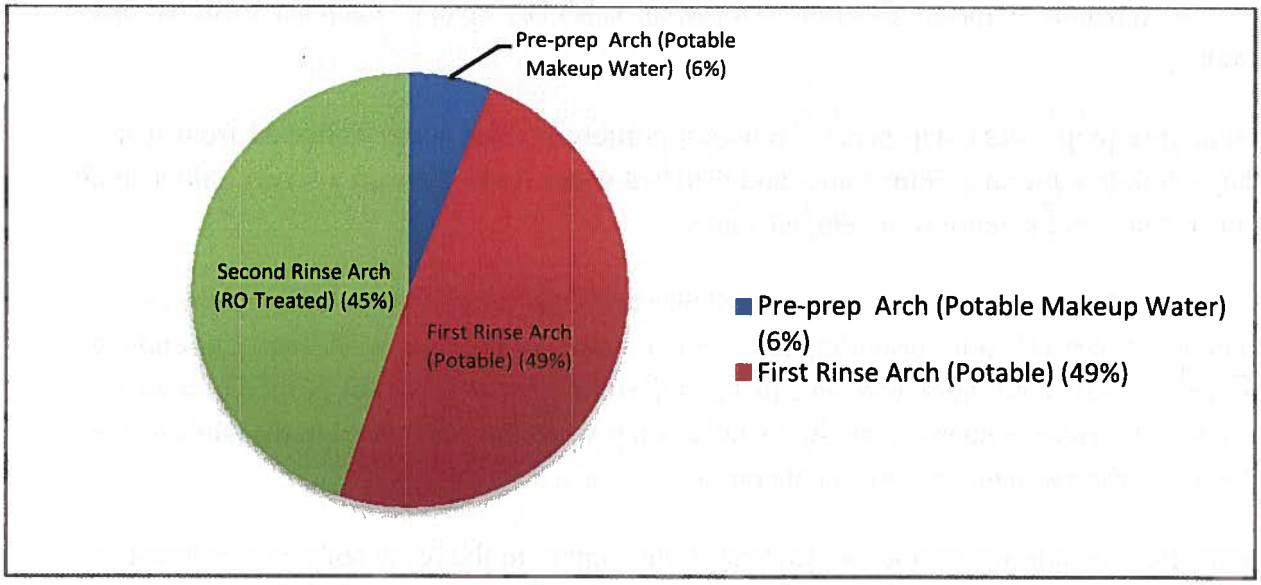
   During the flow monitoring period, the makeup water supply to the reuse tanks was estimated to be 6% of the total water use. The existing pre-prep wash step at each carwash bay contains five spinning spray jets with an approximate total flow capacity of 80 gpm. The jets are set to spray for approximately 20 seconds. RMC has been informed by a local equipment carwash equipment supplier that the existing pre-prep spinning spray jets were originally configured with solenoid valves to turn flow on as the vehicle entered the rinse phase and to turn flow off as the vehicle exited the rinse phase. However, the solenoid valves are no longer in operation. Without the solenoid valves on the jet heads, a small amount of water continues to flow out of the spray jet heads even when the pump is not operating and there is no car in the bay, because of the reuse water tank pressure head. During site visit, some leakage was observed on the pre-prep spinning jets at Carwash Bay No. 1.

2) The "first rinse arch" of the car wash system uses a mixture of potable water and a drying agent. The first rinse arch of each carwash bay consists of 11 nozzles with nominal flow of 2 gpm each. The first rinse arch nozzles are set up to spray for approximately 15 seconds.

3) An RO treatment system located at the Enterprise site produces RO water from potable water for use in the final rinse "RO arch". RO treatment system reject water is discharged to the drain sump where the drain water from car wash processes is collected. RO treatment system product water is collected in four 1,400 gallons tanks. The RO rinse water is pumped from the collected RO product water tanks. The RO arch of each carwash bay consists of 11 nozzles with nominal flow of 2 gpm each. The RO arch nozzles are set up to spray for approximately 10 seconds. Based on

field verification, it is estimated that existing RO system rejects approximately 37% of the total RO influent flow.

An estimate of water use by process is presented in the following chart. The Enterprise Facility installed one 2-inch flowmeter on the potable water supply line to the RO system, and one 1-inch flowmeter on the total potable water supply line located in Carwash Bay No. 2 to refine the assumptions for water use.



Note: Water use by process is estimated based on flow measurements and field verified nozzle spray durations, discussion with the NS Wash System Representative and discussion with Facility Manager.

DESCRIPTION OF CONSERVATION TECHNOLOGIES CONSIDERED

Enterprise is considering upgrading the existing carwash equipment and/or water treatment systems to conserve water. Four potential project options were identified. Note that for options A, B and C, the first three project elements are the same.

Option A:

- Replace existing high flow nozzles at the first rinse arch and RO arch with water efficient nozzles
- Replace pre-prep arch spinning jets with a more water efficient spray jets
- Replace automatic valves on the potable water makeup line to the Reuse Storage Tank with accessible manual valves
- Modify the RO reject to directly convey flow to the Reuse Storage Tank

Option B:

- Replace existing high reject RO system with lesser reject RO system

Option C:

- Replace pre-prep arch spinning jets with a more water efficient spray jets
- Install Reuse Water Treatment System and modify piping to provide treated reuse water to the first rinse arch

Option D:

- Replace two older carwash bays (carwash bay nos. 1 and 2) with newer water efficient carwash bays including the new reuse water treatment system and the new RO treatment system

Options A, B and C could be combined to achieve more water savings than each option individually. Option C will require replacement of pre-prep arch spinning jets with a more water efficient spray jets to minimize the need for makeup water. The detailed descriptions of the upgrades associated with each option are as follows:

Option A:

Pre-Rinse Arch: According to the information provided by existing carwash equipment manufacturer NS Wash representative, the flowrate of the five spinning jets at the pre-prep arch is approximately 80 to 100 gpm. Field measurement during site visit indicated that the jets spray for approximately 20 seconds. The existing jets also continue to flow when there is no car under the carwash bays. Replacing these spinning jets with a more water efficient spray jets will reduce water flow at pre-prep arch for approximately 50 percent.

First Rinse Arch and RO Arch: The nominal flow rate of each nozzle on the first rinse arch and the RO arch is 2 gpm and the nozzles are set to run for approximately 15 seconds. Based on the flow measurements and field verifications of the nozzle spray duration, it is estimated that the existing nozzles spray approximately 2.7 gpm. Replacement of these nozzles on the first rinse arch and the RO arch with higher efficiency nozzles will reduce water use at these wash steps by approximately 50 percent.

Reuse Tank Potable Water Make-up Automation: Closer monitoring and control of the potable water makeup system is proposed to reduce makeup water use. The volume of water used and collected from the First Rinse and RO arches easily exceeds the amount of water needed for the Pre-Rinse Arch. Therefore, make-up water should not be required to maintain sufficient level in the reuse tanks for all reuse water needs. Troubleshooting of the reuse water recovery system and upgrades would eliminate the need for make-up water under normal operating conditions. Added features may include level monitoring in the reuse water tanks, annunciation of low level prior to automatic makeup water filling, and potential modifications to the operation of the recovery sump system.

RO Reject Conveyance Modification: In addition to the general upgrades identified above, this option also would modify the RO reject water conveyance to the Reuse Storage Tank to increase quality of the reused water.

Option A will reduce overall water use at carwash process for approximately 50 percent.

Option B:

Upgrade of the RO water system is the primary component of Option B. The existing RO system is estimated to have a reject rate of 37% or higher. Replacing the existing RO system with a more efficient RO system with a reject rate of 25% will provide water savings. It is estimated that the replacement of the RO system will provide approximately 10 percent of potable water savings.

Option C:

For Option C, a new water treatment system would be installed to allow reuse in the first rinse arch rather than the use of potable water, as shown in Figure 3 provided in Appendix A. Treatment systems such as the PurClean/PurWater system provided by New Wave Industries, are designed to treat the reuse water to a level of 5 micron quality. This treated drain water could then supply the pre-prep rinse arch as well as the first rinse arch. For this option, it is assumed that the pre-prep spray jets will be replaced with a more water efficient spray jets. It is estimated that this option will provide approximately 30 percent of potable water savings.

Option D:

Option D includes replacement carwash bay nos. 1 and 2, which are the oldest systems with the greatest number of service years. The replacement of these carwash bays with water efficient carwash systems including the high efficiency water reuse system and RO treatment system will provide significant water savings. Depending on the carwash bay system and reuse treatment system selected, the water savings may vary. For the purpose of this report, the water savings for the two carwash bays replacement is estimated at 65 percent of total potable water. The flow measurements indicated that the carwash bays nos. 1 and 2 are utilized for approximately 80 percent of the total car washing at this facility. Therefore, the overall water saving for this option will be approximately 52 percent of total potable water use.

In addition to the options presented, it was observed that the parking lot size and configuration limits the use of carwash bay no. 4. Washed cars are backed up and block the carwash no 4 bay exit, thus preventing the use of the bay. Reconfiguration of the flow of washed cars may be used to optimize the use of more efficient car wash equipment installed under any of the options.

POTABLE WATER USE AND SEWER DISCHARGE RATE

The City of Inglewood is the local water supplier for Enterprise at the Aviation location. Enterprise operates 24 hours a day, seven days a week, but water usage fluctuates with seasonal and weekly car rental patterns. For the purpose of this report, it is assumed that Enterprise operates 365 days per year and water use is averaged uniformly over this period.

The City of Inglewood provided potable water supply data over a one-year period from November 2011 to October 2012 for analysis in this report. The following City of Inglewood account provided a record of the water use at Enterprise:

- Account XXXXXX99-02

A table and a graph of the facility's net potable water use data for this time period are provided in Appendix B of this report. A review of the data indicates that Enterprise used an average of 8.4 million gallons (MG) per year of potable water for process operations during the 12-month period beginning November 2011. The average daily process water use for the Enterprise facility calculates to approximately 23,100 gallons per working day (GPD).

Enterprise sewer services are provided by the Sanitation Districts of Los Angeles County (LACSD). The facility has a wastewater discharge flow meter on site and the wastewater flow data is reported to the LACSD on an annual basis. Based on the information provided by the LACSD, the facility discharges approximately 9.91 MG of wastewater from July 2011 through June 2012. The water consumption data received from the City of Inglewood indicated of 9.01 MG of potable water supply to the facility for the same time frame. It is noted that the sewer flow exceeds the water consumption which is unexpected. Sewer flow rates would be anticipated to be lower than metered water use. For the purpose of this report, it is assumed that the sewer discharge rate is approximately equal to the water use rate. Based on this assumption, Enterprise's carwash process discharges approximately 23,100 GPD to the sewer and the annual sewage discharge is around 8.4 MG.

WATER BALANCE CALCULATIONS

A detailed analysis of the existing operations at Enterprise was conducted to develop a new water balance and to further refine the anticipated water savings originally estimated in the Field Survey Report. Figure 4 in Appendix A shows the net water balance pre- and post-retrofit.

The potable water from city water line entered the facility and provided potable water supply to the RO system, the first rinse arches, and the makeup water of the Reuse System. Modifications to the makeup water system such as the installation of a manual valve on the reuse makeup potable water line will eliminate the addition of potable water to the Reuse Storage Tanks, without warning.

RO product water is stored in RO supply water storage tanks and RO reject water is drained into the drain sump where the carwash rinse water is captured. The drain sump overflows drain flow to the reuse sumps, where the submersible sump pump is located. The sump pump pumped reuse water from sump to the reuse storage tanks. The reuse water is then pumped to the pre-prep arch spinning spray jets. The excess drain water from the drain sump is discharged to the LACSD sewer line.

Impact of Process Change on Product Quality

The installation and operation of the proposed changes are not anticipated to impact the quality of the carwash process. Enterprise may decide to switch out the nozzles on one carwash bay and observe the car washing quality changes before switching out all the nozzles on all carwash bays. Enterprise may also decide to install one Reuse Water Treatment System for two carwash bays and test the quality before installing the second unit.

Impact of Process Change on Sewer Discharge

Enterprise discharges industrial wastewater as a Significant Industrial User with LACSD. Discharge limits are established for heavy metals (i.e., arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver and zinc), cyanides (total), Total Identifiable, Chlorinated Hydrocarbons, dissolved sulfide, total toxic organics, methylene chloride, 1,1,1-Trichloroethane, Tetrachloroethylene, Benzene, Toluene, Ethylbenzene, O-Xylene, M+P-Xylene, chemical oxygen demand (COD), and suspended solids (SS). The cost for COD discharge is $135.10 per one thousand pounds and discharge for SS is $382.10 per one thousand pounds.

Per LACSD 2011-2012 Wastewater Treatment Surcharge Statement, Enterprise discharged 23.53 thousand pounds of COD and 19.26 thousand pounds of SS during the 12-month period from July 2011 through June 2012. The reduction in potable water use by the proposed process changes will increase the concentration of the constituents in the wastewater because the mass of the constituents will remain the same, while the dilution affected by the water will decrease. However, it is not anticipated that the net total pounds of these constituents discharged is not expected to increase.

Estimated Annual Cost Savings

The water conservation cost savings at Enterprise are estimated based on four retrofit analysis options. Options A, B and C include general improvements including the replacement of the pre-prep arch spinning jets, the replacement of nozzles in the first rinse arch and RO arch, and improvements to the makeup water system in the reuse tanks. Option A also includes conveyance of the RO reject water directly to the reuse water tanks. Option B incorporates the general improvements as well as the replacement of the RO system, nozzles on the first rinse arch, and replacement of the pre-prep spray jets. Option C is based on the installation of the Reuse Water Treatment System, nozzles on the first rinse arch, and replacement of the pre-prep spray jets. Option D is based on the replacement of carwash bay nos. 1

and 2 including RO system and Reuse Water System. The budgetary costs of the improvements are listed in **Table 1**.

Table 1. Estimated Improvement Costs (1)

Option	Description	Equipment Cost	Installation Cost(2)	Total Cost
A	Replacement of Nozzles and Spray Jets	$10,500	$ 5,500	$ 16,000
B	Replacement of RO System	$ 20,000	$ 10,000	$ 30,000
C	Installation of Reuse Water Treatment System and Replacement of Spray Jets	$ 45,000	$ 23,000	$ 68,000
D	Replacement of Car Wash Bay Nos. 1 and 2	$ 150,000	$ 100,000	$ 250,000

(1) Improvement costs are estimated from the quotes provided by manufacturers and estimated delivery costs.
(2) Installation costs include installation of equipment, electrical, instrumentation and engineering costs.

The average water usage at Enterprise over a 12-month period (i.e., November 2011 to October 2012) was approximately 23,096 GPD or 8.4 MG per year. Based on the data received from manufacturers, the anticipated water savings for the proposed improvements described under Option A is 50%, Option B is 10%, Option C is 33% and Option D is 52% of current water use. The estimated annual water savings, potential cost savings from the potable water supply costs from the City of Inglewood, and potential cost savings from the sewer costs from LACSD is provided in **Table 2**.

Table 2. Summary of Annual Water and Sewer Cost Savings (1)

Option	Description	Annual Water and Sewer Savings		Annual Savings (2)
		Gallons per day (gpd)	Million gallons (MG)	
A	Replacement of Nozzles and Spray Jets	11,550	4.2	$ 28,583
B	Replacement of RO System	2,310	0.8	$ 5,717
C	Installation of Reuse Water Treatment System and Replacement of Spray Jets	6,930	2.5	$ 17,150
D	Replacement of Car Wash Bay Nos. 1 and 2	12,010	4.4	$ 29,721

(1) Costs provided in March 2013 dollars.
(2) Cost Savings based on the water cost of $4.50 per hundred cubic feet of potable water from City of Inglewood and the sewer surcharges of $764 per million gallons per year from LACSD.

A summary of the estimated cost savings for Options A through D is provided in Table 3. The detailed calculations of the cost savings are provided in Appendix F.

Table 3. Summary of Cost Savings [1]

Option	Description	Capital Cost [2]	Annual Savings [3]	Simple Payback (Yr)	Simple Payback after receiving incentives (Yr)
A	Replacement of Nozzles and Spray Jets	$ 16,000	$ 28,583	< 1	< 1
B	Replacement of RO System	$ 30,000	$ 5,717	5	4
C	Installation of Reuse Water Treatment System and Replacement of Spray Jets	$ 68,000	$ 17,150	4	3
D	Replacement of Car Wash Bay Nos. 1 and 2	$ 250,000	$ 29,721	9	8

(1) Costs provided in March 2013 dollars.
(2) Capital cost included the capital cost of the equipment, delivery, installation, electrical, instrumentation and engineering costs.
(3) Annual savings based on a reduction of potable water use and wastewater discharges into sewer without including O & M cost associated with the treatment systems.

ESTIMATED GAS AND ELECTRICITY SAVINGS

The propose improvements are not expected to increase or decrease the power usage at the facility.

PRELIMINARY DESIGN DRAWINGS AND PHOTOGRAPHS

The following technical preliminary design data are provided in Appendix D:

- Technical equipment cutsheets and quotes provided by RO system manufacturers;
- Technical equipment cutsheets and quote provided by the Reuse Water Treatment System Manufacturer; and

PROPOSED LOCATIONS OF MONITORING DEVICES

After the water savings equipment is installed and operational, verification of actual water savings is required to obtain full payment of a Program incentive to Enterprise. The photographs of the flow measurement and monitoring devices currently installed at the facility are included in Appendix G. The 1-inch potable water supply meter located in the Bay No. 2 is currently monitoring all the influent potable water to the carwash process. Enterprise is currently monitoring the carwash process water use by recording the two water meters installed for flow verification process. Water savings can be monitored

using those meters. Enterprise also records the number of car going through wash process. As the amount of water used per car at each rinse arch is known, the actual water savings can be calculated. Therefore, the actual water savings can be monitored by the existing monitoring devices and through facility car count records.

Impact of Production Changes on Estimated Water Savings

Enterprise provides a car rental service and the carwash process is specifically for rental service cars. Per information provided by Enterprise, the number of car washed varies seasonally throughout the year. The water use at carwash facility increases during traveling seasons such as holidays and summer time. The flow measurements and car volume measurements for data verification purposes were conducted in February and March during low season. For the accuracy of the water conservation realized and to avoid the influent of the seasonal fluctuation throughout the monitoring period, water use will be monitored on a unit basis (i.e., gallons per car). In an effort to determine the current unit rate of water use, Enterprise provided weekly information on water use and car counter information. A plot of the water usage in gallons per car from February 15, 2013 through March 22, 2013 is provided in Appendix E.

During this period, Enterprise washed approximately 55,785 cars and used approximately 698 thousand gallons of process water (excludes water use in bathrooms and landscaping). The average number of car washed was approximately 1,550 cars per day. Dividing the average daily water use by the average number of car washed per day provides a factor of 15 gallons per car. Thus, in addition to water flow rates, it is proposed that Enterprise's car counter information also be monitored over a 6-month period to determine if there are significant changes that may impact the actual water savings.

Potential Program Cash Incentive

With verified water savings monitored for a one-year period and considering the Program's financial incentives available, the maximum potential Program cash incentive for Enterprise is $6.00 per 1,000 gallons of actual water saved over a one-year period, up to the total capital improvement cost. Additional details are provided in Appendix F.

Program Application and Implementation

Based on a review of the proposed retrofits and equipment upgrades, Enterprise is considered a viable candidate to apply for the incentive funding under the **RECIRC & $AVE** Program. The next step is for the Enterprise to sign the standardized contract with West Basin to initiate their acceptance into the Program. Following acceptance and inclusion, Enterprise will continue to monitor the flow meters and car counter information for a one-year period. Data would be collected on a monthly basis and compared with previous collected flow and car counter information. Upon equipment installation and confirmation of the anticipated water savings, Enterprise may receive up to the balance of the cash incentive calculated in this report.

Additional Utility Incentive Programs

In addition to the Program under West Basin, other utility incentive programs are also available for industrial customers.

The Southern California Gas Company and Southern California Edison are offering potential cash incentives to qualifying industrial users for reduction in gas and electricity usage. The South Bay Environmental Services Center serves as a regional clearing house for information about programs offered by the Southern California Gas Company and Southern California Edison. Visit www.sbesc.com or call (310) 271-7222 for further information.

The MET's So Cal Water Smart also provides rebates to industrial customers for commonly used plumbing fixtures, such as toilets and urinals. Call Elise Goldman at West Basin (310) 660-6253 or visit socalwatersmart.com for more information on these and other water saving devices.

Program Contact Information

A separate reference table is enclosed in Appendix H with the name, affiliation, phone number, and the e-mail address of the personnel associated with this Program and related incentive programs.

Appendix A

Figures and Flow Charts

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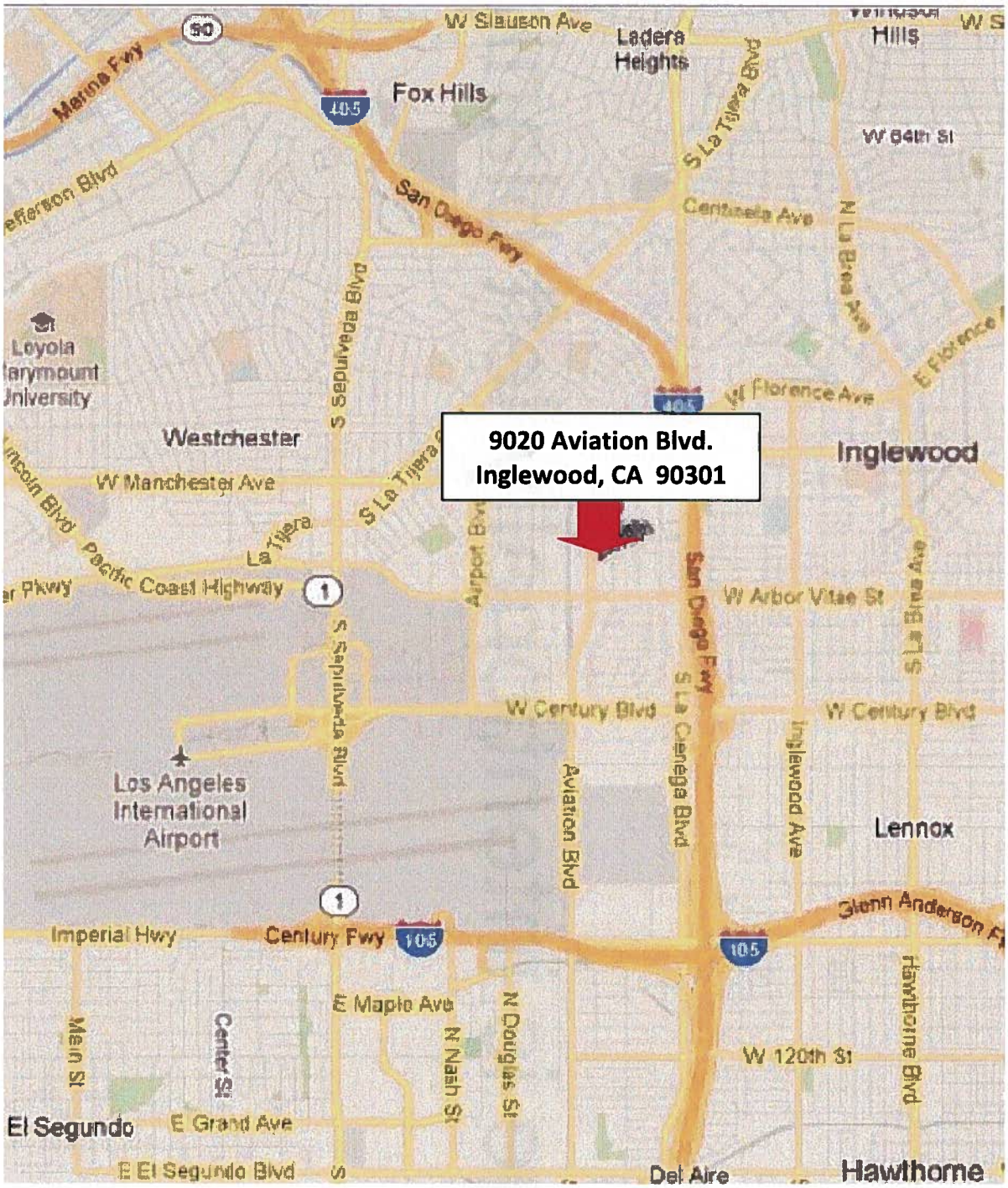

RMC
Water and Environment

Figure 1

Location Map
Enterprise Holdings

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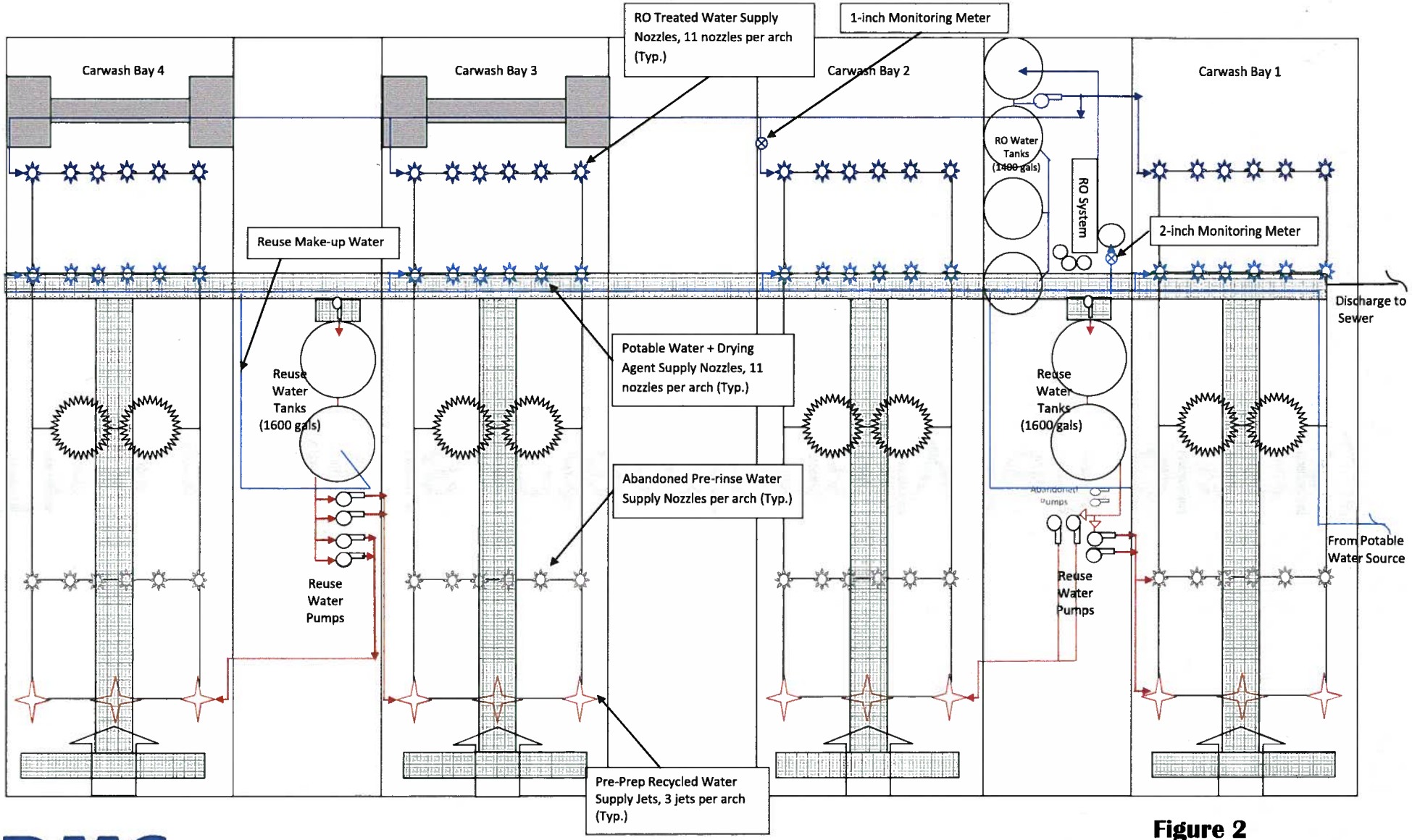

RMC Water and Environment

Figure 2

Existing Equipment Layout
Enterprise Holdings

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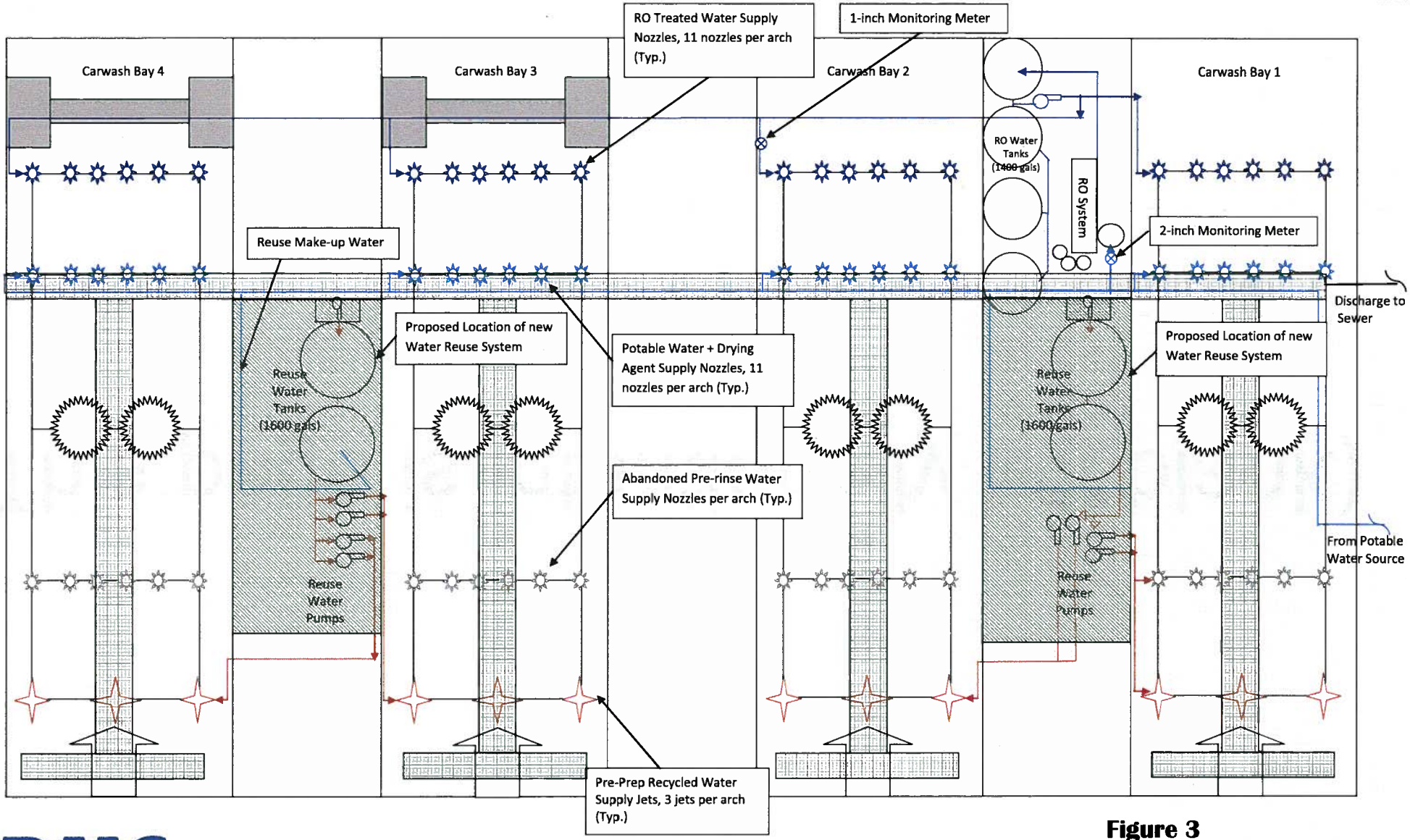

RMC Water and Environment

Figure 3

Proposed Location of New Water Reuse System
Enterprise Holdings

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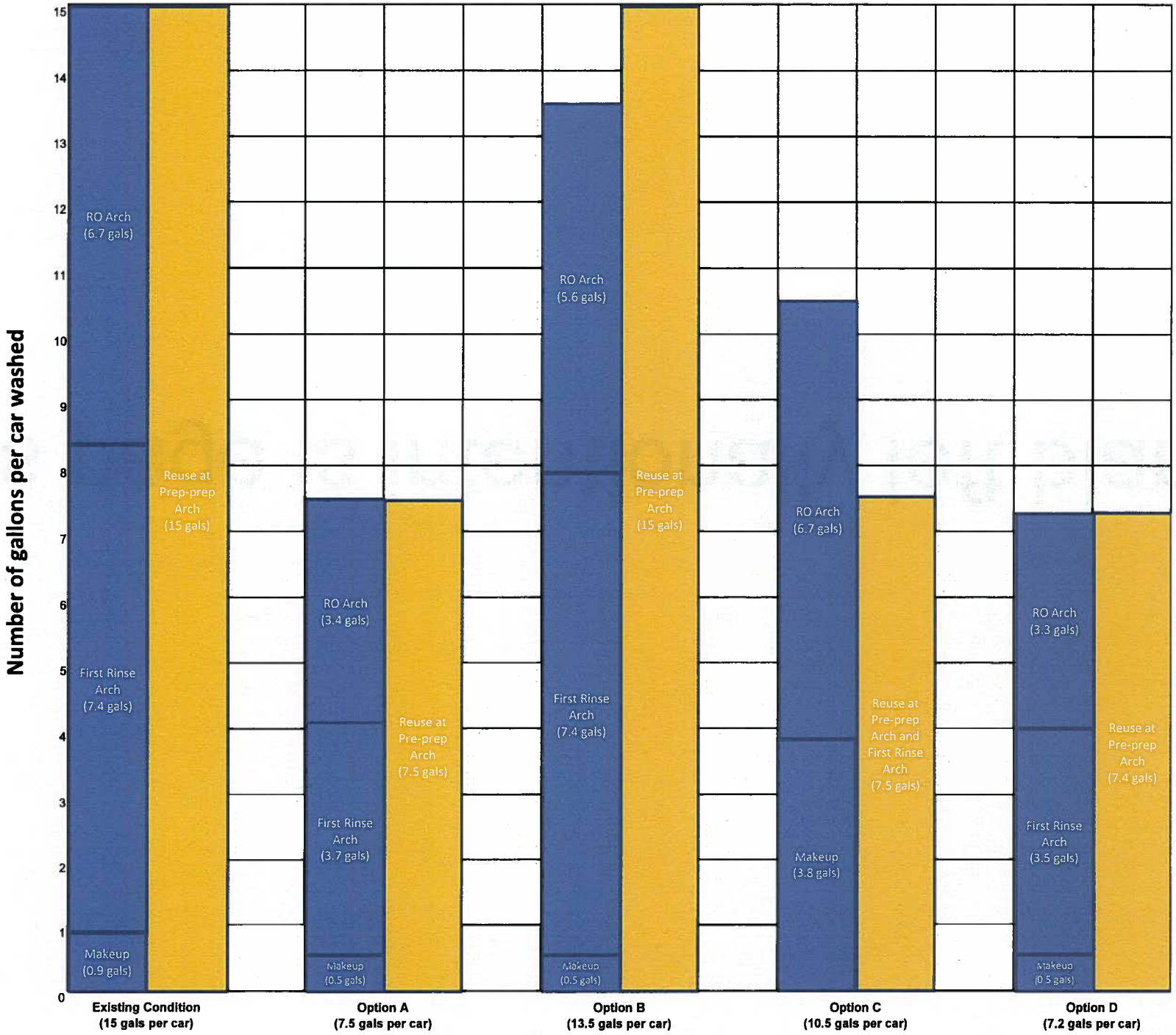
Appendix A
Figure 4
Enterprise Holdings
Recirc & $ave Program
Pre and Post Retrofit Net Water Use per Car



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Appendix B

Potable Water Use Data

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Appendix B
Enterprise Holdings
Recirc & $ave Program
Potable Water Use Data

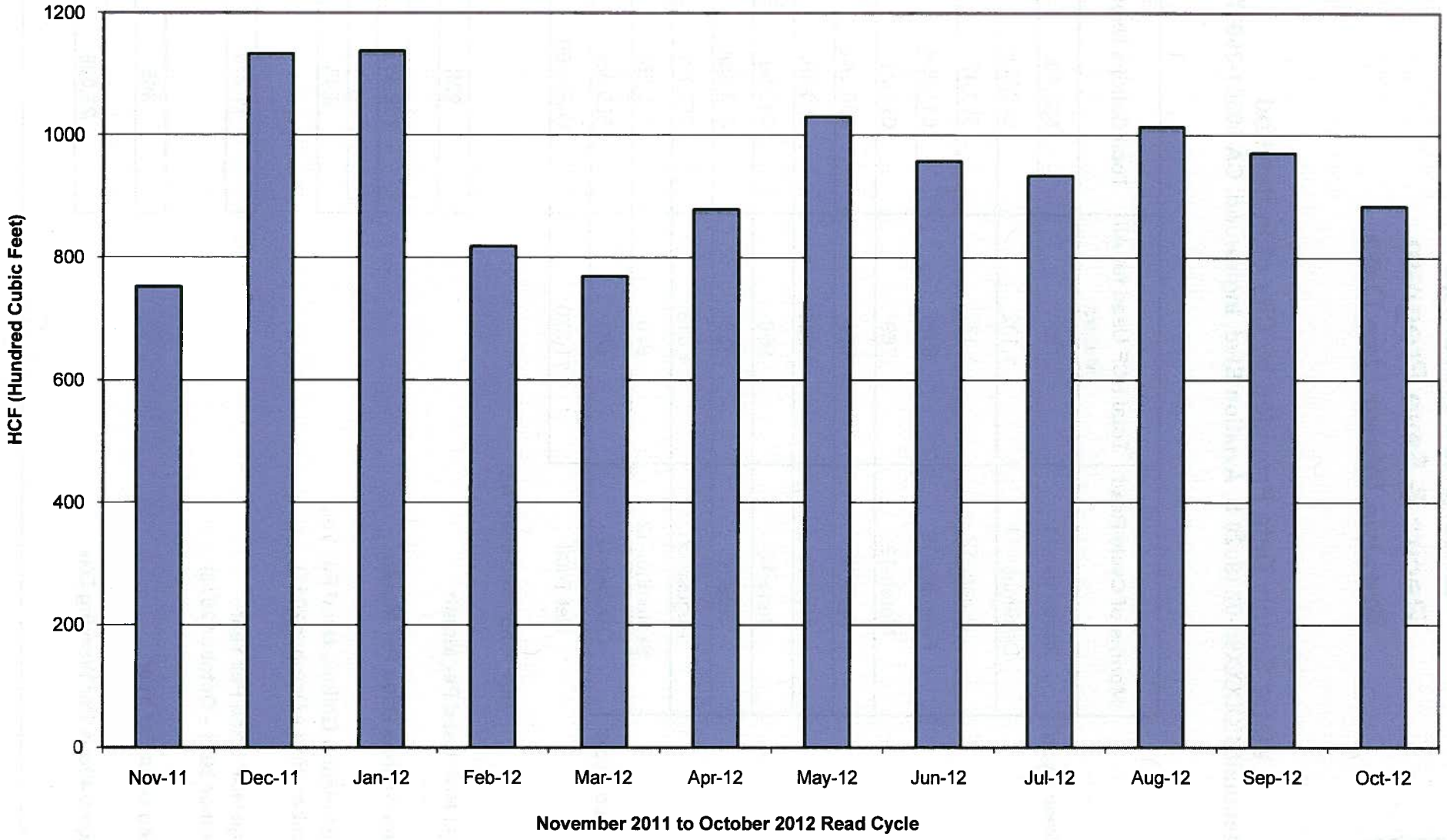
Water Supply Data Provided by City of Inglewood
Account 1XXXXX99-02 (9020 S. Aviation Blvd, Inglewood, CA 90301-2907)

	Months of Cycle Read	Total HCF Used for All Meters	Total Gallons Used
Start of Read Cycle	November-11	752	562,496
	December-11	1,132	846,736
	January-12	1,137	850,476
	February-12	818	611,864
	March-12	769	575,212
	April-12	878	656,744
	May-12	1,029	769,692
	June-12	956	715,088
	July-12	933	697,884
	August-12	1,013	757,724
	September-12	970	725,560
End of Read Cycle	October-12	883	660,484
	Net Total	11,270	8,429,960

HCF = hundred cubic feet

Average HCF Used Per Month	**939**
Average Gallons Used Per Month	**702,497**
Average Million Gallons Used Per Year (November 2011 - October 2012)	**8.43**
Average HCF Used Per Year (November 2011 - October 2012)	**11,270**
Working Days Per Year	**365**
Average Gallons Per Working Day	**23,096**

Appendix B
Enterprise Holdings
Recirc & $ave Program
Potable Water Use Data



Appendix C

Preliminary Engineering Design and Photographs

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Spray Heads

Spraying Systems Co.

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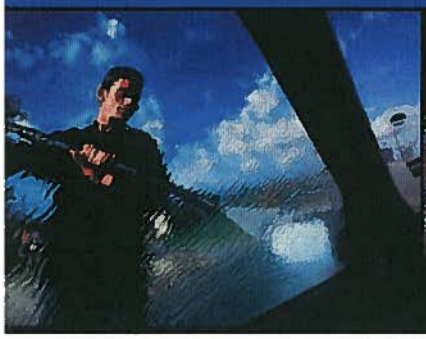
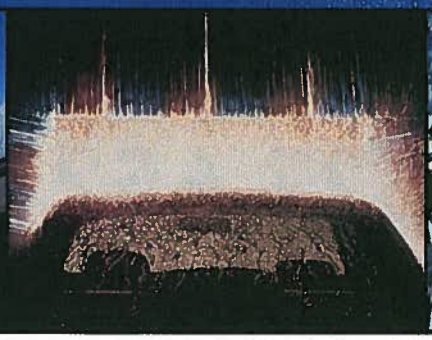
Spraying Systems Co.®
Experts in Spray Technology

Spray Nozzles | Spray Control | Spray Analysis | Spray Fabrication

Spray Products for the Car Wash Industry

Reduce operating costs and improve customer satisfaction by maximizing spray performance





Spraying Systems Co. high-performance spray products for improving your car wash operation are available through most OEMs or aftermarket suppliers.

Spray nozzle performance drives car wash quality, cost efficiency and customer satisfaction

As a business owner, you may not spend much time thinking about a little thing like spray nozzles, but the fact is that your car wash is only as good as the spray your nozzles deliver. Depending on how you select and maintain your spray nozzles, they can be a source of major savings or a needless expense.

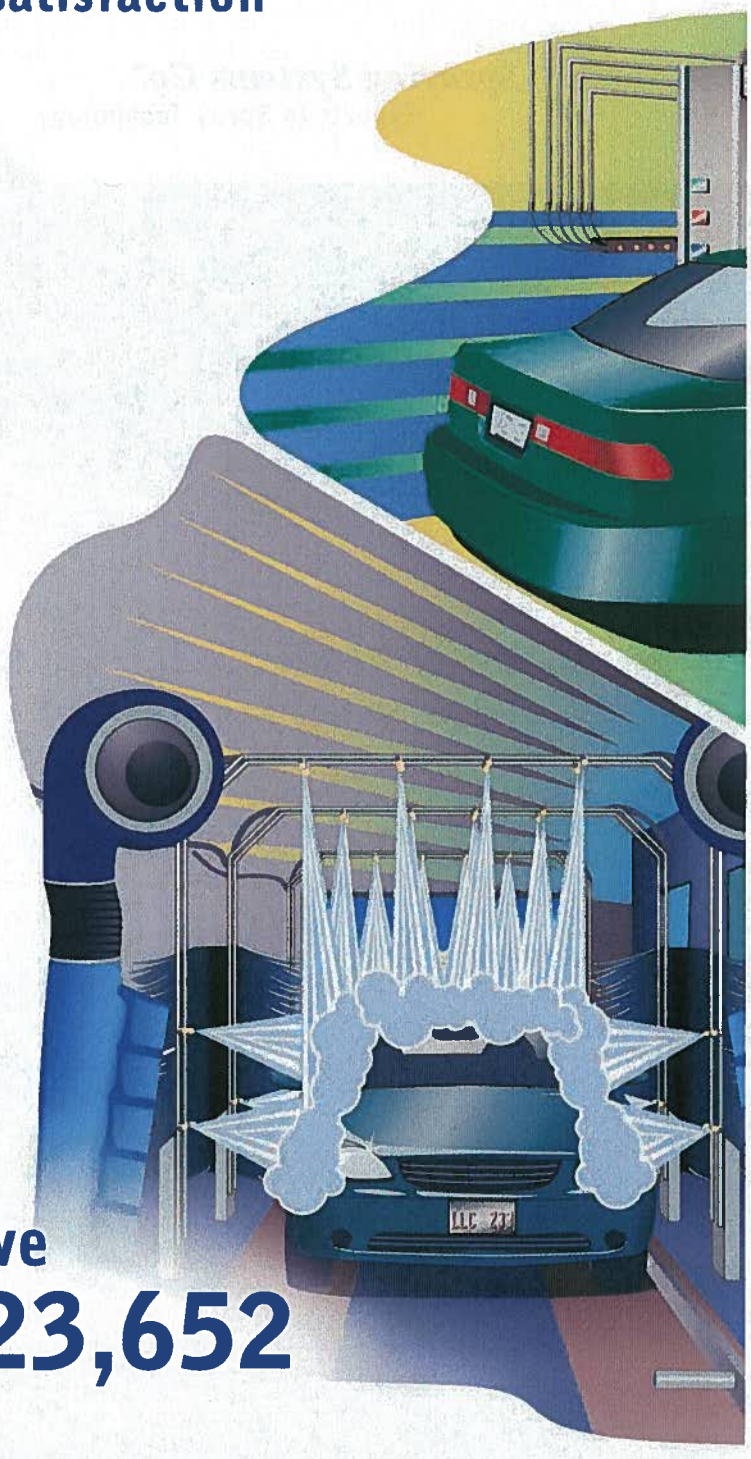
Worn nozzles or using the wrong type of nozzle can easily spray up to 30% more water and chemicals than necessary, which can amount to tens of thousands of dollars each year. Just look at these three examples of typical annual car wash operating expenses. Our examples only calculate the cost of excess water and detergents from unnecessarily higher flow rates. Don't forget to factor in all the additional expenses related to an inefficient spray system:

- **Lost customers as a result of a poor quality wash or excessive downtime**
- **Excessive wastewater and disposal costs**
- **Additional power used by pump equipment to keep up with higher flow rates or pressure losses**
- **Unnecessary labor from increased maintenance**

By optimizing your spray system, you can turn these unnecessary expenses into savings opportunities.

How much can you save? Find out at www.spray.com/carwashsavings.

Simply input some information about your own operation, and the free calculator will calculate your potential savings instantly.



Conveyor Car Wash

Average cars per day:	120
Days open per year:	365
Flow per car:	40 gal
Liquid used:	1,752,000 gal
Wasted water:	262,800 gal
Wasted chemical:	2,300 gal

Annual cost of wasted water and chemical: $23,652

Save $23,652

Save
$11,826

Inbay Automatic Car Wash

Number of bays:	2
Average cars per day per bay:	40
Days open per year:	365
Flow per car:	30 gal
Liquid used:	876,000 gal
Wasted water:	131,400 gal
Wasted chemical:	1,150 gal

Annual cost of wasted water and chemical: $11,826

Save
$11,974

Self-Serve Car Wash

Number of bays:	6
Hours of utilization: (18 hours per day x 365 days per year x 15% utilization)	985
Flow rate:	2.5 gpm
Liquid used: (150 gph x 985 hours per year x 6 bays)	886,950 gal
Wasted water:	133,042 gal
Wasted chemical:	1,164 gal

Annual cost of wasted water and chemical: $11,974

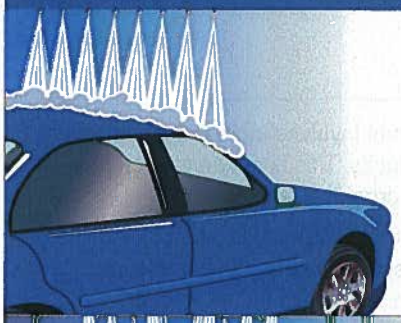
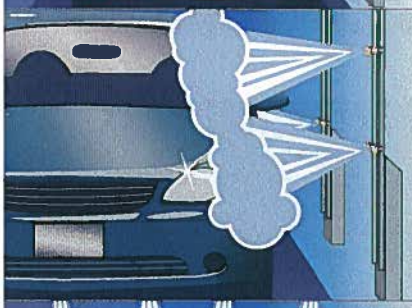
Assumptions

Average cost of water:	$2.50/1,000 gal
Average cost of chemical:	$10/gal
Dilution ratio:	40:1
Chemical usage:	35%
Excess liquid sprayed:	15%

Nozzle Selection Guide – Spray Pattern

Spray Pattern	Spray Characteristics	Spray Angle	Recommended Car Wash Applications	Recommended Nozzles	Page No.
Flat 	Overlapping or aligning spray patterns from adjacent sprays produce uniform distribution.	15° to 110°	Chemical arches or anywhere spray nozzles are aligned to overlap to produce a uniform distribution.	 **VeeJet®**	18–20
Flat high pressure, even spray 	Provides high and uniform impact capabilities. Even spray pattern eliminates the need to overlap patterns from adjacent nozzles.	5° to 65°	Pressure wash or first rinse. Any application where high impact is needed to remove dirt or detergent.	 **WashJet®**	14–17
Flat deflected, tapered 	Medium-sized drops with tapered edges and wide spray angles at lower pressures. Can overlap patterns from adjacent sprays for even coverage. Large free passage reduces clogging.	73° to 153°	Rinse arches and presoak, especially in stages that use recycled water. Good for overlapping adjacent sprays to produce uniform coverage.	 **FloodJet®**	22
Flat deflected, non-tapered 	Medium-sized drops at lower pressure with narrower spray angles. High impact. Large free passage reduces clogging.	15° to 50°	Rinse arches and presoak especially when recycled water is being used. Excellent for any application in which adjacent spray patterns do not overlap.	 **FlatJet®**	21
Full Cone 	Uniform, round and full spray pattern with medium to large drops. Good for covering larger areas.	15° to 125°	Presoak and covering larger areas.	 **FullJet®**	12–13
Solid Stream 	Uniform stream provides maximum impact.	0°	Cleaning grills, rocker panels and wheel wells.	 **WashJet**	14–17
Self-aspirating 	Flat spray pattern, mixes surrounding air with premixed liquid to generate foam. Medium to medium-fine foam stays on vehicle longer. Keeps energy costs down because compressed air is not required.	0° to 80°	Detergent application.	 **FoamJet®**	24–29

Nozzle Selection Guide – Application

Wash Stage	Spray Nozzle Characteristics for Best Performance	Recommended Nozzles	Page No.
 **Presoak**	Pressure: low Flow Rate: low Impact: low Angle: wide Drop Size: large	**FoamJet®** **VeeJet®** (Kynar®) **FloodJet®** **FullJet®**	**24–29** **18–20** **22** **12–13**
 **Wash**	Pressure: high Flow Rate: medium Impact: high Angle: narrow Drop Size: large	**WashJet®**	**14–17**
 **Rinse**	Pressure: low Flow Rate: high Impact: medium Angle: medium Drop Size: large	**VeeJet** **FlatJet®**	**18–20** **21**
 **Wax**	Pressure: low Flow Rate: low Impact: low Angle: medium Drop Size: fine	**VeeJet**	**18–20**
 **Final Rinse**	Pressure: low Flow Rate: low Impact: low Angle: medium to wide Drop Size: fine	**VeeJet** **FloodJet**	**18–20** **22**
 **Self-Serve**	Pressure: high Flow Rate: low to medium Impact: high Angle: narrow Drop Size: medium to large	**WashJet**	**14–17**

The Basics of Nozzle Selection

Spray Pressure and Impact

When looking at the cleaning effectiveness of a spray nozzle, impact is the main criteria to evaluate. Impact is the total force of the spray as it hits the vehicle.

The true measure of cleaning effectiveness is impact per square inch. To calculate impact pressure at 12" from the nozzle, first determine theoretical impact using the formula below. Then, multiply the total force by the percent ratio. The highest unit impact pressure is provided by solid stream nozzles and can be closely approximated by the formula: 1.9 x spray pressure.

$$I = K \times Q \times \sqrt{P}$$

I	Total theoretical spray impact	lbs.
K	Constant	.0526
Q	Flow rate	gpm
P	Liquid pressure	psi

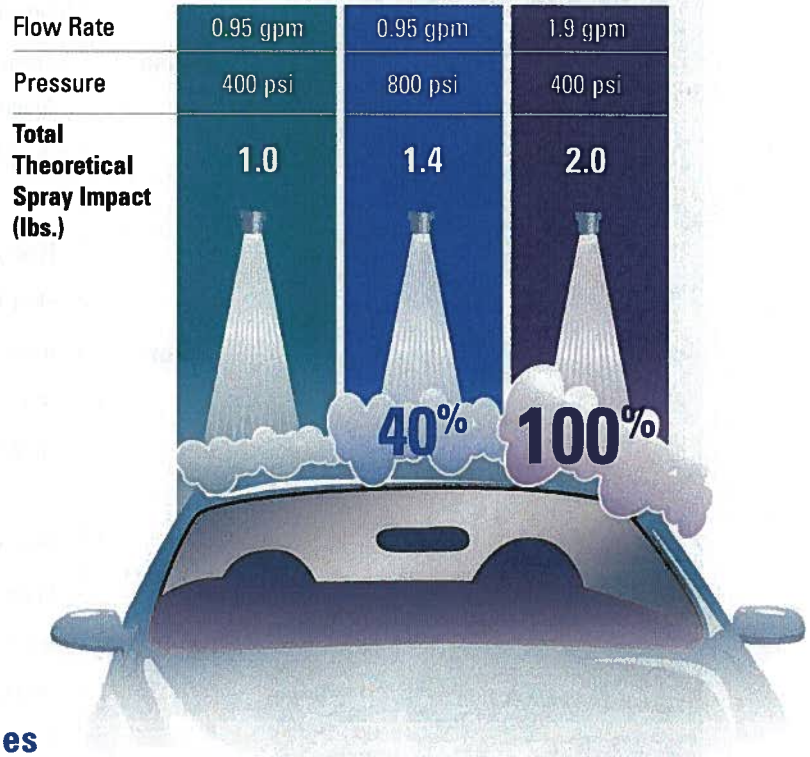
Unit Impact per Sq. Inch of a Flat Fan Spray Pattern at 12" From the Nozzle

Spray Angle	% of Theoretical Total Impact
15°	30%
25°	18%
35°	13%
40°	12%
50°	10%
65°	7%
80°	5%

Maximizing the cleaning impact involves increasing both the mass of the spray and its velocity. This is accomplished by increasing flow rate in gpm, droplet size or psi.

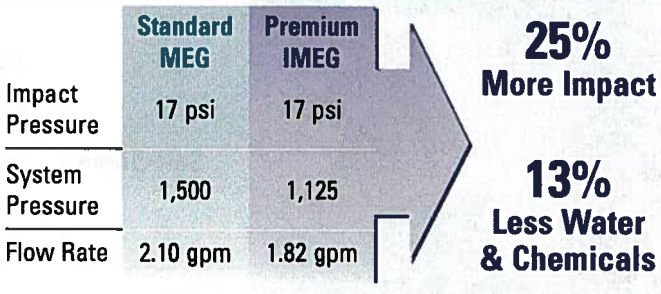
Most people only think about spray pressure when it comes to impact, but increasing pressure can sometimes be counterproductive. High pressure produces smaller droplets, which have less mass and velocity, and therefore less cleaning impact. As a general rule of thumb, increasing flow rate is much more effective than increasing pressure. Doubling the flow rate increases impact as much as 100%, while doubling pressure provides only 40% more impact.

The downside of increasing flow rate is increased water consumption, and the biggest operating cost today for a car wash is water. At a time when water conservation and lower operating costs are a priority, it is possible to increase pressure and maintain cleaning effectiveness with premium high-pressure nozzles.



Standard vs. Premium High-Pressure Nozzles

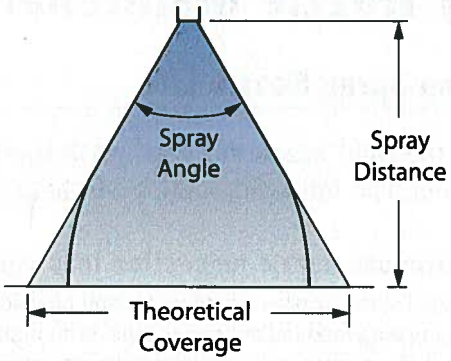
Premium high-pressure IMEG® WashJet® nozzles are engineered to provide up to 25% greater impact than standard MEG WashJet nozzles at the same flow rate and system pressure. Though slightly more expensive than standard MEG nozzles, premium IMEG nozzles pay for themselves in enhanced cleaning efficiency and water savings. They also have a longer wear life due to the reduced system pressure and need to be replaced less frequently.



Spray Distance

Spray distance dramatically affects impact, and 6 to 8 inches is the ideal distance to achieve the best performance from your spray nozzles. Increasing the nozzle distance just 6" from the car's surface will decrease impact by 50%. Why? Because droplet velocity is reduced due to the frictional drag effects of the air and because the spray pattern is much larger. The same impact force over a larger area results in less impact pressure.

When determining spray distance use a worst case scenario. First, estimate what is likely to be the shortest distance from a vehicle to the spray nozzle. Then, adjust nozzles so that full coverage and overlap is possible with a vehicle at the shortest distance. This will ensure full coverage and overlap with all vehicle types.



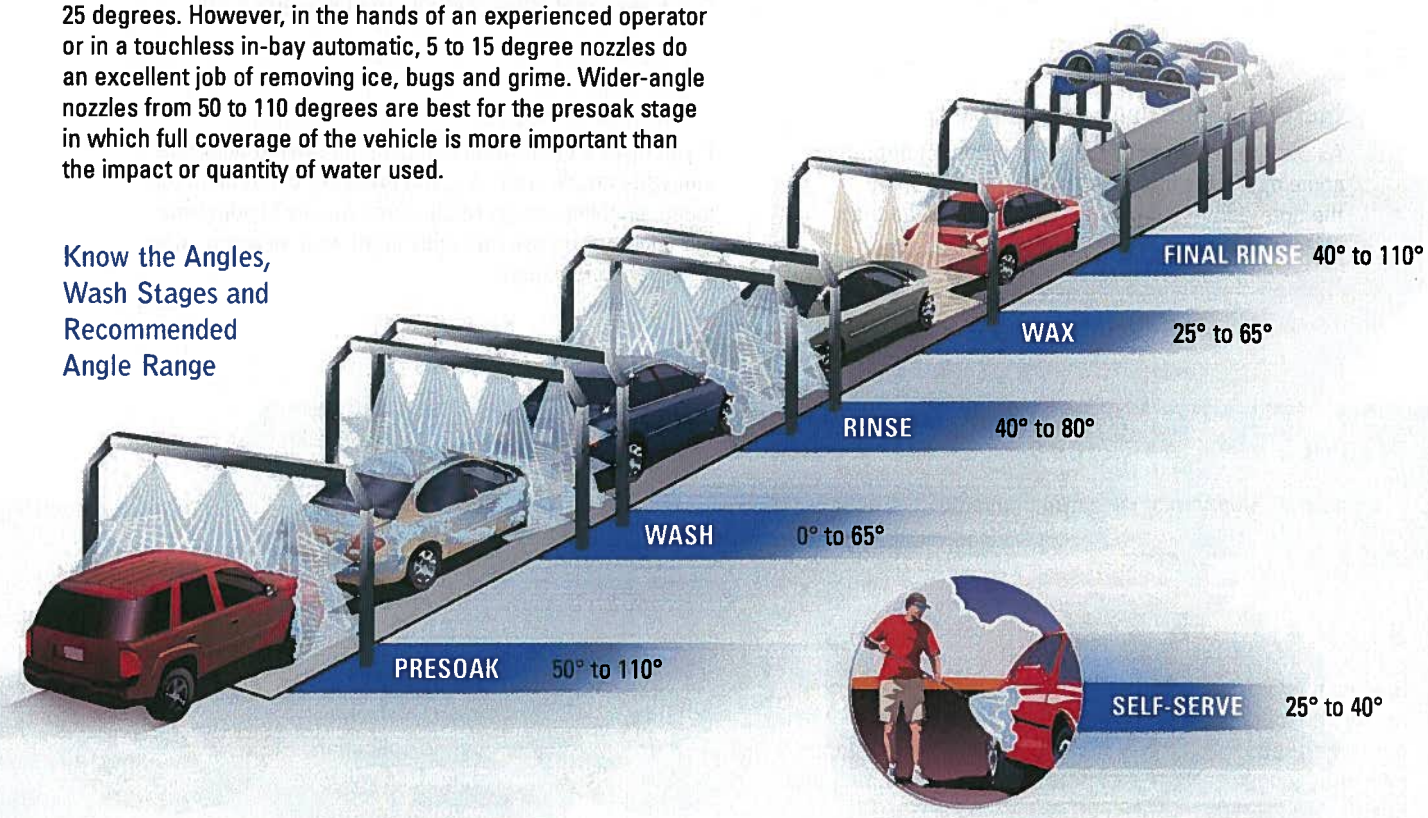
Theoretical Spray Coverage

Spray Angle	At various distances in inches from nozzle orifice					
	6"	8"	10"	12"	15"	18"
15°	1.6"	2.1"	2.6"	3.2"	3.9"	4.7"
25°	2.7"	3.5"	4.4"	5.3"	6.6"	8.0"
40°	4.4"	5.8"	7.3"	8.7"	10.9"	13.1"
65°	7.6"	10.2"	12.7"	15.3"	19.2"	22.9"
80°	10.1"	13.4"	16.8"	20.2"	25.2"	30.3"
110°	17.1"	22.8"	28.5"	34.3"	42.8"	51.4"

Spray Angle and Coverage

Spray angle is the dispersion or width of the spray after it leaves the orifice. We are often asked if pressure affects the spray angle, and it definitely does. At high pressure, spray angles can widen significantly and produce low-impact misting of the spray as it fans out at the edges. Narrower spray angles have more cleaning force per square inch, but they can peel some pin striping, moldings and poor paint jobs. For safety reasons, it is rare to see self-serve tips at less than 25 degrees. However, in the hands of an experienced operator or in a touchless in-bay automatic, 5 to 15 degree nozzles do an excellent job of removing ice, bugs and grime. Wider-angle nozzles from 50 to 110 degrees are best for the presoak stage in which full coverage of the vehicle is more important than the impact or quantity of water used.

Know the Angles, Wash Stages and Recommended Angle Range



Spray Nozzle Maintenance

Extending Spray Nozzle Life

Selecting the right nozzle for each wash stage is just the first step toward optimizing your spray system. The following tactics will help you get more service life from your nozzles.

1 Incorporate nozzle inspection into your regular maintenance program

Damaged spray nozzles waste water and chemicals, decrease cleaning coverage of the vehicles and increase workload on your pumps. With thousands of dollars of profits at stake, you'll want to regularly monitor your spraying system to reveal potential problems. Some nozzle problems, like corrosion or caking, are easy to detect with a visual inspection, but a worn nozzle, the most common problem for a car wash, is almost impossible to detect with the human eye.

Watch for these clues to indicate spray nozzle problems:

Change in pump performance

If you have a positive displacement pump, check the pressure gauge for a drop in system pressure. If there is a drop in pressure, the flow rate will remain constant, but spray velocity and impact will lessen. You may not be wasting water, but the quality of your wash will suffer. Some operators will adjust the unloader valve and use it as a regulator to increase pressure, but this can create high-pressure spikes and damage the pump.

Deterioration of spray pattern

Inspect the spray pattern for uniformity. When nozzles are damaged, worn or clogged the spray pattern is destroyed. Streaks develop and the spray will be heavier or lighter throughout the pattern. The result is inadequate or inconsistent coverage of the vehicle. Customers will experience uneven cleaning or drying, so you'll want to make sure your nozzles are replaced before reaching this point. Customer satisfaction and retention depends on it.

Increased chemical consumption

As the nozzles wear and pressure/impact decreases, some operators increase the concentration of the detergent – a much more costly solution than replacing nozzles.

Flow rate change

If you have a centrifugal pump, an increased flow rate indicates nozzle wear. System pressure will remain the same, enabling you to retain some quality in your wash, but your system will be highly inefficient, wasting costly water and chemicals.

A simple way to detect a flow rate change is with the "Bottle Check"

Tools needed: stopwatch, measuring cup and container

STEP 1:

Spray a new nozzle into the container for a measured amount of time.

STEP 2:

Measure out the amount of water into the measuring cup.

STEP 3:

Divide the amount of water by the collection time. This will give you the gallons per minute rate of the new spray nozzle.

2 Decrease spraying pressure

Where circumstances permit, decreasing the pressure will slow the liquid velocity through the orifice and reduce the wear and corrosion rate. You can take advantage of this tactic in the presoak stage where low pressure, small capacity nozzles are very effective because they provide streakless, full coverage. During presoak, it's not the volume or spray impact that's critical – it's where you place the water and chemical.

3 Use care when cleaning spray nozzles

Cleaning nozzles can often restore a defective spray, but it should be done with materials that are much softer than the nozzle orifice. Use toothbrushes, toothpicks or even compressed air. Never use wire brushes, pocket knives, or welder's tip cleaning rasps. It is easy to damage the critical orifice shape (or size) and end up with distorted spray patterns or excess flow. If you are faced with a stubborn clogging problem, soak the orifice in a non-corrosive cleaning chemical to soften or dissolve the substance.

SPRAY TIP

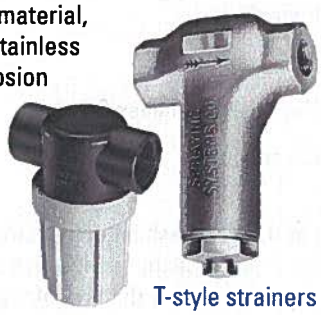
Clean nozzles with a material that is softer than the orifice, like a toothbrush or toothpick.

4 Reduce the quantity of abrasive particles or the concentration of corrosive chemicals

In some stages, you can reduce the amount of abrasive particles in the liquid to reduce wear effects. For example, use recycled water at the start of the car wash, and as the wash progresses use less recycled water until the final rinse where only fresh water is used. Not only does this provide a better quality wash for your customers, but it also reduces the wear on nozzles at the final rinse stage. In stages where chemicals are used, the corrosive activity of a solution may be reduced by using different concentrations or temperatures, depending on the chemicals involved.

5 Add line strainers or use spray nozzles with built-in strainers

When using fresh or recycled water, orifice deterioration and clogging are typical problems. Strainers or spray nozzles with built-in strainers are highly recommended in the presoak cycle. Line strainers not only extend the life of the nozzle but the pump also. The strainer's screen traps the dirt or unwanted material, and it should be made of stainless steel for strength and corrosion resistance. The screen is critical to the operation of the strainer, and an extra screen should be kept on hand for each strainer installed.



T-style strainers

STEP 4:

Take a baseline measurement using a new nozzle in each section of your car wash.

STEP 5:

Repeat the test periodically on the same nozzles and record the date or number of wash cycles since the previous test. As the nozzles begin to wear, the flow rate will increase. Creating a log will help you determine how quickly your nozzles are wearing.

Spray Nozzle Maintenance

Common Causes of Spray Nozzle Problems

Erosion/Wear Life

Erosion is the single biggest cause of nozzle problems in a car wash operation. Gradual abrasion of material from the spray nozzle orifice and internal flow passages cause them to enlarge and/or become distorted. As a result, flow usually increases, pressure may decrease, the spray pattern becomes irregular and liquid drops become larger.

Spray pressure, fluid abrasiveness, nozzle orifice size and chemical compatibility are just a few of the factors that play a role in a nozzle's wear life. You can minimize how quickly your nozzles wear by selecting materials of construction with a higher resistance ratio.

Abrasion Resistance Ratios

Nozzle Material	Resistance Ratio
Brass	1
Kynar®	3
Stainless Steel	4 – 6
Hardened Stainless Steel	10 – 15
Ceramics	90 – 200

For the car wash industry, hardened stainless steel nozzles provide excellent service, are cost effective and resist wear 30% better than regular stainless steel nozzles and up to 15 times better than brass.

Most high-pressure nozzles are currently constructed of hardened stainless steel, however not all manufacturers use the same hardening process, which can lessen the durability of the material. To prove this point, we tested our WashJet® nozzles, made of hardened stainless steel, against a competitor's similar nozzle. The competitor's nozzle reached a 10 percent wear point more than twice as fast as the WashJet nozzle.

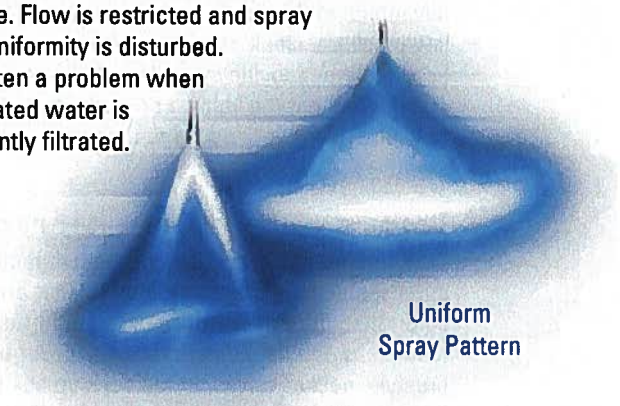
Nozzles with ceramic orifices are able to withstand harsh cleaning chemicals and high temperatures. Nozzles constructed of Kynar, a very tough plastic material, are good choices for high-temperature wax sealing applications.

Caking

Build-up of material on the inside, on the outer edges or near the orifice is caused by liquid evaporation. A layer of dried solids remains and obstructs the orifice or internal flow passages.

Clogging

Unwanted solid particles can block the inside of the orifice. Flow is restricted and spray pattern uniformity is disturbed. This is often a problem when re-circulated water is insufficiently filtrated.



Distorted Spray Pattern

Accidental Damage

Damage can occur if a spray nozzle is dropped or scratched during installation, operation or cleaning. This a common occurrence in self-service car washes, since many customers often let spray wands fall onto, or scrape against, the concrete floor of the bay.

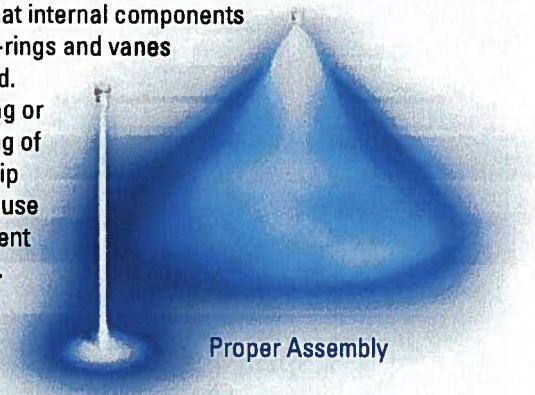
Corrosion

Spray nozzle material can also break down due to the chemical qualities of the sprayed material or the environment. The effect is similar to that caused by erosion and wear, with possible additional damage to the outside surfaces of the spray nozzle.

Corroded

Improper Assembly

Some spray nozzles require careful re-assembly after cleaning so that internal components such as gaskets, O-rings and vanes are properly aligned. Improper positioning or even over-tightening of nozzle caps can strip threads and can cause leaking and inefficient spray performance.



Improper Assembly

Frequently Asked Questions

Q: Can I use a standard "fan" nozzle for the high-pressure wash portion of my car wash?

A: A standard VeeJet® or UniJet® "fan" type nozzle is not the best choice for high-pressure applications. The orifice is designed to provide a great spray pattern at lower pressures. The WashJet® product line, however, was designed specifically to operate in high-pressure applications and will provide improved cleaning effectiveness and a better distribution of impact across the entire spray pattern.

Q: How often should I replace my spray nozzles?

A: Depending on your system, we would suggest cleaning your spray nozzles every couple of months and replacing them every 6 to 12 months. Preferably, you want to replace them right before the season in which your business picks up. It is difficult to determine when your wash needs new nozzles because it depends on so many factors. How good is your filtration or recycling system? How corrosive are your chemicals? At what temperature and pressure are you spraying? All these factors affect how your nozzles wear. When you replace your nozzles, take note of the difference in spray appearance, pressure reading for your system and the flow rate. You might be surprised at how much waste in water and chemical your car wash was operating with before the replacement.

Q: Do guide vanes really help with the cleaning effectiveness of my wash?

A: In most cases, yes they can. The guide vane reduces turbulence to help the spray nozzle provide a much more even impact force for cleaning cars. However, there are a few cases where the vane can actually make things worse. If your spray nozzles are installed at the end of a long straight section of pipe or hose, then the vane can hurt the cleaning effectiveness of the spray. Only use stabilizer vanes when they are threaded directly into an elbow or into the side of a pipe or arch.

SPRAY TIP

If your fluid system has a lot of twists and turns, request nozzles with stabilizer vane inserts to reduce turbulence and deliver more cleaning impact.

Q: My water bill is going up and my Bottle Check tests show that my flow rate is up, but my nozzles are fine and the spray pattern looks nice and clean. What is going on?

A: Simply put, your nozzles are wearing normally. A nozzle can be spraying up to 30% over capacity with no streaks or other visual problems. Close monitoring and maintenance are critical to understanding what happens to the nozzles in your system over time.

Q: After a car passes the foam sticks on my conveyor, the foam drips out the bottom hole and all that chemical is wasted. How can I solve this problem?

A: Normally, we would recommend that every nozzle in your entire system has a check valve installed immediately behind it. That way, after the car passes and the pressure in the arch drops, the check valve shuts off preventing all the water and chemical from draining out. An additional benefit is that when the next car comes down the line, your arch is already filled and the nozzles spray immediately. Unfortunately, it is extremely difficult to use either an in-line or diaphragm type check valve on pre-generated foam. It just does not work well. One alternative is to replace your foam sticks with FoamJet® nozzles. These nozzles are self-aspirating and generate the foam after the liquid passes the check valve. This gives you the added benefit of eliminating your compressed air requirement and allows you to control the foam's capacity and spray angle.

Q: I have seen a lot of plastic nozzle tips available, but I am concerned about where to use them. Where are the best applications for plastic nozzles in my car wash?

A: Plastic nozzles are perfect solutions to low pressure applications with corrosive chemicals. Constructed of molded Kynar®, the plastic VeeJet spray nozzles are more economical than metal nozzles, withstand a variety of temperature ranges, and are resistant to acids, bases and oxidizing agents. Additionally, they are rated up to 500 psi and have a surprisingly high wear resistance. You can confidently use plastic nozzles in the presoak, rinse and wax sections of your wash.

FEATURES AND BENEFITS

- Solid cone-shaped spray pattern with round impact area.
- Unique vane design with large flow passages provides superior control and uniform distribution.
- Standard angles 50° to 80° at 10 psi.
- Wide-angle solid cone-shaped spray pattern with round impact area and spray angles from 120° to 125° at 10 psi.

GG

Removable cap and vane
1/8" to 1/4" NPT or BSPT (M)

GG-W

Removable cap and vane
1/8" to 1/4" NPT or BSPT (M)

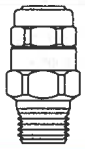
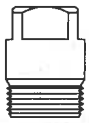
HH

One-piece body
1/8" to 1/4" NPT or BSPT (M)

HH-W

One-piece body
1/8" to 1/4" NPT or BSPT (M)

DIMENSIONS AND WEIGHTS

Standard	Nozzle Type	Inlet Conn. (in.)	Length (in.)	Dia. (in.)	Hex (in.)	Net Weight (oz.)
	GG, GG-W (M)	1/8	1-9/32	–	9/16	3/4
		1/4	1-9/16	–	11/16	1-1/2
	HH, HH-W (M)	1/8	7/8	1/2	–	1/2
		1/4	29/32	17/32	–	1/2

Based on largest/heaviest version of each type.

MATERIALS

Material	Material Code	Nozzle Type	
		GG, GG-W	HH, HH-W
Brass	(none)	●	●
Mild Steel	I	●	●
303 Stainless Steel	SS	●	●
316 Stainless Steel	316SS	●	●
Polyvinyl Chloride	PVC	●	●

Other materials available upon request.

PERFORMANCE DATA

*At the stated pressure in psi.

Inlet Conn. (in.)	Nozzle Type		Capacity Size	Capacity (gallons per minute)*						Spray Angle (°)*	
	GG	HH		10	20	30	40	60	80	20	80
1/8	●	●	1	.10	.14	.17	.19	.23	.26	58	53
	●	●	1.5	.15	.21	.25	.28	.34	.39	65	59
	●	●	2	.20	.28	.33	.38	.46	.52	50	46
	●	●	3	.30	.41	.50	.57	.68	.78	65	59
	●	●	3.5	.35	.48	.58	.66	.80	.91	50	46
	●	●	5	.50	.69	.83	.95	1.1	1.3	65	59
1/4	●	●	6.5	.65	.89	1.1	1.2	1.5	1.7	50	46
	●	●	10	1.0	1.4	1.7	1.9	2.3	2.6	67	61

*At the stated pressure in psi.

Inlet Conn. (in.)	Nozzle Type		Capacity Size	Capacity (gallons per minute)*						Spray Angle (°)*	
	GG-W	HH-W		10	20	30	40	60	80	10	80
1/8	●		1.5W	.15	.21	.25	.28	.34	.39	120	86
	●	●	2.8W	.28	.39	.46	.53	.64	.73	120	102
	●	●	4.3W	.43	.59	.71	.81	.98	1.1	120	102
	●		5.6W	.56	.77	.93	1.1	1.3	1.5	120	102
	●	●	8W	.80	1.1	1.3	1.5	1.8	2.1	120	103
1/4	●		10W	1.0	1.4	1.7	1.9	2.3	2.6	120	103
	●		12W	1.2	1.7	2.0	2.3	2.7	3.1	120	103
	●	●	14W	1.4	1.9	2.3	2.6	3.2	3.6	120	103

ORDERING INFO

STANDARD SPRAY NOZZLE

1/4	GG	–	SS	10
Inlet Conn.	Nozzle Type		Material Code	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

FEATURES AND BENEFITS

- High pressure, high impact solid stream (0°) or flat fan spray pattern.
- Spray angles of 5° to 80° at operating pressures from 300 to 4000 psi.
- Uniform distribution by using internal guide vane to stabilize liquid turbulence.
- Longer wear life and flow control accuracy with specially hardened stainless steel construction.
- IMEG – Optimized fluid dynamics to minimize turbulence and maximize spray performance with our patented design and superior chemical/corrosion resistance provided by a hardened shield.

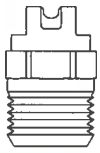
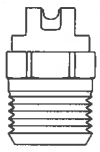
MEG

1/8" to 1/4" NPT or BSPT (M)

IMEG®

1/8" to 1/4" NPT or BSPT (M)

DIMENSIONS AND WEIGHTS

Standard	Nozzle Type	Inlet Conn. (in.)	Length (in.)	Hex. (in.)	Flats (in.)	Net Weight (oz.)
	MEG (M)	1/8	7/8	1/2	5/16	5/8
		1/4	29/32 flat 1-1/64 solid	9/16	13/32	3/4
	IMEG (M)	1/8	7/8	1/2	5/18	5/8
		1/4	1-15/64	9/16	13/32	3/4

Based on largest/heaviest version of each type.

ORDERING INFO

STANDARD SPRAY NOZZLE

1/4	MEG	–	15	04
Inlet Conn.	Nozzle Type		Spray Angle	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

STANDARD SPRAY NOZZLE

1/8	MEG	–	65	05
Inlet Conn.	Nozzle Type		Spray Angle	Capacity Size

PERFORMANCE DATA

MEG

*At the stated pressure in psi.

Nozzle Type and Spray Angle														Capacity Size	Capacity (gallons per minute)*								
1/8 MEG							1/4 MEG																
0°†	5°	15°	25°	40°	50°	65°	0°†	5°	15°	25°	40°	50°	65°		300	400	500	700	800	1500	2000	2500	3000
									●					01	.27	.32	.35	.42	.50	.61	.71	.79	.87
									●					015	.41	.47	.53	.63	.75	.92	1.1	1.2	1.3
●	●	●	●	●			●	●	●	●	●		●	02	.55	.63	.71	.84	1.0	1.2	1.4	1.6	1.7
													●	025	.68	.79	.88	1.0	1.3	1.5	1.8	2.0	2.2
●		●	●	●	●		●	●	●	●	●	●	●	03	.82	.95	1.1	1.3	1.5	1.8	2.1	2.4	2.6
							●		●	●	●			035	.96	1.1	1.2	1.5	1.8	2.1	2.5	2.8	3.0
●		●	●	●	●	●	●	●	●	●	●	●	●	04	1.1	1.3	1.4	1.7	2.0	2.4	2.8	3.2	3.5
●		●	●	●		●	●		●	●	●		●	045	1.2	1.4	1.6	1.9	2.3	2.8	3.2	3.6	3.9
●	●	●	●	●	●	●	●	●	●	●	●	●	●	05	1.4	1.6	1.8	2.1	2.5	3.1	3.5	4.0	4.3
●		●	●	●	●	●	●	●	●	●	●	●	●	055	1.5	1.7	1.9	2.3	2.8	3.4	3.9	4.3	4.8
●	●	●	●	●	●	●	●	●	●	●	●	●	●	06	1.6	1.9	2.1	2.5	3.0	3.7	4.2	4.7	5.2
●		●	●	●	●	●	●	●	●	●	●	●	●	08	2.2	2.5	2.8	3.3	4.0	4.9	5.7	6.3	6.9
●		●	●	●	●	●	●		●	●	●	●	●	10	2.7	3.2	3.5	4.2	5.0	6.1	7.1	7.9	8.7
●				●			●	●	●	●	●	●	●	12	3.3	3.8	4.2	5.0	6.0	7.3	8.5	9.5	10.4

†0° = Solid Stream.

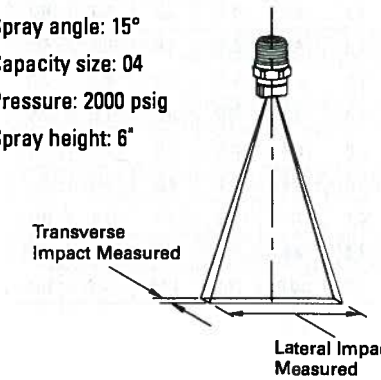
IMEG®

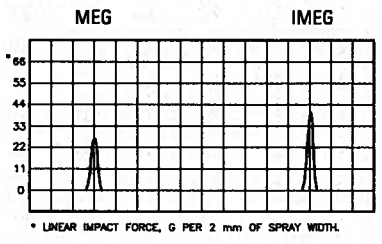
*At the stated pressure in psi.

Inlet Conn. (in.)	Spray Angle at 40 psi								Capacity Size	Capacity (gallons per minute)*												
	5°	10°	15°	25°	40°	50°	65°	80°		300	400	500	600	700	800	1000	1500	2000	2500	3000	3500	4000
1/8, 1/4	●	●	●	●	●	●	●	●	03	.82	.95	1.1	1.2	1.3	1.3	1.5	1.8	2.1	2.4	2.6	2.8	3.0
	●	●	●	●	●	●	●	●	035	.96	1.1	1.2	1.4	1.5	1.6	1.8	2.1	2.5	2.8	3.0	3.3	3.5
	●	●	●	●	●	●	●	●	04	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.4	2.6	3.2	3.5	3.7	4.0
	●	●	●	●	●	●	●	●	045	1.2	1.4	1.6	1.7	1.9	2.0	2.3	2.8	3.2	3.6	3.9	4.2	4.5
	●	●	●	●	●	●	●	●	05	1.4	1.6	1.8	1.9	2.1	2.2	2.5	3.1	3.5	4.0	4.3	4.7	5.0
	●	●	●	●	●	●	●	●	055	1.5	1.7	1.9	2.1	2.3	2.5	2.8	3.4	3.9	4.3	4.8	5.1	5.5
	●	●	●	●	●	●	●	●	06	1.6	1.9	2.1	2.3	2.5	2.7	3.0	3.7	4.2	4.7	5.2	5.6	6.0
	●	●	●	●	●	●	●	●	065	1.8	2.1	2.3	2.5	2.7	2.9	3.3	4.0	4.6	5.1	5.6	6.1	6.5
	●	●	●	●	●	●	●	●	07	1.9	2.2	2.5	2.7	2.9	3.1	3.5	4.3	4.9	5.5	6.1	6.5	7.0
	●	●	●	●	●	●	●	●	075	2.1	2.4	2.7	2.9	3.1	3.4	3.8	4.6	5.3	5.9	6.5	7.0	7.5
	●	●	●	●	●	●	●	●	08	2.2	2.5	2.6	3.1	3.3	3.6	4.0	4.9	5.7	6.3	6.9	7.5	8.0

MEG AND IMEG IMPACT DATA

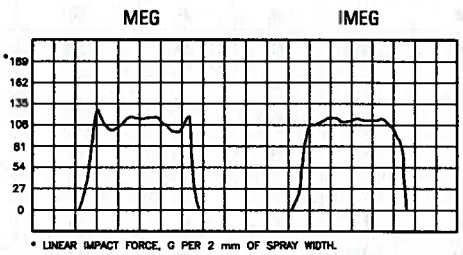
Spray angle: 15°
Capacity size: 04
Pressure: 2000 psig
Spray height: 6"





Transverse Impact

IMEG provides 25 to 100% more impact (dependent on nozzle size and angle)



Lateral Impact

IMEG provides more evenly distributed impact

QCMEG

1/4" quick-connect

QCIMEG

1/4" quick-connect

FEATURES AND BENEFITS

- High impact flat fan spray pattern with uniform distribution.
- Spray angles range from 0° to a 40° flat spray.
- One-piece body design is constructed of hardened stainless steel.
- QCIMEG™ offers optimized fluid dynamics to minimize turbulence and maximize spray performance.
- Incorporates the convenience of a quick connect/disconnect design.
- Protective nozzle guards are color-coded for easy identification of spray angles.
- Locating ribs on nozzle guards for fast alignment and easy spray pattern direction.
- Streamlined internal passage optimizes fluid dynamics and provides maximum performance, minimum turbulence.
- A 302 Stainless Steel guide vane further stabilizes turbulent flow and improves pattern quality and cleaning efficiency.
- QCEM – Soap nozzle available in brass.

PERFORMANCE DATA

QCMEG

*At the stated pressure in psi.

Spray Angle at 40 psi				Capacity Size	Capacity (gallons per minute)*												
0°† (Red)	15° (Yellow)	25° (Green)	40° (White)		300	400	500	600	700	800	1000	1500	2000	2500	3000	3500	4000
		●	●	02	.55	.63	.71	.77	.84	.89	1.0	1.2	1.4	1.6	1.7	1.9	2.0
●	●	●		03	.82	.95	1.1	1.2	1.3	1.3	1.5	1.8	2.1	2.4	2.6	2.8	3.0
●	●	●	●	035	.96	1.1	1.2	1.4	1.5	1.6	1.8	2.1	2.5	2.8	3.0	3.3	3.5
●	●	●	●	04	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.4	2.8	3.2	3.5	3.7	4.0
●	●	●	●	045	1.2	1.4	1.6	1.7	1.9	2.0	2.3	2.8	3.2	3.6	3.9	4.2	4.5
●	●	●	●	05	1.4	1.6	1.8	1.9	2.1	2.2	2.5	3.1	3.5	4.0	4.3	4.7	5.0
●	●	●	●	055	1.5	1.7	1.9	2.1	2.3	2.5	2.8	3.4	3.9	4.3	4.8	5.1	5.5
●	●	●	●	06	1.6	1.9	2.1	2.3	2.5	2.7	3.0	3.7	4.2	4.7	5.2	5.6	6.0
●	●	●	●	065	1.8	2.1	2.3	2.5	2.7	2.9	3.3	4.0	4.6	5.1	5.6	8.1	6.5
●	●	●	●	07	1.9	2.2	2.5	2.7	2.9	3.1	3.5	4.3	4.9	5.5	6.1	6.5	7.0
●	●	●	●	075	2.1	2.4	2.7	2.9	3.1	3.4	3.8	4.6	5.3	5.9	6.5	7.0	7.5
●	●	●	●	08	2.2	2.5	2.8	3.1	3.3	3.6	4.0	4.9	5.7	6.3	6.9	7.5	8.0
	●	●	●	09	2.5	2.8	3.2	3.5	3.8	4.0	4.5	5.5	6.4	7.1	7.8	8.4	9.0
●	●	●	●	10	2.7	3.2	3.5	3.9	4.2	4.5	5.0	6.1	7.1	7.9	8.7	9.4	10.0
●	●	●	●	12	3.3	3.8	4.2	4.6	5.0	5.4	6.0	7.3	8.5	9.5	10.4	11.2	12.0
	●		●	15	4.1	4.7	5.3	5.8	6.3	6.7	7.5	9.2	10.6	11.9	13.0	14.0	15.0

†0° = Solid Stream.

PERFORMANCE DATA

QCIMEG™

*At the stated pressure in psi.

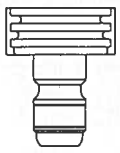
Spray Angle at 40 psi			Capacity Size	Capacity (gallons per minute)*												
15° (Yellow)	25° (Green)	40° (White)		300	400	500	600	700	800	1000	1500	2000	2500	3000	3500	4000
	●	●	02	.55	.63	.71	.77	.84	.89	1.0	1.2	1.4	1.6	1.7	1.9	2.0
●	●	●	03	.82	.95	1.1	1.2	1.3	1.3	1.5	1.8	2.1	2.4	2.6	2.8	3.0
●	●	●	035	.96	1.1	1.2	1.4	1.5	1.6	1.8	2.1	2.5	2.8	3.0	3.3	3.5
●	●	●	04	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.4	2.8	3.2	3.5	3.7	4.0
●	●	●	045	1.2	1.4	1.6	1.7	1.9	2.0	2.3	2.8	3.2	3.6	3.9	4.2	4.5
●	●	●	05	1.4	1.6	1.8	1.9	2.1	2.2	2.5	3.1	3.5	4.0	4.3	4.7	5.0
●	●	●	055	1.5	1.7	1.9	2.1	2.3	2.5	2.8	3.4	3.9	4.3	4.8	5.1	5.5
●	●	●	06	1.6	1.9	2.1	2.3	2.5	2.7	3.0	3.7	4.2	4.7	5.2	5.6	6.0
●	●	●	065	1.8	2.1	2.3	2.5	2.7	2.9	3.3	4.0	4.6	5.1	5.6	6.1	6.5
●	●	●	07	1.9	2.2	2.5	2.7	2.9	3.1	3.5	4.3	4.9	5.5	6.1	6.5	7.0
●	●	●	075	2.1	2.4	2.7	2.9	3.1	3.4	3.8	4.6	5.3	5.9	6.5	7.0	7.5
●	●	●	08	2.2	2.5	2.8	3.1	3.3	3.6	4.0	4.9	5.7	6.3	6.9	7.5	8.0
●	●	●	09	2.5	2.8	3.2	3.5	3.8	4.0	4.5	5.5	8.4	7.1	7.8	8.4	9.0

QCEM

*At the stated pressure in psi.

Spray Angle at 40 psi			Capacity Size	Capacity (gallons per minute)*							
25°	50°	65°		300	500	800	1000	1500	2000	2500	3000
●		●	40	11.0	14.1	17.9	20	24	28	32	35
	●		50	13.7	17.7	22	25	31	35	40	43

DIMENSIONS AND WEIGHTS

Standard	Nozzle Type	Length (in.)	Dia. (in.)	Net Weight (oz.)
	QCMEG QCIMEG	1-7/32	31/32	3/4

Based on largest/heaviest version of each type.

ORDERING INFO

STANDARD SPRAY NOZZLE WITH GUIDE VANE

QCMEG – 15 05
Nozzle Type | Spray Angle | Capacity Size

QCIMEG – 15 04
Nozzle Type | Spray Angle | Capacity Size

STANDARD SPRAY NOZZLE WITHOUT GUIDE VANE

SAQCMEG – 15 05
Nozzle Type | Spray Angle | Capacity Size

SAQCIMEG – 15 04
Nozzle Type | Spray Angle | Capacity Size

H-DT

Below 1 gpm at 40 psi
1/8" to 1/4" NPT or BSPT (F)

H-DU

1 gpm and above at 40 psi
1/8" to 1/4" NPT or BSPT (F)

H-U

1 gpm and above at 40 psi
1/8" to 1/4" NPT or BSPT (M)

H-VV

Below 1 gpm at 40 psi
1/8" to 1/4" NPT or BSPT (M)

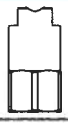
H-VVL

Below 1 gpm with strainer
1/8" to 1/4" NPT or BSPT (M)

FEATURES AND BENEFITS

- Flat spray pattern distributes the liquid as a flat- or sheet-type spray.
- Uniform distribution over a wide range of flow rates and pressures.
- Spray angles available from 0° (solid stream) to 110° at 40 psi.
- Specially tapered spray pattern is ideal for use in manifold and header applications.
- Unobstructed flow passages minimize clogging.
- 12686 strainer will fit H-1/8VV VeeJet nozzle.
- 12687 strainer will fit H-1/4VV VeeJet nozzle.

DIMENSIONS AND WEIGHTS

Standard	Nozzle Type	Inlet Conn. (in.)	Length (in.)	Hex. (in.)	Net Weight (oz.)
	H-VV (M)	1/8	7/8	1/2	1/2
		1/4	29/32	9/16	3/4
	H-VVL (M)	1/8	1-13/32	1/2	3/4
		1/4	1-1/2	9/16	1
	H-DT (F)	1/8	3/4	1/2	1/2
		1/4	25/32	5/8	3/4
	H-U (M)	1/8	7/8	1/2	1/2
		1/4	1	9/16	3/4
	H-DU (F)	1/8	1-1/8	1/2	3/4
		1/4	1-1/4	5/8	1-1/4

Based on largest/heaviest version of each type.

PERFORMANCE DATA

*At the stated pressure in psi.

Nozzle Type/ Inlet Conn. (in.)										Capacity Size	Equiv. Orifice Dia. (in.)	Capacity (gallons per minute)*						
H-VV		H-VVL		H-DT		H-DU		H-U										
1/8	1/4	1/8	1/4	1/8	1/4	1/8	1/4	1/8	1/4			20	40	60	80	100	200	300
●	●	●	●	●						01	.026	.07	.10	.12	.14	.16	.22	.27
●	●	●	●	●	●					02	.035	.14	.20	.24	.28	.32	.45	.55
●	●	●	●	●	●					03	.043	.21	.30	.37	.42	.47	.67	.82
●	●	●	●	●	●					04	.050	.28	.40	.49	.57	.63	.89	1.1
			●	●	●					045	.053	.32	.45	.55	.64	.71	1.0	1.2
●	●	●	●	●	●					05	.056	.35	.50	.61	.71	.79	1.1	1.4
●	●			●	●					055	.059	.39	.55	.67	.78	.87	1.2	1.5
●	●	●	●	●	●					06	.061	.42	.60	.73	.85	.95	1.3	1.6
●	●			●	●					065	.084	.46	.65	.80	.92	1.0	1.5	1.8
●	●	●		●	●					07	.066	.49	.70	.86	.99	1.1	1.6	1.9
●	●									075	.068	.53	.75	.92	1.1	1.2	1.7	2.1
●	●	●	●	●	●					08	.071	.57	.80	.98	1.1	1.3	1.8	2.2
●										085	.073	.80	.85	1.0	1.2	1.3	1.9	2.3
●	●		●	●	●					09	.075	.64	.90	1.1	1.3	1.4	2.0	2.5
●	●	●	●	●	●	●	●	●	●	10	.079	.71	1.0	1.2	1.4	1.6	2.2	2.7
●	●	●	●	●	●	●	●	●	●	15	.094	1.1	1.5	1.8	2.1	2.4	3.4	4.1
						●	●	●	●	20	.109	1.4	2.0	2.4	2.8	3.2	4.5	5.5
						●	●	●	●	30	.133	2.1	3.0	3.7	4.2	4.7	6.7	8.2
						●	●	●	●	40	.153	2.8	4.0	4.9	5.7	6.3	8.9	11.0
							●	●	●	50	.172	3.5	5.0	6.1	7.1	7.9	11.2	13.7
							●		●	60	.188	4.2	6.0	7.3	8.5	9.5	13.4	16.4
						●	●		●	70	.203	4.9	7.0	8.6	9.9	11.1	15.7	19.2

Most capacities may be available in the following spray angles: 0°, 15°, 25°, 40°, 50°, 65°, 80°, 95° and 110°.

MATERIALS

Material	Material Code	Nozzle Type				
		H-VV	H-VVL	H-DT	H-U	H-DU
Brass	(none)	●	●	●	●	●
303 Stainless Steel	SS	●	●	●	●	●

Other materials available upon request.

Mesh Selection Guide	
Orifice Dia. (in.)	Recommended Screen Mesh
Up through .018	200
.019 through .031	100
.032 and larger	50

ORDERING INFO

STANDARD SPRAY NOZZLE

H	1/4	VV	–	SS	110	10
Nozzle Prefix	Inlet Conn.	Nozzle Type		Material Code	Spray Angle	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

VEEJET STRAINER

12687	–	SS	–	100
Strainer Type		Material Code		Mesh Size

H-VV-CKY

Kynar VeeJet Nozzle
1/4" NPT or BSPT (M)

FEATURES AND BENEFITS

- Color-coded for ease of spray angle identification.
- Available in eight different angles: 25°, 40°, 50°, 65°, 80°, 95°, 110° and 120°.
- Constructed of Kynar® for excellent chemical resistance.
- Nozzle body is standard hex size and has a flange for easy installation and removal using a standard socket wrench.
- Flats on the VeeJet nozzle facilitate proper alignment of spray pattern.
- Optional removable strainer.

PERFORMANCE DATA

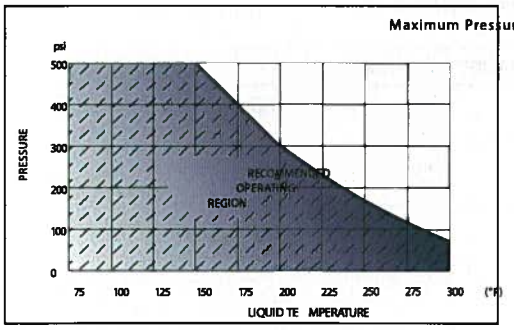
*At the stated pressure in psi.

Nozzle Inlet Conn. NPT or BSPT (M)	Spray Angle at 40 psi								Capacity Size	Capacity (gallons per minute)*										
	25° Green	40° White	50° Blue	65° Purple	80° Light Green	95° Gray	110° Light Blue	120° Light Purple		5	10	20	30	40	60	80	100	200	300	500
1/4		●	●	●	●	●	●	●	02	.07	.10	.14	.17	.20	.24	.28	.32	.45	.55	.71
				●					025	.09	.13	.18	.22	.25	.31	.35	.40	.56	.68	.88
	●	●	●	●	●	●	●	●	03	.11	.15	.21	.26	.30	.37	.42	.47	.67	.82	1.1
		●	●	●	●	●	●	●	04	.14	.20	.28	.35	.40	.49	.57	.63	.89	1.1	1.4
		●	●	●	●	●	●	●	05	.18	.25	.35	.43	.50	.61	.71	.79	1.1	1.4	1.8
	●	●	●	●	●	●	●	●	06	.21	.30	.42	.52	.60	.73	.85	.95	1.3	1.6	2.1
	●	●		●	●				07	.25	.35	.49	.61	.70	.86	.99	1.1	1.6	1.9	2.5
	●	●	●	●	●	●	●	●	08	.28	.40	.57	.69	.80	.98	1.1	1.3	1.8	2.2	2.8
	●	●		●	●				10	.35	.50	.71	.87	1.0	1.2	1.4	1.6	2.2	2.7	3.5

DIMENSIONS AND WEIGHTS

Nozzle Type	Inlet Conn. (in.)	Length (in.)	Dia. (in.)	Net Weight (oz.)
H-VV-CKY (M) 	1/4	7/8	5/8	1/10

Based on largest/heaviest version of each type.



ORDERING INFO

STANDARD SPRAY NOZZLE

H	1/4	VV	–	CKY	65	06
Nozzle Prefix	Inlet Conn.	Nozzle Type		Material Code	Spray Angle	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

For Nozzle Series	Strainer Order No.
H1/4VV–	12687-*-**

*Material Code
(no material code = Brass;
SS = 303 Stainless Steel)

**Screen Mesh

P

FEATURES AND BENEFITS

1/4" to 1/2" NPT or BSPT (M)

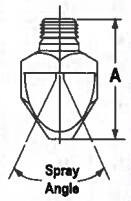
- Very high impact flat spray pattern with narrow spray angle, sharply defined edges and uniform spray distribution.
- Solid one-piece design with deflector plane.
- Large unobstructed flow passage minimizes clogging.

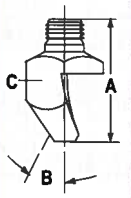
PERFORMANCE DATA

P

*At the stated pressure in psi.

Spray Angle (°) at 40 psi	Inlet Conn. (in.)			Capacity Size	Capacity (gallons per minute)*								Spray Angle (°)*			Dimensions			
	1/4	3/8	1/2		15	20	30	40	60	80	100	150	15	40	100	A Length (in.)	B Deflection Angle (°)	Net Weight (oz.)	Standard
50	●			05	.31	.35	.43	.50	.61	.71	.79	.97	33	50	60	1-7/32	60	1	
	●			10	.61	.71	.87	1.0	1.2	1.4	1.6	1.9	34	50	60	1-7/32	60	1	
	●	●		25	1.5	1.8	2.2	2.5	3.1	3.5	4.0	4.8	42	50	59	1-5/8	42	3	
	●	●		40	2.4	2.8	3.5	4.0	4.9	5.7	6.3	7.7	39	50	60	1-27/32	45	3	
		●		60	3.7	4.2	5.2	6.0	7.3	8.5	9.5	11.6	42	50	53	2-5/32	37	5	
40		●		40	2.4	2.8	3.5	4.0	4.9	5.7	6.3	7.7	31	40	50	2-3/8	35	5	
		●		50	3.1	3.5	4.3	5.0	6.1	7.1	7.9	9.7	31	40	49	2-1/2	33	7	
		●		60	3.7	4.2	5.2	6.0	7.3	8.5	9.5	11.6	32	40	49	2-27/32	33	8	
35	●			10	.61	.71	.87	1.0	1.2	1.4	1.6	1.9	18	35	39	1-7/16	36	2	
	●	●		20	1.2	1.4	1.7	2.0	2.4	2.8	3.2	3.9	24	35	40	1-21/32	30	2	
		●		25	1.5	1.8	2.2	2.5	3.1	3.5	4.0	4.8	24	35	39	1-15/16	28	3	
		●		30	1.8	2.1	2.6	3.0	3.7	4.2	4.7	5.8	26	35	41	2-1/16	28	3	
		●		40	2.4	2.8	3.5	4.0	4.9	5.7	6.3	7.7	28	35	38	2-9/32	26	4	
		●		50	3.1	3.5	4.3	5.0	6.1	7.1	7.9	9.7	31	35	38	2-1/2	23	5	
			●	60	3.7	4.2	5.2	6.0	7.3	8.5	9.5	11.6	29	35	39	2-7/8	27	8	
15	●			10	.61	.71	.87	1.0	1.2	1.4	1.6	1.9	–	15	23	1-7/8	22	2	
	●			20	1.2	1.4	1.7	2.0	2.4	2.8	3.2	3.9	–	15	19	2-1/8	19	2	
		●		30	1.8	2.1	2.6	3.0	3.7	4.2	4.7	5.8	6	15	24	2-27/32	25	4	
		●		40	2.4	2.8	3.5	4.0	4.9	5.7	6.3	7.7	8	15	21	3-5/8	18	8	
		●		50	3.1	3.5	4.3	5.0	6.1	7.1	7.9	9.7	9	15	20	3-9/16	15	6	
			●	60	3.7	4.2	5.2	8.0	7.3	8.5	9.5	11.6	10	15	19	4-15/16	14	12	





MATERIALS

Material	Material Code	Nozzle Type
		P
Brass	(none)	●
Mild Steel	I	●
303 Stainless Steel	SS	●
316 Stainless Steel	316SS	●

Other materials available upon request.

ORDERING INFO

STANDARD SPRAY NOZZLE

3/8	P	–	SS	50	60
Inlet Conn.	Nozzle Type		Material Code	Spray Angle	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

K

1/8" to 1/2" NPT or BSPT (M)

Features and Benefits

- Wide-angle flat fan spray pattern with uniform distribution and medium impact.
- Unobstructed flow passages minimize clogging.
- Precision engineered for dependable, accurate control of deflection and spray angle.

Performance Data

K

*At the stated pressure in psi.

Inlet Conn. (in.)				Capacity Size	Capacity (gallons per minute)*						Spray Angle (°)*	
1/8	1/4	3/8	1/2		10	15	20	30	40	60	20	60
●	●			2	.20	.24	.28	.35	.40	.49	113	129
●	●			2.5	.25	.31	.35	.43	.50	.61	122	133
●	●			3	.30	.37	.42	.52	.60	.73	112	126
●				4	.40	.49	.57	.69	.80	.98	123	132
●	●			5	.50	.61	.71	.87	1.0	1.2	128	142
●	●			7.5	.75	.92	1.1	1.3	1.5	1.8	119	134
●	●			10	1.0	1.2	1.4	1.7	2.0	2.4	133	145
●	●			12	1.2	1.5	1.7	2.1	2.4	2.9	139	153
●	●			15	1.5	1.8	2.1	2.6	3.0	3.7	113	123
●	●			18	1.8	2.2	2.5	3.1	3.6	4.4	120	131
●	●			20	2.0	2.4	2.8	3.5	4.0	4.9	122	133
		●		30	3.0	3.7	4.2	5.2	6.0	7.3	110	121
		●	●	40	4.0	4.9	5.7	6.9	8.0	9.8	126	136
			●	50	5.0	6.1	7.1	8.7	10.0	12.2	131	140
			●	60	6.0	7.3	8.5	10.4	12.0	14.7	134	142
			●	70	7.0	8.6	9.9	12.1	14.0	17.1	137	146
			●	80	8.0	9.8	11.3	13.9	16.0	19.6	138	149

Materials

Material	Material Code	Nozzle Type
		K
Brass	(none)	●
303 Stainless Steel	SS	●
316 Stainless Steel	316SS	●
Polyvinyl Chloride	PVC	●

Other materials available upon request.

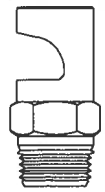
Ordering Info

STANDARD SPRAY NOZZLE

1/8	K	–	SS	2
Inlet Conn.	Nozzle Type		Material Code	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

Dimensions and Weights

Standard	Nozzle Type	Orifice Dia. Nom. (in.)	Length (in.)	Hex. (in.)	Net Weight (oz.)
	K (M)	1/8	1	7/16	1/2
		1/4	1-7/32	9/16	1
		3/8	1-3/4	11/16	2
		1/2	2	7/8	4

Based on largest/heaviest version of each type.

UniJet Bodies

- T female or TT male inlet connections

T female body or

TT male body

Screen strainer

Spray tip

Tip retainer

UniJet Spray Tips

A typical UniJet assembly consists of a T female body or TT male body, screen strainer, spray tip and tip retainer.

TPU

Standard spray tip

Features and Benefits

- Flat fan spray pattern with uniform distribution.
- Spray angles available in 0°, 15°, 25°, 40°, 65°, 80° and 110°.
- Lower cost – nozzle body can be reused – only spray tips are replaced.
- Recessed orifices to protect against damage.
- A large choice of interchangeable spray tips, body types/sizes, materials, spray angles and accessories.
- T and TT bodies are compatible with FoamJet® spray tips. See pages 25 and 27.

Performance Data

TPU

*At the stated pressure in psi.

Capacity Size	Equiv. Orifice Dia. (in.)	Capacity (gallons per minute)*							
		10	20	30	40	60	80	100	200
01	.026	.05	.07	.09	.10	.12	.14	.16	.22
015	.032	.08	.11	.13	.15	.18	.21	.24	.34
02	.035	.10	.14	.17	.20	.24	.28	.32	.45
03	.043	.15	.21	.26	.30	.37	.42	.47	.67
04	.050	.20	.28	.35	.40	.49	.57	.63	.89
045	.053	.23	.32	.39	.45	.55	.64	.71	1.0
05	.056	.25	.35	.43	.50	.61	.71	.79	1.1
06	.081	.30	.42	.52	.60	.73	.85	.95	1.3
07	.086	.35	.49	.61	.70	.86	.99	1.1	1.8
08	.071	.40	.57	.69	.80	.98	1.1	1.3	1.8
09	.075	.45	.64	.78	.90	1.1	1.3	1.4	2.0
10	.079	.50	.71	.87	1.0	1.2	1.4	1.6	2.2
12	.087	.60	.85	1.0	1.2	1.5	1.7	1.9	2.7

Other body types may be available. Contact representative for further information.

Materials

Material	Material Code	Spray Tip	Bodies	
		TPU	T	TT
Brass	(none)	●	●	●
303 Stainless Steel	SS	●	●	●
Nylon	NYB		●	●

Other materials available upon request.

Ordering Info

TIP ONLY

TPU	–	110	10	–	SS
Tip Type		Spray Angle	Capacity Size		Material Code

BSPT connections require the addition of a "B" prior to the nozzle body inlet connection.

FoamJet® Nozzle Selection Guide

1. Choose Spray Tip (See Page 26)

QJFJP		FJ	
	COMPATIBLE WITH: ● Split-Eyelet with Check Valve ● Split-Eyelet without Check Valve (for QJ7421-NY body only) ● Pipe Thread with Check Valve (for QJ8355-NY-BL and QJ8360-NY-BL bodies only)		COMPATIBLE WITH: ● Split-Eyelet without Check Valve ● Pipe Thread with Check Valve ● Pipe Thread without Check Valve

2. Choose Body Style (See Page 27)

Split-Eyelet with Check Valve		Split-Eyelet without Check Valve	
	Connection Specifications:		**Connection Specifications:**
 **QJ17560A-NY-BL**	1/2", 3/4" or 1" pipe Outlet: QuickJet®	 **QJ7421-NYB**	1/2", 3/4" or 1" pipe Outlet: QuickJet
 **QJ22187-NYB**	1/2", 3/4" or 1" pipe Outlet: QuickJet	 **7421***	1/2", 3/4" or 1" pipe Outlet: 11/16"–16 thd
		 **25775****	1/2", 3/4" or 1" pipe Outlet: 11/16"–16 thd

*Tip retainer choice determined by material:
For brass bodies: use CP1325.
For stainless steel bodies: use CP1325-SS.

**Tip retainer choices:
CP18032-NYB or CP8027-NYB.

See page 28 for more information on tip retainers and check valves.

FJP-PP		FJP-VS	
	COMPATIBLE WITH: ● Split-Eyelet without Check Valve ● Pipe Thread with Check Valve ● Pipe Thread without Check Valve		COMPATIBLE WITH: ● Split-Eyelet without Check Valve ● Pipe Thread with Check Valve ● Pipe Thread without Check Valve

Pipe Thread with Check Valve		Pipe Thread without Check Valve	
	Connection Specifications:		**Connection Specifications:**
 **8360-NY-BL, 8360-1/4-NY-BL**	Inlet: 1/4" M Outlet: 11/16"–16 thd or 1/4" F	 **TT**	Inlet: 1/4" F Outlet: 11/16"–16 thd
 **8355-NY-BL**	Inlet: 1/4" F Outlet: 11/16"–16 thd	 **TTT**	Inlet: 1/4" M Outlet: 11/16"–16 thd
 **QJ8355-NY-BL**	Inlet: 1/4" F Outlet: QuickJet®	 **QJ1/4T-NYB**	Inlet: 1/4" F Outlet: QuickJet
 **QJ8360-NY-BL**	Inlet: 1/4" M Outlet: QuickJet	 **QJ1/4TT-NYB**	Inlet: 1/4" M Outlet: QuickJet

Add 21950-BL to part number for check valve if needed.

For 1/4" M inlet and 1/4" F outlet, order 8360-1/4-NY-BL and CP8027-NYB tip retainer. Add 21950-BL to part number for check valve if needed.

†For T or TT in nylon:
Tip retainer: Use CP18032-NYB or CP8027.
For T or TT in brass:
Tip retainer: Use 1325.
For T or TT in stainless steel:
Tip retainer: Use 1325-SS.

See page 28 for more information on tip retainers and check valves.

FJ

FJP-PP, FJP-VS

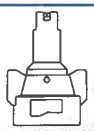
QJFJP

Features and Benefits

- **Key feature overview for FJ and FJP-PP:**
  - FoamJet nozzles deliver a superior wash with highly aerated lasting foam.
  - Made of chemical-resistant and durable material.
  - Plastic FoamJet nozzles are color-coded for easy capacity identification.
  - Available in UniJet® body assemblies for fast, easy maintenance.
- **Key feature overview for QJFJP and FJP-VS:**
  - QuickJet® FoamJet and FJP-VS nozzles deliver a superior wash with an even spray pattern.
  - Choice of 40° or 80° spray angles and wide range of spray patterns.
  - Nozzles provide even coverage in headers and manifolds where multiple nozzles are needed.
  - QJFJP offers easy installation and maintenance with quarter turn automatic alignment.
  - Blue, color-coded check valve on QJFJP saves on chemical usage.
  - Available in UniJet body assemblies for fast, easy maintenance.
  - See Also:

    Bulletin 567C, FoamJet and New QuickJet FoamJet Nozzles.

Dimensions and Weights

Standard	Nozzle Type	Length (in.)	Net Weight (oz.)
	FJ	1-3/4	1
	FJP-PP	1-9/16	1/4
	FJP-VS	1-15/32	1/4
	QJFJP	2-1/16	5/8

Based on largest/heaviest version of each type.

Performance Data

*At the stated pressure in psi.

Capacity Size		Capacity (gallons per minute)*		Spray Angle (°)								
				FJ			FJP-PP				QJFJP FJP-VS	
Orifice	Colort	40	60	0°	40°	80°	20°	40°	65°	80°	40°	80°
015	Green	.15	.18				●	●	●	●	●	●
02	Yellow	.20	.24				●	●	●	●	●	●
03	Blue	.30	.37		●		●	●	●	●	●	●
04	Red	.40	.49			●	●	●	●	●	●	●
05	Brown	.50	.61			●	●	●	●	●	●	●
06	Gray	.60	.73	●		●	●	●	●	●	●	●
08	White	.80	.98	●		●	●	●	●	●	●	●
10	Lt. Blue	1.0	1.22	●		●	●	●	●	●		
15		1.5	1.8	●								
20		2.0	2.5	●								
25		2.5	3.1	●								
30		3.0	3.7	●								

†Color Inserts for FJP, QJFJP and FJP-VS Series.

Ordering Info

STANDARD SPRAY TIP

FJP	–	25	04	PP
Spray Tip		Spray Angle	Capacity Size	Material Code

STANDARD SPRAY TIP

QFJP	–	80	04
Spray Tip		Spray Angle	Capacity Size

FoamJet® Nozzle Bodies

QJ17560A-NY-BL

Quick-connect diaphragm check valve nozzle body
Maximum pressure of 300 psi
Fits 1/2", 3/4" or 1" pipe

QJ22187-NYB

Quick-connect diaphragm check valve body with side mounting
Fits 1/2", 3/4" or 1" pipe

QJ7421-NYB

Quick-connect split eyelet nozzle body
Fits 1/2", 3/4" or 1" pipe
Maximum pressure of 150 psi

7421

Split-eyelet nozzle body
Fits 1/2", 3/4" or 1" pipe
Maximum pressure of 250 psi

25775

Split-eyelet nozzle body
Fits 1/2", 3/4" or 1" pipe
Maximum pressure of 150 psi

8360-NY-BL

Diaphragm check valve nozzle body
Maximum pressure of 125 psi
1/4" NPT (M)

8360-1/4-NY-BL

Quick-connect diaphragm check valve nozzle body
Maximum pressure of 300 psi
1/4" NPT (M)
Outlet 1/4" NPT or BSPT (F)

8355-NY-BL

Diaphragm check valve nozzle body
Maximum pressure of 125 psi
1/4" or 1/8" NPT (F)

QJ8360-NY-BL

Quick-connect diaphragm check valve nozzle body
Maximum pressure of 300 psi
1/4" NPT (M)

QJ8355-NY-BL

Quick-connect diaphragm check valve body
1/4" F

QJ1/4T-NYB

Quick-connect nozzle body
Maximum pressure of 300 psi
1/4" NPT (F)

QJ1/4TT-NYB

Quick-connect nozzle body
Maximum pressure of 300 psi
1/4" NPT (M)

Threaded Body Styles

	1/4" Inlet		Outlet	Materials
	M	F		
8360	●		11/16"–16 thread	Nylon
8360-1/4	●		1/4" (F)	Nylon
8355		●	11/16"–16 thread	Nylon
T		●	11/16"–16 thread	Brass, 303 Stainless Steel, Nylon
TT	●		11/16"–16 thread	Brass, 303 Stainless Steel, Nylon
QJ1/4T		●	QuickJet®	Nylon
QJ1/4TT	●		QuickJet	Nylon
QJ8360	●		QuickJet	Nylon
QJ8355		●	QuickJet	Nylon

Split-Eyelet Body Styles

	1/2" Pipe	3/4" Pipe	1" Pipe	Outlet	Materials
25775	●	●	●	11/16"–16 thread	Nylon
7421	●	●	●	11/16"–16 thread	Brass, 303 Stainless Steel
QJ17560A	●	●	●	QuickJet	Nylon
QJ22187	●	●	●	QuickJet	Nylon
QJ7421	●	●	●	QuickJet	Nylon

Order check valve separately.

Add 21950-BL to part number for 8360, 8355, QJ8360 and QJ17560A.

1325, 8027 Tip Retainers

Ordering Info

TIP RETAINER		
CP1325	–	SS
Model No.		Material Code

TIP RETAINER		
CP8027	–	NYB
Model No.		Material Code

18032A Tip Retainer

Ordering Info

TIP RETAINER		
CP18032A	–	NYB
Model No.		Material Code

21950 Check Valve

Ordering Info

CHECK VALVE				
21950	–	2	–	NYB
Model No.		Opening Pressure		Material Code

Features and Benefits

- **Key feature overview for 1325 and 8027 tip retainers:**
  - Used to hold nozzle assembly together.
  - Inlet connection 11/16"-16 female thread.
- **Key feature overview for 18032A tip retainer:**
  - Winged cap allows quick change of spray tips with no tool required.
  - Inlet connection 11/16"-16 female thread.
- **Key feature overview for 21950 check valve:**
  - Choice of opening pressures – 2 psi, 8 psi or 20 psi.
  - Use at pressures up to 300 psi.
- **Key feature overview for 11370 and 11950 jet stabilizers:**
  - Increase spray projection distance and spray impact on flat spray tips which are mounted at a 90° angle to the liquid supply line.
  - Reduce turbulence that is created when the liquid turns the corner in a manifold, tee or elbow and reduce distortions in the spray pattern.
  - 11370 jet stabilizer is available in 1/8", 1/4", 3/8" and 1/2" connections.

Jet Stabilizers

11370

11950

Ordering Info

JET STABILIZER		
11370 – SS – 1/8x1/8		
Stabilizer Type	Material Code	Conn. Size

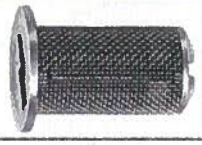
BSPT connections require the addition of a "B" prior to the inlet connection.

Materials

Material	Material Code	Tip Retainer Type			Check Valve	Jet Stabilizer Type	
		CP1325	CP8027	CP18032A	21950	11950†	11370
Brass	(none)	●				●	●
Stainless Steel	SS	●				●	●
Nylon	NYB		●	●	●		

Other materials available upon request.
†Stainless steel guide vane.

SPECIFICATIONS

Strainers	Model	Construction	Screen
	5053	Brass	Stainless steel with 24, 50, 100, 200 mesh
	8079	Polypropylene	Stainless steel with 24, 50, 100, 200 mesh
	6051	Stainless steel	Stainless steel with 24, 50, 100, 200 mesh
	4514 Slotted	Brass	Milled slot equivalent 16, 25, 50 mesh
		Aluminum	Milled slot equivalent 16, 25 mesh
		Nylon	Milled slot equivalent 16, 25, 50 mesh
	4067 Cup	Stainless steel	Stainless steel with 50, 100, 200 mesh
	7630 Disc	Stainless steel	Stainless steel with 50, 100, 200 mesh
	4193A with check valve*	Aluminum Brass Stainless steel Polypropylene	Stainless steel with 24, 50, 100, 200 mesh

*Built-in check valve and stainless steel springs with opening pressures of 5, 10, 20 or 40 psi.

ORDERING INFO

STRAINER

6051 - SS - 50

Strainer Type	Material Code	Mesh Size

STRAINER

4193A - SS - 5 - 50SS

Strainer Type	Material Code	Spring Opening Pressure (psi)	Mesh Size

STRAINER

4514 - NY - 10

Strainer Type	Material Code	Slot Width

MATERIALS

Material	Material Code	Strainer Type						
		5053	8079	6051	4514-10 (50 Mesh)	4514-20 (25 Mesh)	4514-32 (16 Mesh)	4193A
Brass	(none)	●			●	●	●	●
Aluminum	AL					●	●	●
Nylon	NY				●	●	●	
Stainless Steel	SS			●				●
Polypropylene	PP		●					●

Other materials available upon request.

Mesh Selection Guide	
Orifice Dia. (in.)	Recommended Screen Mesh
Up through .018	200
.019 through .031	100
.032 and larger	50

36275

Male inlet/female outlet
1/8" to 3/4" NPT or BSPT

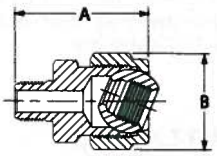
37235

Male inlet 1/4" to 1/2" NPT

FEATURES AND BENEFITS

- Allow positioning of spray for more exact control of spray direction and reduced over-spraying.
- Smooth finished surfaces assure leak-proof connections.
- 36275 – Maximum pressure 300 psi
  - Available in brass and 303 Stainless Steel
- 37235 – Maximum pressure 125 psi
  - Maximum temperature 180°F
  - ProMax® (polypropylene) body with a polyphthalamide cap and an EPDM rubber O-ring (Viton® optional)
  - Data Sheets 37235-1, 37235-2

SPECIFICATIONS

Adjustable Ball Fitting Type	Inlet Conn. (in.)	Outlet Conn. (in.)	Total Included Angle of Adjustment	Dimensions		Net Weight (oz.)	Standard
				A (in.)	B (in.)		
36275	1/8	1/8	45°	1-3/8	31/32	2	
	1/4	1/4		1-9/16	1-3/32	3	
	1/4	1/8		1-9/16	1-3/32	3-1/8	
	3/8	3/8		1-25/32	1-3/8	5-1/2	
	3/8	1/4		1-3/8	1-25/32	5-3/4	
	1/2	1/2		2-7/32	1-21/32	10	
	1/2	1/4		1-7/8	1-3/8	5-3/4	
	1/2	3/8		1-7/8	1-3/8	5-3/8	
	3/4	3/4		2-13/32	1-29/32	17	

Based on largest/heaviest version of each type.

MATERIALS

Material	Material Code	Ball Fitting Type
		36275
Brass	(none)	●
303 Stainless Steel	SS	●
316 Stainless Steel	316SS	●

If inlet and outlet connections are different sizes, material options are brass or 303 Stainless Steel. Other materials available upon request.

ORDERING INFO

36275 ADJUSTABLE BALL FITTING

36275	–	1/2	x	1/2	–	SS
Ball Fitting Type		Inlet Conn.		Outlet Conn.		Material Code

BSPT connections require the addition of a "B" prior to the inlet connection.

CV

In-line drip-free shut-off
1/8" to 1/4" NPT or BSPT

12328

Diaphragm-type
1/2" to 3/4" NPT or BSPT

FEATURES AND BENEFITS

- Either valve type provides positive drip-free shut-off to maintain line pressure during on-and-off spraying cycles.
- 12328 valves offer line flows without pressure drop throughout the valve.
- Prevent back flow.
- Maximum pressure at 150 psi.
- Cracking pressure/spring rating at 5, 10 or 20 psi.
- O-ring (Viton®) soft-seat provides positive seal – no leakage.
- See Also:
  - Bulletin 593, CV Series Inline Check Valves
  - Data Sheet 12527

SPECIFICATIONS

Check Valve	Maximum Pressure (psi)	Maximum Flow Rate (gpm)	Spring Rates	Opening Pressure (psi)	Inlet Connection	Outlet Connection
AACV	150	2	5, 10 or 20 psi	–	1/8 or 1/4 NPT or BSPT (F)	1/8 or 1/4 NPT or BSPT (F)
BACV	150	2	5, 10 or 20 psi	–	1/8 or 1/4 NPT or BSPT (M)	1/8 or 1/4 NPT or BSPT (F)
ABCV	150	2	5, 10 or 20 psi	–	1/8 or 1/4 NPT or BSPT (F)	1/8 or 1/4 NPT or BSPT (M)
BBCV	150	2	5, 10 or 20 psi	–	1/8 or 1/4 NPT or BSPT (M)	1/8 or 1/4 NPT or BSPT (M)
12328	125	15	–	7	1/2 or 3/4 NPT or BSPT (M)	1/2 or 3/4 NPT or BSPT (F)

ORDERING INFO

BALL-TYPE CHECK VALVES

1/4	ABCV	–	SS	5
Inlet/ Outlet Conn.	Check Valve Type		Material Code	Spring Rating (psi)

DIAPHRAGM CHECK VALVE

12328	–	1/2	–	NYB
Check Valve Type		Inlet/ Outlet Conn.		Material Code

BSPT connections require the addition of a "B" prior to the inlet connection.

MATERIALS

Material	Material Code	Valve Type	
		CV	12328
Brass	(none)	●	
Stainless Steel	SS	●	
Nylon	NYB		●

FEATURES AND BENEFITS

- Throttling valves regulate flow in systems equipped with centrifugal pumps.
- Adjustable pressure relief valves accurately control spray line pressures – liquid waste caused by excessive pressures is minimized as excess liquid is bypassed back to the liquid source or pump inlet.
- **Key feature overview for 23520-PP throttling valve:**
  - Compact throttling valve with adjusting cap and lock ring.
  - Polypropylene construction features excellent chemical resistance.
- **Key feature overview for 23120-PP pressure relief valve:**
  - Polypropylene body with nylon adjusting cap means excellent chemical resistance.
  - Easily hand-adjustable pressure relief valve.
  - Maintain line pressure with adjustable locknut.
- **Key feature overview for 8460 pressure relief valve:**
  - Diaphragm design pressure relief valve.
  - Aluminum housing with nylon inlet body.
  - Fairprene® diaphragm seals off all working parts from contact with liquid and provides responsive, chatter-free operation.
  - Features additional port for pressure gauge installation.
- **Key feature overview for 9840 pressure relief valve:**
  - Diaphragm design pressure relief valve.
  - Aluminum and brass housing with nylon inlet body.
  - Fairprene diaphragm seals off all working parts from contact with liquid and provides responsive, chatter-free operation.
  - Features additional port for pressure gauge installation.
- **Key feature overview for 6815 pressure relief valve:**
  - Piston-type pressure relief valve.
  - Full flow with minimum pressure loss due to extra large valve passage.
  - Free-floating seat design improves overall speed and sensitivity of the valve action.
  - Aluminum, brass or stainless steel construction.
- **Key feature overview for 110 pressure relief valve:**
  - Piston-type pressure relief valve.
  - Guide vane seat stabilizes flow and reduces chatter.
  - Removable valve bonnet for service without disturbing fluid line connections.
  - Full flow with minimum pressure loss due to extra large valve passage.
  - Free-floating seat design improves overall speed and sensitivity of the valve action.
  - Aluminum, brass or stainless steel construction.

23520-PP

Throttling valve

23120-PP

Pressure relief valve

8460

Pressure relief valve
(Aluminum housing/
nylon inlet body)

9840

Pressure relief valve
(Aluminum or brass body)

6815

Pressure relief valve –
extra large passage

110

Pressure relief valve –
extra large passage
with guide vane seat

SPECIFICATIONS

Inlet/Outlet Pipe Conn. (in.)	Operating Pressure Max. (psi)	Valve Type						
		23520-PP	23120-PP	8460	9840	6815	6815-HSS	110
1/4	Up to 300							●
	300 to 700							●
	700 to 1000							●
3/8	Up to 300							●
	300 to 700							●
	700 to 1000							●
1/2	Up to 50					●		
	Up to 150	●	●					
	Up to 300			●	●	●		
	300 to 700					●		
	700 to 1200					●	●	
3/4	Up to 50					●		
	Up to 150	●	●					
	Up to 300			●	●	●		
	300 to 700					●		
	700 to 1200					●	●	

MATERIALS

Material	Material Code	Valve Type					
		23520-PP	23120-PP	8460	9840	6815*	110
Brass	(none)				●	●	●
Hardened Stainless Steel	HSS					●	
Nylon/Aluminum	NY			●			
Polypropylene	PP	●	●				

*Brass only for operating pressures up to 700 psi; hardened stainless steel only for pressures from 700 to 1200 psi.

ORDERING INFO

THROTTLING VALVE

23520	–	1/2	–	PP
Valve Type		Inlet/ Outlet Conn.		Material Code

PRESSURE RELIEF/REGULATING VALVE

9840	–	1/2
Valve Type		Inlet/ Outlet Conn.

PRESSURE RELIEF/REGULATING VALVE

6815	–	1/2	–	50
Valve Type		Inlet/ Outlet Conn.		Pressure Rating (psi)

BSPT connections require the addition of a "B" prior to the inlet connection.

Contact your local sales representative for pressure ratings.

60

AA70

FEATURES AND BENEFITS

- Sturdy design and materials including nylon handles and trigger guards, forged brass valve bodies, Buna-N or Viton® stem seals, TEFLON® valve seats and stainless steel working parts mean long, productive equipment life.
- Ergonomic designs assure positive control and operator comfort even at maximum flow and pressure conditions.
- Optional "weep" feature (AA70, PW4000 and 30A) helps prevent freezing in cold conditions.

PW4000A

PW4000AS

30A

SPECIFICATIONS

Model Type	Model	Pressure (psi)	Capacity (gpm)	Temperature (°F)	Inlet Conn.	Outlet Conn.	Length (in.)	Width (in.)	Height (in.)	Net Weight (oz.)	Special Features
	60	2500	6	300	3/8" NPT or BSPT (F)	11/16"–16 THD	8-3/4	1-7/16	6-1/2	16	Stainless steel body available.
	AA70	5000	10	300	3/8" NPT or BSPT (F)	1/4" NPT or BSPT (F)	7.83	1.35	7.56	25	Heavy-duty. Ergonomic/balanced to reduce operator fatigue.
	PW4000A	4000	10	300	1/4", 3/8" NPT or BSPT (F)	1/4", 3/8" NPT or BSPT (F)	8-3/4	1-1/4	7-3/4	24	Fatigue-reducing trigger.
	PW4000AS	4000	10	300	1/4", 3/8" NPT or BSPT (F) swivel	1/4", 3/8" NPT or BSPT (F)	8-3/4	1-1/4	7-3/4	24	Bottom trigger pivot and inlet swivel.
	30A	1500	5	200	1/4" NPT or BSPT (F)	11/16"–16 THD	8	1-1/8	6-9/16	15	Trigger lock. Nylon handle. Trigger guard.
	30L	250	5	200	1/4" NPT or BSPT (F)	11/16"–16 UniJet® THD	8	1-1/8	6-9/16	15	Trigger lock. Nylon handle. Trigger guard.
	30L-PP	150	5	120	1/4" NPT or BSPT (F)	11/16"–18 UniJet THD	8	1-1/8	6-9/16	9	Polypropylene handle. Trigger guard. Trigger lock.

GunJet® AND TriggerJet® SPRAY GUNS

30L

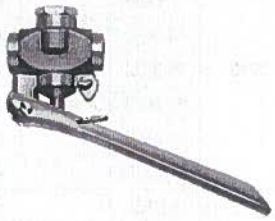
30L-PP

50800-PP-1/4

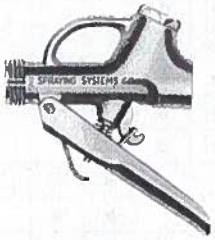
50800-15-PP-1/4

22650-PP

36



4688



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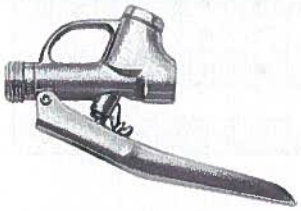
6466



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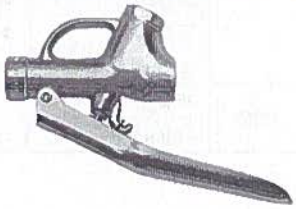

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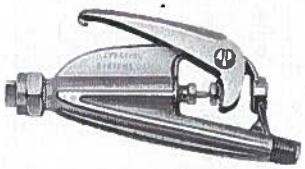


SPECIFICATIONS

Specialty Spray Guns	Pressure (psi)	Capacity (gpm)	Inlet Conn.	Outlet Conn.	Special Features
50800 TriggerJet	100	1.5	1/4" or 3/8" hose or 1/4" NPT or BSPT (F)	11/16"–16 THD	Polypropylene strainer located inside handle to prevent tip clogging.
50800-15-PP-1/4 TriggerJet	100	1.5	1/4" NPT or BSPT adapter	11/16"–16 THD	Trigger lock permits gun to be locked open for continuous flow. Strainer in handle to prevent tip clogging. Use with any standard UniJet tip.
22650-PP, 22670-PP TriggerJet	150	2	1/4" or 3/8" hose or 1/4" NPT or BSPT (F)	11/16"–16 THD	Corrosion resistant polypropylene construction. Trigger lock. UniJet strainer available. Durable Viton® diaphragm.
36 Trigger Valve	150	7	1/4" or 3/8" NPT or BSPT (F)	1/4" or 3/8" NPT or BSPT (F)	Trigger lock. Brass or stainless steel.
4688 Trigger Valve	250	2	1/4" NPT or BSPT (F)	11/18"–16 THD	Trigger lock. Brass or stainless steel.
6104 Trigger Valve	250	2	1/4" NPT or BSPT (F)	1/4" NPT or BSPT (F)	Trigger lock. Brass or stainless steel.
6466 Trigger Valve	250	2	1/4" NPT or BSPT (F)	11/16"–16 THD	Extra long trigger.
6590 Trigger Valve	250	2	1/4" NPT or BSPT (F)	1/4" NPT or BSPT (F)	Extra long trigger.
31 GunJet	500	5	1/4" NPS (M) or NPT or BSPT (F)	11/16"–16 THD	Drip-free shut-off. Trigger lock (optional).

ORDERING INFO

COMPLETE SPRAY GUN ASSEMBLY

22650 – PP – 1/4

GunJet Type	Material Code	Inlet Conn.

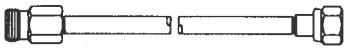
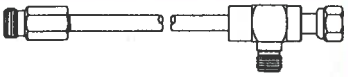
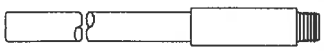
Spray Gun Compatibility

Extension No.	Length Available in. (mm)	Spray Guns								
		30	60	31	36-1/4	4688	6486	6104	6590	22650
9004-SS	8 (203)	●	●	●		●	●			
	12 (305)	●	●	●		●	●			
	18 (457)	●	●	●		●	●			
	24 (610)	●	●	●		●	●			
	36 (914)	●	●	●		●	●			
11806	8 (203)	●	●	●		●	●			
	12 (305)	●	●	●		●	●			
	18 (457)	●	●	●		●	●			
	24 (610)	●	●	●		●	●			
	36 (914)	●	●	●		●	●			
20400-1/4M	18 (457)	●*	●*		●			●	●	
	36 (914)	●*	●*		●			●	●	
15699	8 (203)			●		●	●			
	18 (457)			●		●	●			
	24 (610)			●		●	●			
	36 (914)			●		●	●			
	48 (1219)			●		●	●			
9527	8 (203)			●		●	●			
	18 (457)			●		●	●			
	24 (610)			●		●	●			
	36 (914)			●		●	●			
	48 (1219)			●		●	●			

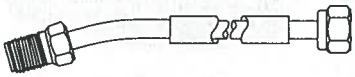
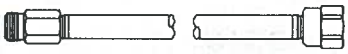
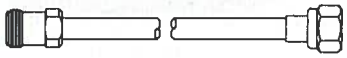
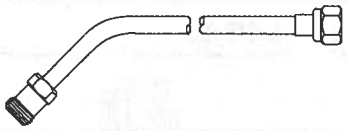
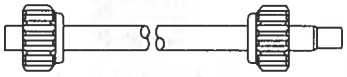
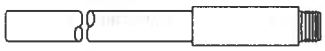
Extension No.	Length Available in. (mm)	Spray Guns								
		30	60	31	36-1/4	4888	6486	6104	6590	22650
12086	8 (203)			●		●	●			
	18 (457)			●		●	●			
	24 (610)			●		●	●			
	36 (914)			●		●	●			
7715	8 (203)			●		●	●			
	12 (305)			●						
	18 (457)			●						
	24 (610)			●						
	30 (762)			●						
	36 (914)			●						
	48 (1219)			●						
6671	8 (203)			●		●	●			
	18 (457)			●		●	●			
	24 (610)			●		●	●			
	30 (782)			●		●	●			
	36 (914)			●		●	●			
	48 (1219)			●		●	●			
22665	15 (381)									●
	24 (610)									●

*Use with 14643-1/4-SSP stainless steel adapter.

Specifications

Gun Extension	Extension No.	Maximum Pressure (psi)	Inlet Conn.	Outlet Conn.	Extension Material	Special Features
	9004-SS	4000	11/16"–16 THD	11/16"–16 THD	Stainless steel	–
	11806	4000	11/16"–16 THD 1/4" NPS (M) liquid recirculating	11/16"–16 THD 1/4" NPS (M) liquid recirculating	Brass	Stainless steel only available in 8" length.
	20400	3000	1/4" NPT or BSPT (M)	1/4" NPT or BSPT (M) or 1/8" NPT or BSPT (F)	Stainless steel or zinc-plated steel	–
	15699	1000	11/16"–16 THD	11/16"–16 THD	Brass	Rubber insulated (48" length not rubber insulated).

SPECIFICATIONS

Gun Extension	Extension No.	Pressure (psi)	Inlet Conn.	Outlet Conn.	Extension Material	Special Features
	9527	1000	11/16"–16 THD	11/16"–16 THD	Brass	Curved, rubber insulated.
	12086	1000	11/16"–16 THD	11/16"–16 THD	Brass	–
	7715	250	11/16"–16 THD	11/16"–16 THD	Brass 8"	–
		500	11/16"–16 THD	11/16"–16 THD	Brass (18", 24" and 36" lengths also available in stainless steel)	–
	6671	125	11/16"–16 THD	11/16"–16 THD	Brass (36" lengths also available in stainless steel)	Curved body.
	22665	150	11/16"–16 THD	11/16"–16 THD	Polypropylene	–
	20400	3000	1/4" NPT or BSPT (M)	1/4" NPT or BSPT (M) or 1/8" NPT or BSPT (F)	Stainless steel or zinc-plated steel	–

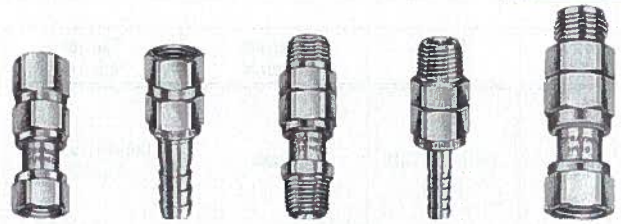
ORDERING INFO

COMPLETE EXTENSION ASSEMBLY

7715	–	18	–	SS
Extension Type		Extension Length (inches)		Material Code

GunJet® Spray Gun Swivel Connectors and Adapters

11990



Maximum 1000 psi

9765

Maximum 4000 psi

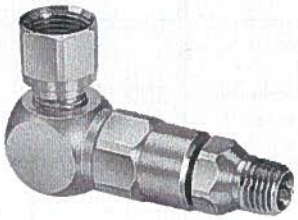
15950

Maximum 3000 psi

21550

Maximum 1500 psi

21550-90NP



Maximum 1500 psi

36560

Maximum 2000 psi

8510

Maximum 4000 psi
Strainer swivel

13212

3/4" garden hose thread (F) inlet connection
3/8", 1/2" NPT or BSPT (M) outlet connection

14269

3/4" garden hose thread (F) inlet connection
1/4" NPS (F) or 1/4" NPT (F) outlet connection

4676

11/16"–16 THD (F) inlet connection
1/8", 1/4", 3/8", 1/2", 3/4 NPT or BSPT (F) outlet connection

14643

11/16"–16 THD (F) inlet connection
1/8", 1/4 NPT or BSPT (F) outlet connection

Ordering Info

Spray Gun Connectors
11990-6
Swivel Type

Outlet Adapter		
4676	1/4	SS
Adapter Type	Inlet Conn.	Material Code

Swivel Connectors	
21550-90NP	1/4
Swivel Type	Inlet Conn.

Call for ordering information for other swivels and strainers.

Specifications

Model No.	Inlet Conn.	Outlet Conn.	Maximum Pressure (psi)	Temperature (°F)	Material	Special Features
11990	1/4" to 1/2" NPT or BSPT (F)	–	1000	180	Brass	Leakproof hose, 360° swivel eliminates hose kinking and operator fatigue.
	–	1/4" NPT or NPS (F)				
	1/4" to 1/2" NPT or BSPT (M)	–				
	–	1/4" NPS (M)				
	–	1/4" to 1/2" NPT or NPS (F)				
15950	3/8" NPT or BSPT (M)	3/8" NPT or BSPT (F)	3000	200	Brass or stainless steel	–
21550	1/4", 3/8" NPT or BSPT (F)	1/4", 3/8" NPT or BSPT (M)	1500	200	Brass	–
9765	1/4" NPS (M)	1/4" NPS (F)	4000	–	Stainless steel	–
21550-90NP	1/4", 3/8" NPT (M)	3/8" NPT or BSPT (F)	1500	200	Delrin® bearings and Buna-N O-ring	Ceiling-mount.
36560	3/8" NPT (M)	3/8" NPS (F)	2000	200	Nickel-plated brass	Boom swivel designed for ceiling mount.
8510 Strainer	1/4" NPS (M)	1/4" NPS (F)	4000	–	Stainless steel	Choice of screen mesh sizes. Internal support prevents screen collapse at high pressure.
13212	3/4" garden hose thread (F)	3/8", 1/2" NPT or BSPT (M)	150	–	Brass	–
14269	3/4" garden hose thread (F)	1/4" NPS (F) or 1/4" NPT (F)	125	–	Brass	–
4676	11/16"–16 THD (F)	1/8", 1/4", 3/8", 1/2", 3/4" NPT or BSPT (F)	1000	–	Brass and nickel-plated brass	–
			2000	–	303 Stainless Steel	–
			125	–	Nylon	–
14643	11/16"–16 THD (F)	1/8", 1/4" NPT or BSPT (F)	4000	–	Nickel-plated steel	–

11990

Connection Type	Swivel Ordering No.	Connection Thread Sizes (NPT/BSPT or NPS)		Approx. Overall Length (in.)
Female x Female	11990-7	1/4" (F) NPT/BSPT	1/4" (F) NPT/BSPT	2-1/18
	11990-20	3/8" (F) NPT/BSPT	1/4" (F) NPS	1-3/4
Male x Male	11990-8	1/4" (M) NPT/BSPT	1/4" (M) NPT/BSPT	2-1/4
	11990-13	1/4" (M) NPT/BSPT	1/4" (M) NPS	2-1/4
	11990-15	3/8" (M) NPT/BSPT	3/8" (M) NPT/BSPT	2-5/16
	11990-18	1/2" (M) NPT/BSPT	1/2" (M) NPT/BSPT	2-3/4
Male x Female	11990-9	1/4" (M) NPT/BSPT	1/4" (F) NPT/BSPT	2-3/16
	11990-21	3/8" (M) NPT/BSPT	1/4" (F) NPS	2

Connection Type	Swivel Ordering No.	Connections		Approx. Overall Length (in.)	For Hose ID (in.)
		Thread Sizes (NPT/BSPT or NPS)	Shank Dia. (in.)		
Female x Hose Shank	11990-60	1/4" (F) NPS	.281	2-5/8	1/4
Male x Hose Shank	11990-62	1/4" (M) NPT/BSPT	.281	2-5/16	1/4
	11990-63	1/4" (M) NPS	.281	2-3/8	1/4
	11990-64	1/4" (M) NPT/BSPT	.406	2-15/32	3/8

AA707

1/4" NPT or BSPT (M)
ABS or PPS

AA727

1/4" NPT or BSPT (M) ABS or PPS
1/4" NPT or BSPT (F) ABS only

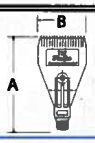
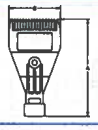
Features and Benefits

- Both models are available in a wide range of patterns, sizes, and materials.
- AA707 Series produce a tightly directed round spray pattern with minimal noise levels.
- Extended ribs protect the recessed orifices against external damage.
- AA727 Series produce an air stream through 16 precision orifices that ensure uniform distribution and spray pattern integrity.

Performance Data

Inlet Conn. NPT or BSPT	Nozzle Type	Capacity Size	Capacity (scfm)			
			10 psi	30 psi	60 psi	90 psi
1/4 (M)	AA707	11	5.2	9.6	16.0	22.3
		15	6.4	12.4	21.0	29.4
		23	10.4	19.2	32.3	45.0
1/4 (M, F)	AA727 AA727-F	11	5.0	8.9	14.4	19.8
		15	6.8	12.8	21.3	29.6
		23	9.9	18.4	30.9	43.4

Dimensions and Weights

Model Type	Nozzle Type	Inlet Conn. NPT or BSPT (in.)	A (in.)	B (in.)	Net Weight (oz.)
	AA727 (M)	1/4	3-9/18	2	2
	AA727-F (F)	1/4	3-9/16	2	2-1/8
	AA707 (M)	1/4	1-7/8	1	1-5/8

Based on largest/heaviest version of each type.

Materials

Materials	Material Code	Nozzle Type	
		AA727	AA707
ABS Plastic	(none)	●	●
Polyphenylene Sulfide	RY	●	●
Stainless Steel	SS	●	●
PVDF	KY		●

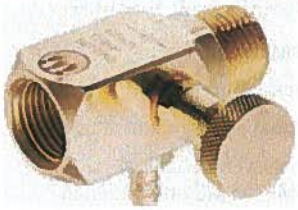
Ordering Info

WINDJET NOZZLE			
AA707	– 1/4	– 11	
Nozzle Type	Inlet Conn.	Capacity Size	

WINDJET NOZZLE			
AA727	– 1/4	– RY	– 15
Nozzle Type	Inlet Conn.	Material Code	Capacity Size

BSPT connections require the addition of a "B" prior to the nozzle number.

50580



Adjustable

13340

Fixed

FEATURES AND BENEFITS

- **Key feature overview for 50580 Adjustable Siphon Injector:**
  - Provides the flexibility to easily adjust and lock-in different mixture ratios.
  - Numbered index adjustment screw enables measured and repeatable siphon control.
  - Lock-nut to secure settings from system vibrations.
  - Needle valve design to ensure precise control of flow.
  - Easy open check-valve design on siphon inlet.
  - Flow range: 0.5 to 6.0 gpm.
  - See also Bulletin 552B and Data Sheet 50580 for flow capacity and ordering information.
- **Key feature overview for 13340 Fixed Siphon Injector:**
  - Calibrated to provide proper siphoning when matched with system flow rates.
  - Easy open check-valve design on siphon inlet.
  - See also: Bulletin 552B and Data Sheet 13340 for specific siphon rate and ordering information.

SPECIFICATIONS

Model Number	Maximum Pressure (psi)	Inlet Connection	Outlet Connection	Siphon Inlet Connection	Maximum Temperature (°F)	Approximate Weight (oz.)	Material
50580	4000	3/8" or 1/2" NPT or BSPT (F)	3/8" or 1/2" NPT or BSPT (M)	.281" Dia. Hose Barb or 1/4" NPT or BSPT (M)	300	8	Brass
13340	4000	3/8" or 1/2" NPT or BSPT (F)	3/8" or 1/2" NPT or BSPT (M)	.281" Dia. Hose Barb or 1/4" NPT or BSPT (M)	300	6-1/2	Brass

Other materials available upon request.

ORDERING INFO

ADJUSTABLE SIPHON INJECTOR

50580	-	3/8	-	5
Model No.		Inlet/ Outlet Conn.		Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

ADJUSTABLE SIPHON INJECTOR

50580	-	1/2	-	20	-	1/4
Model No.		Inlet/ Outlet Conn.		Capacity Size		Siphon Conn.

FIXED SIPHON INJECTOR

13340	-	3/8	-	1	-	73
Model No.		Inlet/ Outlet Conn.		Siphon Conn.		Metering Orifice

SPRAYING SYSTEMS CO.'S TRADEMARK USAGE

The following is a current list of Spraying Systems Co.'s trademarks registered in the United States. Some marks are registered in other countries as well.

AirJet®
AutoJet®
CasterJet®
ChemSaver®
Clip-Eyelet®
ConeJet®
DeflectoJet®
DescaleJet®
DistriboJet®
Drip Free™
DripSafe™
FlatJet®
FloMax®
FloodJet®
FoamJet®
FogJet®
FullJet®
GunJet®
IMEG®
iSpray®
MeterJet®
MiniFogger® II
ProMax®
PulsaJet®
QCIMEG™
QJ®
QJA®
QJJA®
QuickJet®
QuickMist®
Rokon®
RotoClean®
SpiralJet®
SprayDry®
Spraying Systems Co.®
SprayLogic®
TriggerJet®
UltraStream®
UniJet®
VeeJet®
WashJet®
WhirlJet®
WindJet®

REGISTERED TRADEMARK CREDITS

American Express®	American Express Company
AMPCO® 8	AMPCO-Pittsburgh Corporation
ANSI®	American National Standards Institute
ASME®	American Society of Mechanical Engineers (ASME, ASME International)
ASTM®	ASTM International
CARPENTER® 20	Carpenter Technology Corporation
Celcon®	Celanese Corporation
CUPRO® NICKEL	Inco Alloys International, Inc.
DELRIN®	E.I. du Pont de Nemours and Company
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Lucite®	Lucite International
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Teflon®	DuPont Company
Tri-Clamp®	Ladish Co., Inc.
ULTIMET®	Haynes International, Inc.
Visa®	Visa U.S.A.
Viton®	DuPont Performance Elastomers

Terms and Conditions of Sale

(1) Modification of Terms

Seller's acceptance of any order is expressly subject to Buyer's assent to each and all of the terms and conditions set forth below and Buyer's assent to these terms and conditions shall be conclusively presumed from Buyer's receipt of this document without prompt written objection thereto or from Buyer's acceptance of all or any part of the goods ordered. No addition to or modification of said terms and conditions shall be binding upon Seller unless specifically agreed to by Seller in writing. If Buyer's purchase order or other correspondence contains terms or conditions contrary to or in addition to the terms and conditions set forth below, acceptance of any order by Seller shall not be construed as assent to such contrary or additional terms and conditions or constitute a waiver by Seller of any of the terms and conditions.

(2) Price

Unless otherwise specified: (a) all prices, quotations, shipments and deliveries by Seller are f.o.b. Seller's plant; (b) all base prices, together with related extras and deductions, are subject to change without notice and all orders are accepted subject to Seller's price in effect at the time of shipment; and (c) all transportation and other charges are for the account of Buyer, including all increase or decrease in such charges prior to shipment. Payment of said price shall be due at the remittance address shown on the Seller's invoice 30 days after the date of Seller's invoice. Interest will be charged at a rate of 1 to 1-1/2% per month on all balances outstanding more than 30 days after the date of the invoice.

(3) Minimum Billing

The minimum billing by the Seller for any order shall be $50.00.

(4) Warranties

Seller warrants that its products will conform to and perform in accordance with the products' specifications. Seller warrants that the products do not infringe upon any copyright, patent or trademark. THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THOSE CONCERNING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

(5) Limitation on Liabilities

Because of the difficulty of ascertaining and measuring damages hereunder, it is agreed that, except for claims for bodily injury, Seller's liability to the Buyer or any third party, for any losses or damages, whether direct or otherwise, arising out of the purchase of product from Seller by Buyer shall not exceed the total amount billed and billable to the Buyer for the product heraunder. IN NO EVENT WILL SELLER BE LIABLE FOR ANY LOSS OF PROFITS OR OTHER SPECIAL OR CONSEQUENTIAL DAMAGES, EVEN IF SELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

(6) Quality Assurance

Seller shall have no obligation to ensure that any goods purchased from Seller meet any special Buyer quality assurance specifications and/or other special Buyer requirements unless such specifications and/or other requirements are specifically set forth in Buyer's purchase order and expressly accepted by Seller. In the event that any such goods supplied by Seller in connection therewith, are applied to an end use without the appropriate specification and/or other requirement therefore having been set forth in Buyer's purchase order and expressly accepted by Seller, Buyer shall indemnify and hold Seller harmless against any and all damages or claims for damages made by any person for any injury, fatal or nonfatal, to any person or for any damage to the property of any person incident to or arising out of such application.

(7) Claims

Claims respecting the condition of goods, compliance with specifications or any other matter affecting goods shipped to Buyer must be made promptly and, unless otherwise agreed to in writing by Seller, in no event later than one (1) year after receipt of the goods by Buyer. In no event shall any goods be returned, reworked or scrapped by Buyer without the express written authorization of Seller.

(8) Default in Payment

If Buyer fails to make payments on any contract between Buyer and Seller in accordance with Seller's terms, Seller, in addition to any other remedies available to it, may at its option, (i) defer further shipments until such paymants are made and satisfactory credit arrangements are re-established or (ii) cancel the unshipped balance of any order.

(9) Technical Assistance

Unless otherwise expressly stated by Seller: (a) any technical advice provided by Seller with respect to the use of goods furnished to Buyer shall be without charge; (b) Seller assumes no obligation or liability for any such advice, or for any results occurring as a result of the application of such advice; and (c) Buyer shall have sole responsibility for selection and specification of the goods appropriate for the end use of such goods.

(10) Cancellation of Special Orders

Special orders or goods specially manufactured for Buyer cannot be canceled or modified by Buyer, and releases cannot be held up by Buyer, after such goods are in process except with the express written consent of the Seller and subject to conditions then to be agreed upon which shall include, without limitation, protection of Seller against all loss.

(11) Patents

The Seller shall not be liable for any costs or damages incurred by the Buyer as a result of any suit or proceeding brought against Buyer so far as based on claims (a) that use of any product, or any part thereof, furnished hereunder, in combination with products not supplied by the Seller or (b) that a manufacturing or other process utilizing any product, or any part thereof furnishad hereunder, constitute either direct or contributory infringement of any patent of the United States. The Buyer shall hold the Seller harmless against any expense or loss resulting from infringement of patents or trademarks arising from compliance with Buyer's designs or specifications or instructions.

(12) Complete Agreement

The terms and conditions set forth herein, together with any other documents incorporated herein by reference constitute the sole and entire agreement between Buyer and Seller with respect to any order superseding completely any oral or written communications. No additions to or variations from such terms and conditions whether contained in Buyer's purchase ordar, any shipping release or elsewhere shall be binding upon Seller unless expressly agreed to in writing by Seller.

(13) Governing Law

All orders are accepted by Seller at its mailing address in Wheaton, Illinois, and shall be governed by and interpreted in accordance with the laws of the State of Illinois.

(14) Customer Return Policy

We recognize that at times it is necessary for our customers to return products for a variety of reasons. Returns are a normal part of an on-going business relationship. To make the process as straightforward and fair as possible, our policy is based upon the following:

- An error on our part: Seller will credit you for the product and shipping costs, up to one year from ship date.
- An error on your part: Standard products can be returned for full credit, freight prepaid, also up to one year from date of shipment. There is the normal restocking charge of 20%.

Returns are subject to inspection.

For quick handling and authorization of returns, contact your local sales office.

Spraying Systems Co. reserves the right to make changes in specifications or design of the products shown in the catalog or to add improvements at any time without notice or obligation.

Other Helpful Resources

Car Wash Application Center

www.spray.com/carwash

Our Car Wash Center is your online resource for maximizing spray performance. It gives you 24/7 access to nozzle performance data and the **free savings calculator** can identify potential savings in chemical and water usage. Simply answer a few questions about your operation and your savings will be calculated instantly.

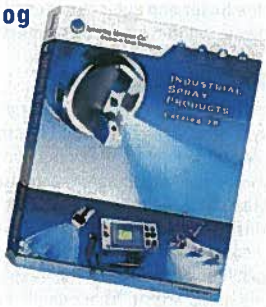
Adjustable and Fixed Siphon Injectors

Bulletin 552B

Adjustable siphon injectors feature a numbered index dial that enables increased control of chemical mixture dilutions and savings on costly chemical usage.

Industrial Spray Products Catalog

Catalog 70



Our full product-line catalog is the most comprehensive resource for spray nozzles and accessories. You'll find nozzle performance data, technical information and tips to improve quality and lower costs in your spray operation.

FoamJet® and QuickJet® FoamJet Nozzles

Bulletin 567C

FoamJet nozzles deliver a superior wash with highly-aerated lasting foam and an even spray pattern.

Spray Optimization Handbook

Technical Manual 410

Comprehensive handbook explains how to maximize performance and quality in your spray application. Topics include detecting, solving and preventing spray system problems.

Liquid Strainers

Catalog 35B

To reduce nozzle wear from solid particulates in the water, a TW- or 122-PP system strainer should be used. Request Catalog 35 to select the appropriate material and strainer mesh size.

Spraying Systems Co.®
Experts In Spray Technology

Spray Nozzles | Spray Control | Spray Analysis | Spray Fabrication

P.O. Box 7900, Wheaton, IL 60189-7900 USA

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Catalog 25A Printed in the U.S.A.

PurClean/PurWater

Water Treatment Systems

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PURCLEAN

SPOT-FREE RINSE SYSTEMS

NEWWAVE INDUSTRIES

4,500 GPD In Bay Spot-Free Rinse System

Features

- Water Stabilizer (replaces softener)
- Inlet & Pressure Pump
- Carbon Tank with Auto Back Flushing Head
- Multi-Stage Pressure Pump
- Low Pressure Shut Off
- Automatic Membrane Flush
- Production & Reject Meters
- On Board TDS Meter
- Two Step Powdercoated Aluminum Frame
- Repressurization and / or Reject Recapture Pump
- Thin Film Membrane
- Hinged Control Box - Quick and Easy Internal Access
- ETL Listed

Specifications	4500 GPD In Bay Spot Free Rinse System (RO)		
Water Requirements	(2) 1" Water line w/ FPT ball valves, 20 GPM at 30 PSI. Mount 4 feet up from floor to the right of the spot free rinse system and (1) drain.		
Electrical Requirements	1Ph	(1)220V 20 Amp Single phase circuit with its own L6-20 locking receptacle. Put plug 5 feet up from the floor to the right of the spot free rinse system.	
	3Ph	(1) 208/230 or 460/480 20 amp circuit, put circuit 5 feet up from the floor to the right of the spot-free rinse system	
RO Output	Production - 2.8 GPM		
Reject	2.3 GPM		
RO Motor	1.5 HP booster pump		
RO Motor Amps	1Ph 208/230 = 10.5 amps	3Ph 208/230 = 5.7 amps	3Ph 460/480 = 2.85 amps
Dimensions	32" Wide X 46" Tall X 16" Deep		
Net Weight	500 Lbs.		
Delivery Pump	Standard delivery pump 15 GPM max at 50 PSI max. Automatic freshwater bypass pressure and GPM varies depending on which car wash application. (Call PurClean for more info.)		

PURWATER

WATER RECOVERY SYSTEMS

General Description:

The use of reclaim water has become an important method for the car wash operator to reduce his/her operating expenses (water / sewer costs) and start-up costs (impact fees). Treatment of reclaim water also promotes water conservation and provides a cleaner water discharge to sewer. Municipalities increasingly require the use of reclaim water in car wash operations and operators continually look for ways to increase profits, reclaim systems are becoming essential in the overall operation of the wash.

Reclaim water is the re-use of water that has already been used in the wash and recovered by the drain system. Most drain systems consist of a catch basin to settle out the large solids, followed by a three compartment, underground settling tank to remove oil & grease, floatable materials and settleable solids. Treated water from this reclaim tank is then discharged to sewer or an oil /water separator.

Reclaim water from the settling tank contains solids that have not settled within the tank. These solids are typically small in size (less than 150 microns) and consist of sand, clay, and silt. These solids can increase wear on pumps, piping, and nozzles, and increase the potential of plugging nozzles. Reclaim water also is a great environment for growing bacteria which can create plugging and odor problems. Typically, anaerobic bacteria (bacteria that grow in the absence of oxygen) will grow beneath the settled solids in the reclaim water tank. This type of bacteria produces hydrogen sulfide which produces an odor similar to rotten eggs. A properly designed reclaim system must both remove solids and provide biological / odor control.

A PurWater reclaim system takes water from the last compartment of the reclaim tank and treats it further so that the quality is acceptable for re-use in the wash. The PurWater reclaim system also returns a portion of the water back to the reclaim tank to provide biological / odor control. Reclaim water that is treated by a PurWater system can then be used during the pre-soak, undercarriage, and side panel wash cycles which greatly reduces the overall amount of city water required by the wash and the amount of water discharged to sewer.

PurWater Reclaim System:

The PurWater Reclaim System consists of cyclone separators to remove solids and one of two methods (air sparger or ozone addition) to control odor and biological growth. The system is contained on a compact frame with its own pump / motor and controls. The system will recirculate water back to the second compartment of the reclaim tank for odor and biological control. When a demand for reclaim water is received from the wash, the system will provide treated reclaim water.

5 MICRON (CYCLONE SERIES)

PW 100/200/300-M5 Series Systems: The PW 100/200/300-M5 series systems consist of high efficiency cyclones, pump / motor, controls and one of three odor control systems ... air sparger, enzyme addition, or ozone addition. The systems are designed to treat 30, 60, and 90 gpm of reclaim water. The new generation of high efficiency cyclones will remove down to 5 micron solids, so that the treated water can be used by high pressure or friction in-bay automatics and tunnel wash applications. The system utilizes a Variable Frequency Drive (VFD) on the pump motor which is controlled by the wash demand, to vary the amount of water that is treated. Water continuously recirculates back to the reclaim tank, both when water is demanded by the wash and when there is no demand. Up to three different demand inputs from the wash can be incorporated into the VFD. The PW 100/200/300-M5 system piping also incorporates a city water intake line for use as: 1) a make-up to meet wash water demands in case the system is not operating due to an extremely low level in the reclaim tank; 2) a reclaim tank fill to add water when the level in the reclaim tank is low; and 3) a pump prime for system start-up.

Air Sparger

Biological and odor control are accomplished by using one of three methods, depending upon the model number supplied. The first method uses an air sparger (models ending in M5AS), which is mounted within the reclaim tank above the water level. The air sparger will bring in air as water is passed through the sparger. The aerated water will add oxygen to the tank water which will control the anaerobic bacteria growth.

Ozone

The third method utilizes ozone to kill the bacteria (models ending in M512O or M524O). Ozone is a contact killing agent, similar to chlorine used in city water. Ozone (O_3) is generated by concentrating the oxygen (O_2) in ambient air and passing the concentrated oxygen through a high voltage electric current to produce ozone. The ozone laden gas is then educted into the recirculation water stream and into the reclaim tank to kill the bacteria.

Note: Breathing concentrated ozone can create severe breathing problems. Precautions must be made to prevent exposure to concentrated ozone.

NEWWAVE INDUSTRIES

PURCLEAN | PURWATER
WWW.PURCLEAN.COM

CORPORATE
3315 Orange Grove Avenue
North Highlands, CA 95660
800.882.8854

MARKETING
2706 Alternate U.S. 19
North Palm Harbor, FL 34683
800.818.8868

QUOTE

Date:	April 4, 2013
Prepared for:	Enterprise Rent a Car - Inglewood
Prepared By:	Cheri Andresen
Job Description:	6,000 GPD Spot-Free Rinse System
Job Site:	NS – Enterprise Rent a Car Inglewood (4 car wash bays)
Lead Time:	**2 to 3 weeks from order to ship**

THE PURCLEAN "PRO-SERIES" MODEL PC 6000 SPOT-FREE RINSE SYSTEM

The PurClean "Pro-Series" of spot-free rinse systems are designed and built with the professional car wash operator in mind and include the following components:

The PurClean "Pro-Series" model PC 6000 is stand mounted and offers the following standard features. Automatic membrane flush. Unit automatically floods membrane every 2 hours for a 2-minute interval to flush contaminants from the surface of the membrane. This very important feature will prolong the life of the membrane.

The PurClean **Water♦Stabilizer™** (patent pending) pre-treatment system is designed to address water hardness and protect the primary filter/membrane from scaling due to hardness in the water fed to the PurClean system. Eliminates the need and ongoing expense of a water softener while protecting the membrane from premature fouling due to water hardness.

(1) 3 cu. ft. carbon filter **with automatic backflushing carbon head with Centaur Carbon media -** Eliminates chlorine from city water, prevents "membrane burn" due to chlorine. Carbon filter also provides sediment filtration.

(1) 5 micron pre-filter - Eliminates particulate matter larger than 5 micron from entering the PurClean system.

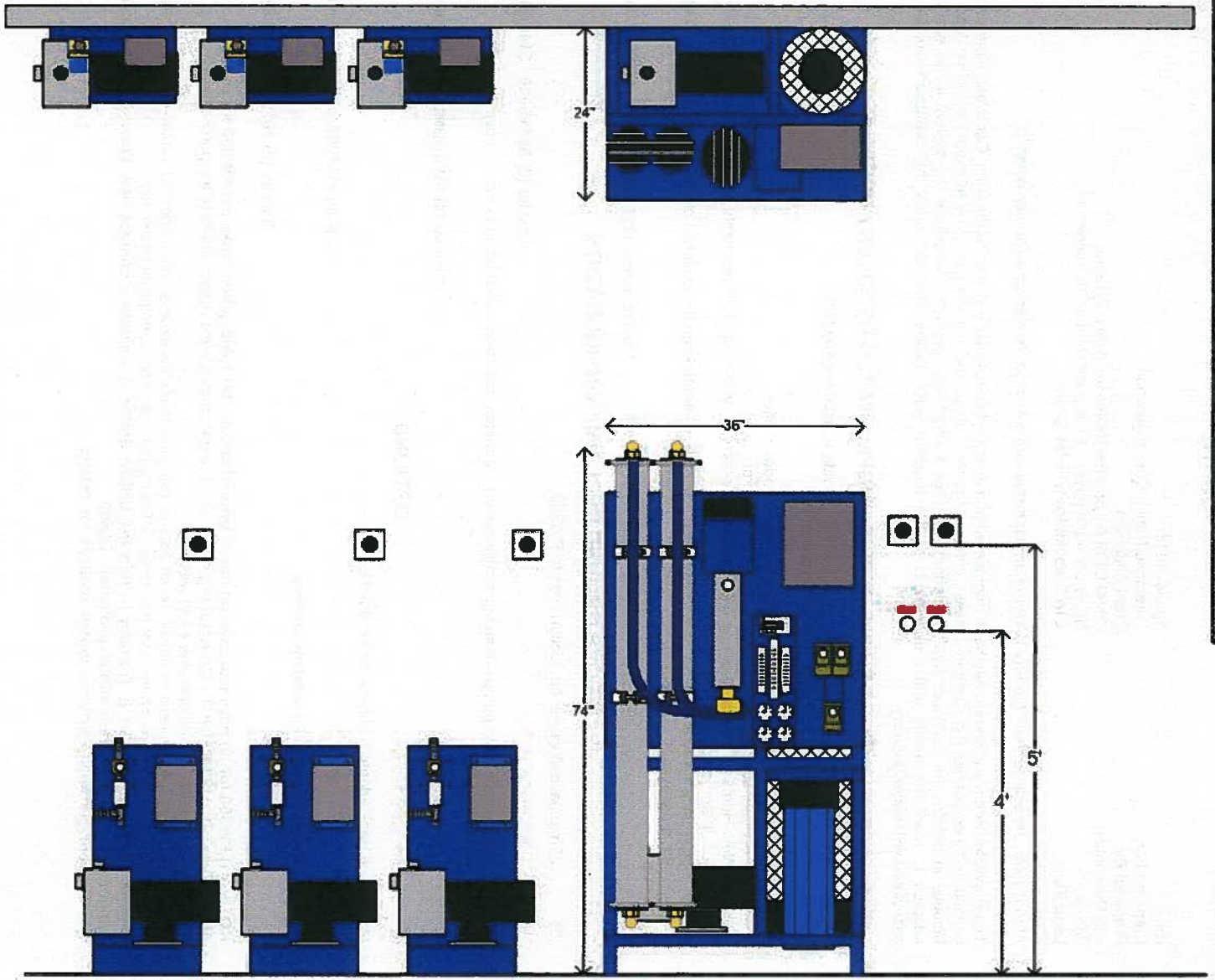
(4) CJ90F 1½ hp (15gpm, 50psi) stainless steel repressurization pumps, delivers spot-free water from water storage tank to the rinse arch.

(4) Freshwater bypass feature. Automatically senses water interruption and will provide a fresh city water rinse until spot-free water is restored.

Cost for **PC06KS W/(4) PC CJ90F**: $17,880.00

NOTE: RO and Delivery systems are standard at 1 phase – if you want to order your RO and Delivery system at 3 phase you will have to add (+$1000 to the cost / list).
Above quote is PLUS FREIGHT FOB North Highlands, CA. Freight costs are the responsibility of the purchaser.
NOTE: City water and well water sources vary across the United States – it is recommended that PurClean know the source water for the RO (problem areas include but are not limited to the following): Texas, Florida, Missouri and parts of Virginia and West Virginia. If the source water is well water we recommend you send us a sample for testing – please contact Teresa at (800) 882-8854 for more information.
All PurClean systems include 1 year parts warranty.

6000 GPD STAND MOUNTED REVERSE OSMOSIS SYSTEM UTILTY REQUIREMENTS



REQUIREMENTS

WATER

(1) 1 1/4" WATER LINE WITH FPT BALL VALVE, 30 GPM AT 30 PSI, FOR REVERSE OSMOSIS SYSTEM. (1) 3/4" OR 1" WITH FPT BALL VALVE FOR AUTOMATIC BYPASS, 15 GPM AT 45 PSI. MOUNT BOTH OF THESE 4 FEET FROM THE FLOOR TO THE RIGHT OF THE RO UNIT.

A DRAIN.

ELECTRICAL

(5) 220 VOLT 20 AMP SINGLE PHASE CIRCUITS EACH WITH ITS OWN L6-20 LOCKING RECEPTACLE. PUT THESE PLUGS 5 FEET UP FROM THE FLOOR TO THE RIGHT OF THE RO UNIT.

(4) ½" CONDUIT FROM CARWASH EQUIPMENT CONTROL BOX TO SEND A CONTROL VOLTAGE SIGNAL TO PURCLEAN'S REPRESSURIZATION POWER BOX.

LOCATION: ENTERPRISE RENT-A-CAR INGLEWOOD
DRAWN FOR: ENTERPRISE RENT-A-CAR INGLEWOOD
DRAWN BY: CHERI ANDRESEN
DRAWING SAVED AS: 6000SM

PURCLEAN
SPOT-FREE RINSE SYSTEMS

NEWWAVE INDUSTRIES

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North Highlands, CA 95660
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MARKETING
2706 Alternate U.S. 19
North Palm Harbor, FL 34683
800.818.8868

QUOTE

Date:	April 4, 2013
Prepared For:	Enterprise Rent a Car - Inglewood
Prepared By:	Cheri Andresen
Job Description:	(2) 90 GPM Air Sparger Water Recovery Systems
Job Site:	NS (4 car wash bays) – Enterprise Rent a Car Inglewood
Lead Time:	**2 to 3 weeks from order to ship**

At PurWater, we believe that ***"Quality Water is an essential ingredient to delivering a Quality Wash".***

The PurWater Recovery System has been engineered and designed specifically with the Professional Car Wash Operator in mind and incorporates the same innovative, cutting edge technology the industry has come to expect from PurClean. Modular in design, the PurWater System platform provides a simplified approach that allows the system to be easily adapted to meet the needs and requirements of the targeted wash facility and eliminates the confusion typically associated with water recovery.

THE PURWATER 300 SERIES (90GPM) WATER RECOVERY SYSTEM

- 5hp Motor with a Variable Frequency Drive to provide constant recirculation
- PLC controlled for smooth consistent operation
- Two stage powder coated frame
- Continuous sparging recirculation technology for odor control
- PurWater succession technology to provide 5 micron quality water
- New Human Machine Interface (HMI) allows carwash operator to visually see faults and status – conveniently located on outside of control box
- New underflow valve is PLC controlled and operates thru HMI to keep the cyclones clean automatically – one of the most overlooked maintenance items

Cost for model **(2) PW300-5MAS**: $29,990.00

ABOVE GROUND RECLAIM CONFIGURATION

(2) 2" manual ball valves for suction lines to PW300

Cost for (2) **5041S020**: $140.94

(4) ½ hp submersible pumps (lead lag configuration) – transfer water from catch basin to the above ground reclaim tanks.

Cost for (4) **PWSUBMLL**: $6,380.00

OPTIONS

(4) 4" tank adaptors to hook tanks together

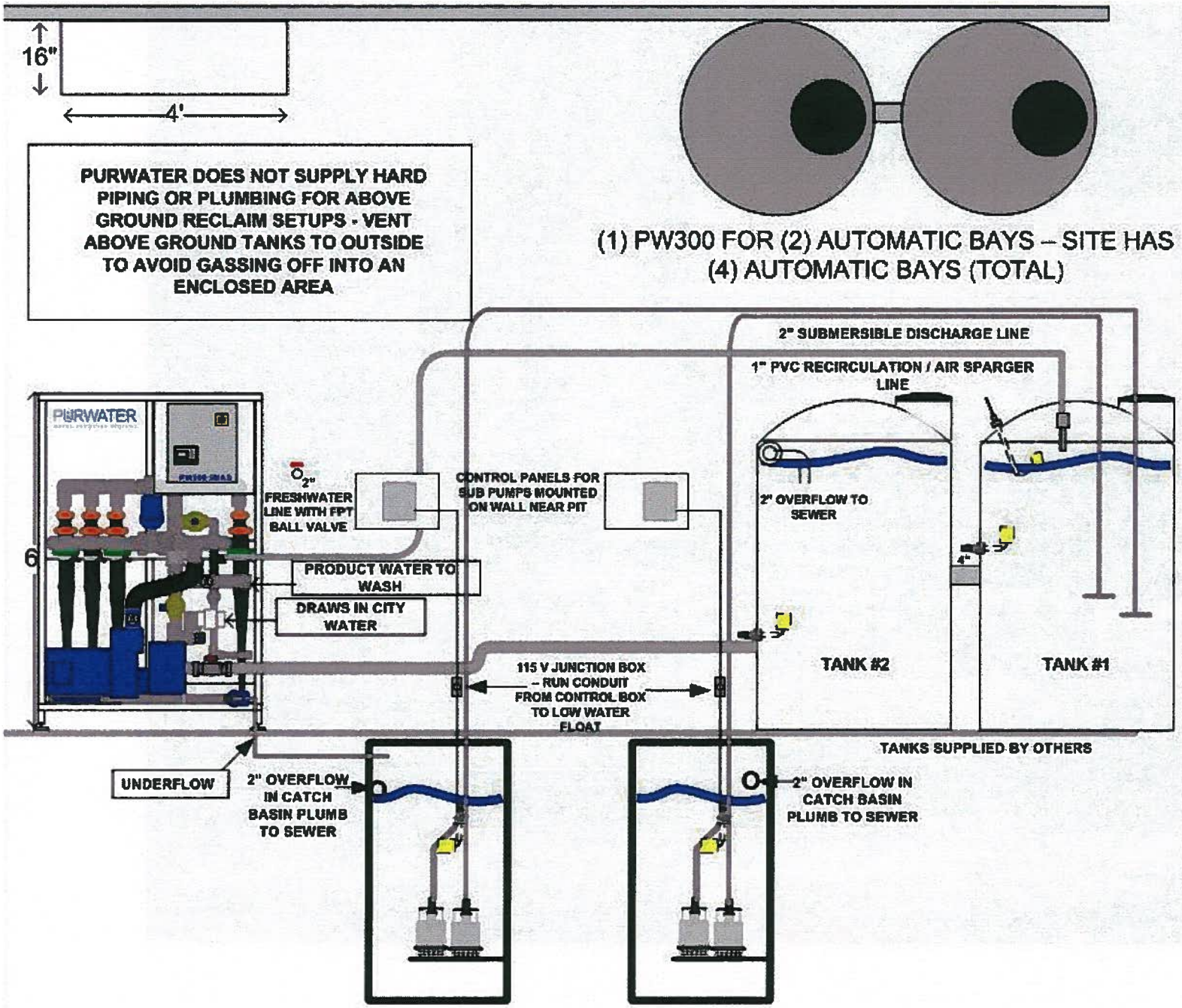
Cost for (4) **7000.040**: $1,540.00

(2) 2" tank adaptors for overflow to sewer

Cost for (2) **7020.020**: $75.42

NOTE: (1) PW300 for (2) bays use existing above ground tanks – (2) 1,600 gallon tanks per PW300 for settling.
Above quote is PLUS FREIGHT FOB North Highlands, CA. Freight costs are the responsibility of the purchaser.
All PurWater systems include one year parts warranty.
NOTE: Site must have access to sewer, leach field or retention tanks for excess water from car wash – freshwater is continually being added through the spot-free rinse (or freshwater rinse and chemical applications).
On-Site Technical Support & Training (within the United States & Canada – contact New Wave for Technical Support & Training on International projects): $2,500
Contact your PurClean-PurWater representatives for details.

PW300 5MAS STAND MOUNTED RECIRCULATION SYSTEM WITH UTILITY REQUIREMENTS



REQUIREMENTS

WATER

(1) 2" SUCTION LINE FROM TANK #2 TO RECLAIM PUMP (INLET).
(1) 1 ½" - 2" LINE OUT TO EACH OF THE WASH MANIFOLDS.
(1) 1" LINE TO RETURN TO TANK #1 OF THE ABOVE GROUND RECLAIM TANK FOR ODOR CONTROL PUR-WATER AIR SPARGER (MOUNT SO STEM END TERMINATES 12" ABOVE WATER LINE).
(1) 1" UNDERFLOW LINE FROM BOTTOM OF RECLAIM FRAME TO CATCH BASIN.
(2) 2" LINES FROM EACH SUBMERSIBLE PUMP TO TANK #1 – RUN LINE DOWN INTO TANK AND END WITH A TEE AS SHOWN.
(1) 2" OVERFLOW BULKHEAD AT TOP OF TANK #2 – PLUMB TO SEWER
(2) 2" OVERFLOWS (ONE IN EACH CATCH BASIN) -PLUMB TO SEWER.

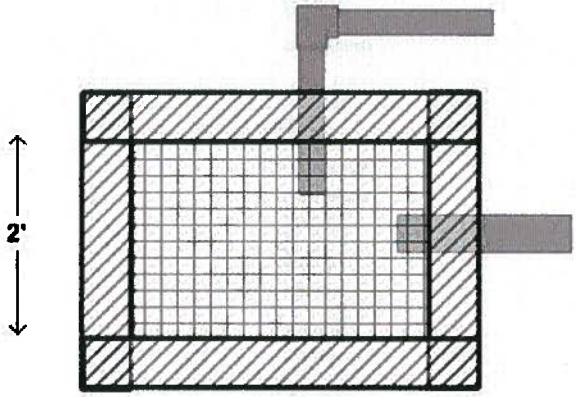
ELECTRICAL

(1) 208/230 30 AMP OR 460/480 VOLT 20 AMP THREE-PHASE CIRCUIT TO BE HARD WIRED 5 FEET UP FROM THE FLOOR TO THE RIGHT OF THE RECIRCULATION UNIT.
(1) 120 VOLT 20 AMP SINGLE PHASE - FOR THE PLC AND (OZONE - IF APPLICABLE)
(2) 120 VOLT 20 AMP SINGLE PHASE CIRCUIT WITH ITS OWN RECEPTACLE - FOR EACH OF THE SUBMERSIBLE PUMP SETUPS.
(1) 1" CONDUIT FROM RECLAIM EQUIPMENT CONTROL BOX TO FRONT OF TANK #1 FOR FLOAT.
(1) ½" CONDUIT FROM EACH CARWASH EQUIPMENT CONTROL BOX TO SEND A CONTROL VOLTAGE SIGNAL TO PUR-WATER'S CONTROL BOX. CONTROL WIRING FROM CAR WASH CONTROLLER (110v IS THE DEFAULT) TO BE WIRED INTO CONTROL BOX ON FRAME.
(1) ¾" CONDUIT FROM CONTROL BOX ON (EACH) SUMP PUMP TO THE RECIRCULATION PUMP CONTROL BOX PULL 8 14 GUAGE WIRES BETWEEN THE TWO BOXES.


DRILL A 3/8" ANTI
SIPHON HOLE IN EACH
OF THE DOWN PIPES
FROM THE LEAD LAG
FILL PUMP(S) NEAR THE
TOP OF THE TANK

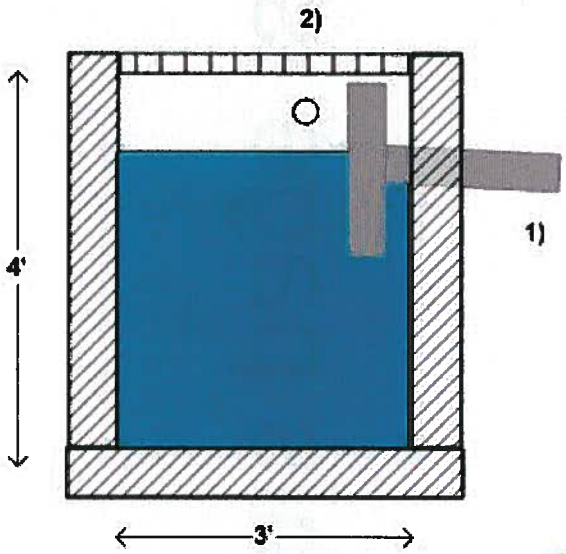
CATCH BASIN

CATCH BASIN DETAIL FOR PW 100 THROUGH 350 MODELS OF PUR-WATER RECOVERY SYSTEMS THIS SHOULD BE A PRE-CAST CONCRETE TANK AND MAY VARY FROM AREA TO AREA THIS IS A RECOMMENDED EXAMPLE ONLY IF IN YOUR AREA IT IS NOT AVAILABLE PLEASE CONTACT PUR-WATER AT 800 882-8854 FOR ASSISTANCE IN SELECTING AN ALTERNATIVE



1) PIPE TO GRAVITY FEED TO RECLAIM TANKS

2) RETURN FROM CYCLONE UNDERFLOW ON PW EQUIPMENT (ALL MODELS) LINE CONNECTION IN EQUIPMENT ROOM IS 1", SHOULD BE ALLOWED TO FREE FLOW INTO PIPE AT LEAST 2-3" IN DIAMETER BACK TO CATCH BASIN AS SHOWN



PURWATER
WATER RECOVERY SYSTEMS

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NSWash Recommendations and Proposed RO System

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Nang Mwe

From: Victor Sanchez [victors@nswash.com]
Sent: Monday, April 01, 2013 2:43 PM
To: Nang Mwe
Cc: chrisa@nswash.com; gthomase@nswash.com; 'Francis Tenggardjaja'; johns@nswash.com; williamc@nswash.com
Subject: RE: Enterprise Car Wash System - Water Conservation Study
Attachments: BT-Series-ML-low.pdf

Hello Nang,

It was a pleasure meeting you and Tricia, I hope that my visit was helpful. The ideas we came up with are very elementary but will definitely help the site save on their water consumption and sewer impact fees. I have included a manual for our latest RO system that recirculates the concentrate to reduce the amount of water required to create gallons of permeate. Below are a couple of suggestions to help the site.

1. Reduce rinse nozzle sizes to 1 gpm per minute. This will cut water consumption by 50%.
2. Shut off fresh water make up systems. These systems introduce fresh water without warning that the sump pumps have failed. Approximately 90 gallons of fresh water is used per cycle when this occurs. With this system off the operators will realize when the system is out of water and address the problem while they manually operate the fresh water feed.
3. A more efficient RO that recirculates concentrate for a better production ratio.
4. Replace Spinner arches with fixed nozzle Blast Off arches reduces reclaim water usage by about 40 gallons per car.
5. Add blowers to reduce runoff and keep water in reclaim system.
6. Plumb the RO concentrate to the above ground reclaim tanks. This will reduce sewer impact and will improve reclaim water quality.
7. Service reclaim sump pumps frequently to ensure that they are operational. Each pump should have its own dedicated GFI circuit. The pumps at this site are plugged into the same GFI's causing the circuit to pop.

If you have any additional questions please feel free to contact me.

Regards,

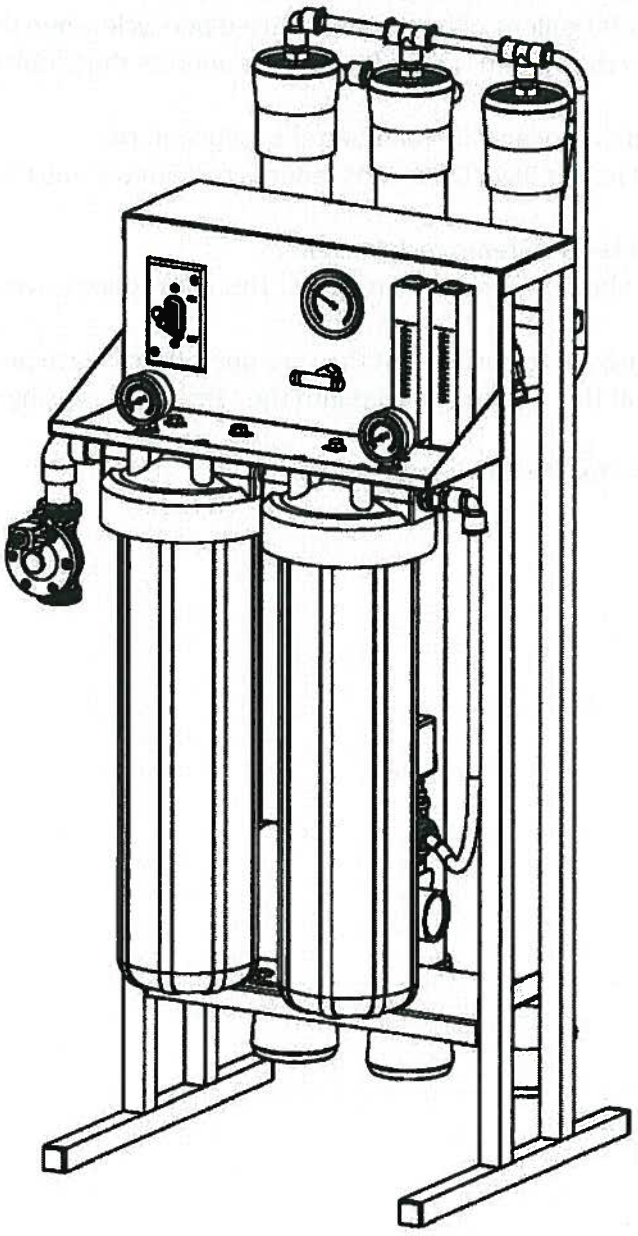
Victor Sanchez
Director of Sales
NS Car Wash Systems
235 West Florence ave
Inglewood,CA 90301
(310)330-1204 direct
(626)622-2036 mobile
(310)412-1196 fax

From: Nang Mwe [mailto:NMwe@rmcwater.com]
Sent: Thursday, March 21, 2013 4:07 PM
To: Victor Sanchez

Reverse Osmosis User's Manual

Model

BT-1500, BT-1800, BT-2000



BT-2000 Pictured

DO NOT UNDER ANY CIRCUMSTANCE; REMOVE ANY CAUTION, WARNING, OR OTHER DESCRIPTIVE LABELS FROM THE SYSTEM.

FEED WATER & OPERATION SPECIFICATIONS

Nothing has a greater effect on a reverse osmosis system than the feed water quality.

NOTE: IT IS VERY IMPORTANT TO MEET THE MINIMUM FEED WATER REQUIREMENTS. FAILURE TO DO SO WILL CAUSE THE MEMBRANES TO FOUL AND VOID THE MANUFACTURER'S WARRANTY.

OPERATING LIMITS

Maximum Feed Temperature °F (°C)	105 (40.96)	Maximum Free Chlorine ppm	0
Minimum Feed Temperature °F (°C)	40 (4.44)	Maximum TDS ppm	2000
Maximum Ambient Temperature °F (°C)	120 (48.89)	Maximum Hardness gpg	15
Minimum Ambient Temperature °F (°C)	35 (1.66)	Maximum pH (Continuous)	11
Maximum Feed Pressure psi (bar)	85 (5.86)	Minimum pH (Continuous)	3
Minimum Feed Pressure psi (bar)	35 (2.41)	Maximum pH (Cleaning 30 Min.)	12
Maximum Operating Pressure psi (bar)	150 (10.34)	Minimum pH (Cleaning 30 Min.)	2
Maximum SDI Rating SDI	<3		
Maximum Turbidity NTU	1		

Test Parameters: 550 TDS Filtered (5 Micron), De-Chlorinated, Softened City Feed Water, 35 psi (2.41 bar) Feed Pressure, 150 psi (10.34 bar) (HF1 Membranes) 100 psi (6.89 bar) (HF4 Membranes) or 70 psi (4.83 bar) (NF3 & NF4 Membranes) Operating Pressure, 77 Degrees F (25 Degrees C), Recovery as stated, 7.0 pH. Data taken after 30 minutes of operation.

Low temperatures and high feed water TDS levels will significantly affect system's production capabilities. Computer projections should be run for individual applications which do not meet or exceed minimum and maximum operating limits.

NOTE: HIGHER TDS AND/OR LOWER TEMPERATURES WILL REDUCE THE SYSTEM'S PRODUCTION.

REJECTION, RECOVERY, & FLOW RATES

BT-Series reverse osmosis systems are designed to produce permeate water at the capacities indicated by the suffix in the system's name under the conditions listed above. For example, the BT-1500 produces 1500 gallons per day of permeate water at the listed operating test conditions.

The amount of total dissolved solids (TDS) rejected by the membrane is expressed as a percentage. For example, a 98.5% rejection rate means that 98.5% of total dissolved

DESIGN BASIS FOR BT-1500, BT-1800, BT-2000

Specifications:

Models	BT-1500	BT-1800	BT-2000
Design			
Configuration	Single Pass	Single Pass	Single Pass
Feed Water Source	City or Well Water	City or Well Water	City or Well Water
Standard Recovery Rate	41%	30%	63%
Recovery with Concentrate Recycle	Up to 75%	Up to 75%	Up to 75%
Rejection and Flow Rates			
Nominal Salt Rejection %	98.5	98.5	98.5
Permeate Flow* gpm (lpm)	1.04 (3.93)	1.25 (4.73)	1.38 (5.22)
Minimum Feed Flow gpm (lpm)	2.04 (7.72)	4.30 (16.28)	2.50 (9.46)
Maximum Feed Flow gpm (lpm)	3.00 (11.36)	5.00 (18.93)	5.00 (18.93)
Minimum Concentrate Flow gpm (lpm)	1.00 (3.78)	3.00 (11.36)	1.00 (3.78)
Connections			
Feed inch	1 FNPT	1 FNPT	1 FNPT
Permeate inch	3/8 Tube	3/8 Tube	3/8 Tube
Concentrate inch	3/8 Tube	3/8 Tube	3/8 Tube
Membranes			
Membrane(s) Per Vessel	1	1	1
Membrane Quantity	2	1	3
Membrane Size	2540	4040	2540
Vessels			
Vessel Array	1:1	1	1:1:1
Vessel Quantity	2	1	3
Pumps			
Pump Type	Rotary Vane 601 Brass or 611 SS	Rotary Vane 1001 Brass or 1011 SS	Rotary Vane 1001 Brass or 1011 SS
Motor HP (kw)	3/4 (0.55)	3/4 (0.55)	3/4 (0.55)
RPM @ 60 (50 Hz)	1725 (1465)	1725 (1465)	1725 (1465)
Electrical			
Standard Voltage	110V 60Hz 1 PH	110V 60Hz 1 PH	110V 60Hz 1 PH
Voltage Options	220V 60Hz 1 PH 220V 50Hz 1 PH	220V 60Hz 1 PH 220V 50Hz 1 PH	220V 60Hz 1 PH 220V 50Hz 1 PH
Voltage Amp Draw (110V 60Hz / 220V 60Hz / 220V 50Hz)	11 / 5.6 / 6.6	11 / 5.6 / 6.6	11 / 5.6 / 6.6
Systems Dimensions **			
L x W x H inch (cm)	19 x 23 x 46 (48 x 58 x 116)	19 x 23 x 46 (48 x 58 x 116)	19 x 23 x 46 (48 x 58 x 116)
Weight lb. (kg)	105 (47.63)	105 (47.63)	115 (52.16)

*Product Flow rates are based on equipment test parameters.
**Does not include operating space requirements.

WARNING: NEVER EXCEED THE MAXIMUM PRESSURE RATING OF YOUR SYSTEM.

Appendix D

Production Data

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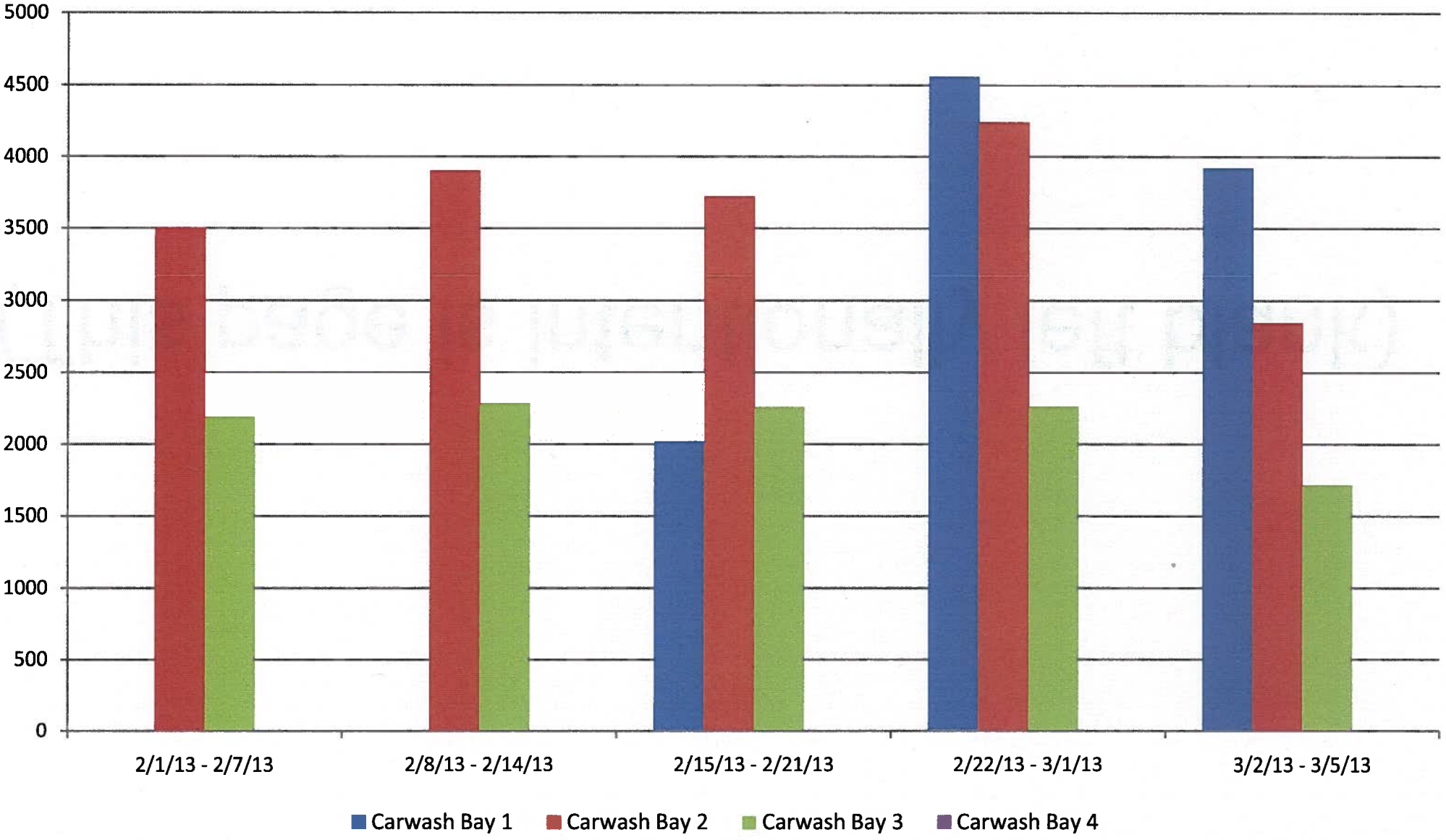
Appendix E
Enterprise Holdings
Recirc & $ave Program
Water Use Per Carwash Bay



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Appendix E

Estimated Program Funding

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Appendix E
Enterprise Holdings
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive
Option 1: Replacement of Nozzles and Spray Jets

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: City of Inglewood Quantity Rates (1) $4.500 Per HCF	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) $764 Per Mgal/yr	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	23,096	8.43	11,270	939	$ 50,715	$ 6,440	$ 57,155
Estimated Water Savings	11,550	4.22	5,636	470	$ 25,362	$ 3,221	**$ 28,583**

(1) Quantity Rates of $4.50 per HCF is effective October 1, 2012. Quantity Rates do not include meter service fee or surcharges authorized by the City of Inglewood.
(2) 2012 - 2013 LACSD Wastewater Treatment Surcharges:
a. Total Flow Volume Per Year (Mgal/yr) x $764.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $135.10
c. Total Suspended Solids Per Year (1000 of lbs) x $382.10
For this preliminary estimate, surcharges b and c are assumed to be constant and are omitted from the Wastewater Treatment Surcharges Calculation

Total Work Days Per Year
365 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	**4.22 Mgal/yr**	
Maximum Potential Water Reduction Incentive	Incentive payment of $6.00 per 1,000 gallons of actual water saved over a one-year period, up to the total capital improvement cost	**$ 16,000**

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 28,583
Potential Program Cash Incentives	$ 16,000
Potential Annual Cost Savings	**$ 44,583**

Appendix E
Enterprise Holdings
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive
Option 2: Replacement of RO System

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: City of Inglewood Quantity Rates (1) $4.500 Per HCF	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) $764 Per Mgal/yr	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	23,096	8.43	11,270	939	$ 50,715	$ 6,440	$ 57,155
Estimated Water Savings	2,310	0.84	1,127	94	$ 5,072	$ 644	**$ 5,717**

(1) Quantity Rates of $4.50 per HCF is effective October 1, 2012. Quantity Rates do not include meter service fee or surcharges authorized by the City of Inglewood.
(2) 2012 - 2013 LACSD Wastewater Treatment Surcharges:
a. Total Flow Volume Per Year (Mgal/yr) x $764.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $135.10
c. Total Suspended Solids Per Year (1000 of lbs) x $382.10
For this preliminary estimate, surcharges b and c are assumed to be constant and are omitted from the Wastewater Treatment Surcharges Calculation

Total Work Days Per Year
365 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	**0.84 Mgal/yr**	
Potential Water Reduction Incentive	Incentive payment of $6.00 per 1,000 gallons of actual water saved over a one-year period, up to the total capital improvement cost	**$ 5,059**

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 5,717
Potential Program Cash Incentives	$ 5,059
Potential Annual Cost Savings	**$ 10,775**

Appendix E
Enterprise Holdings
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive
Option 3: Installation of Reuse Water Treatment System and Replacement of Pre-prep Spray Jets

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: City of Inglewood Quantity Rates (1) $4.500 Per HCF	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) $764 Per Mgal/yr	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	23,096	8.43	11,270	939	$ 50,715	$ 6,440	$ 57,155
Estimated Water Savings	6,930	2.53	3,382	282	$ 15,217	$ 1,932	**$ 17,150**

(1) Quantity Rates of $4.50 per HCF is effective October 1, 2012. Quantity Rates do not include meter service fee or surcharges authorized by the City of Inglewood.
(2) 2012 - 2013 LACSD Wastewater Treatment Surcharges:
a. Total Flow Volume Per Year (Mgal/yr) x $764.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $135.10
c. Total Suspended Solids Per Year (1000 of lbs) x $382.10
For this preliminary estimate, surcharges b and c are assumed to be constant and are omitted from the Wastewater Treatment Surcharges Calculation

Total Work Days Per Year
365 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	2.53 Mgal/yr	
Potential Water Reduction Incentive	Incentive payment of $6.00 per 1,000 gallons of actual water saved over a one-year period, up to the total capital improvement cost	$ 15,177

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 17,150
Potential Program Cash Incentives	$ 15,177
Potential Annual Cost Savings	**$ 32,326**

Appendix E
Enterprise Holdings
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive
Option 4: Replacement of Car Wash Bay Nos. 1 and 2

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: City of Inglewood Quantity Rates (1) $4.500 Per HCF	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) $764 Per Mgal/yr	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	23,096	8.43	11,270	939	$ 50,715	$ 6,440	$ 57,155
Estimated Water Savings	12,010	4.38	5,860	488	$ 26,372	$ 3,349	**$ 29,721**

(1) Quantity Rates of $4.50 per HCF is effective October 1, 2012. Quantity Rates do not include meter service fee or surcharges authorized by the City of Inglewood.
(2) 2012 - 2013 LACSD Wastewater Treatment Surcharges:
a. Total Flow Volume Per Year (Mgal/yr) x $764.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $135.10
c. Total Suspended Solids Per Year (1000 of lbs) x $382.10
For this preliminary estimate, surcharges b and c are assumed to be constant and are omitted from the Wastewater Treatment Surcharges Calculation

Total Work Days Per Year
365 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	4.38 Mgal/yr	
Potential Water Reduction Incentive	Incentive payment of $6.00 per 1,000 gallons of actual water saved over a one-year period, up to the total capital improvement cost	$ 26,302

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 29,721
Potential Program Cash Incentives	$ 26,302
Potential Annual Cost Savings	**$ 56,023**

Appendix F

Monitoring Location

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Appendix F
Enterprise Holdings
Recirc & Save Program

Figure 5. Satellite Photograph of Locations of the City Water Meter

Figure 6. Photograph of Location of the Monitoring 2-inch Meter located at the influent line of RO System

Figure 7. Photograph of the Monitoring 1-inch Meter located on the Potable Supply Water line in Carwash Bay No. 2

Appendix G

Program Contact Information

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Appendix G
Enterprise Holdings
Recirc & $ave Program
Program Contact Information

Name	Affiliation	Phone	Email
Elise Goldman	West Basin Municipal Water District	(310) 660-6253	EliseG@westbasin.org
Tricia Butler	RMC Water and Environment	(949) 587-1700	TButler@rmcwater.com
Nang Mwe	RMC Water and Environment	(949) 587-1700	NMwe@rmcwater.com
Water Service	City of Inglewood	(310) 412-5320	www.cityofinglewood.org
South Bay Environmental Services Center	Southern California Edison	(310) 371-7222	www.sbesc.com
South Bay Environmental Services Center	Southern California Gas Company	(310) 371-7222	www.sbesc.com
Elise Goldman	So Cal Water Smart	(310) 660-6253	socalwatersmart.com

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17140 South Avalon Boulevard, Suite 210, Carson, CA 90746-1296, 310.217.2411, www.westbasin.org

INDUSTRIAL PROCESS WATER AND COOLING TOWER WATER REDUCTION PROGRAM

RECIRC & SAVE

FIELD SURVEY AND EQUIPMENT SURVEY REPORT

prepared for:

Hollywood Riviera Carwash

1500 S. Pacific Coast Highway
Redondo Beach, CA 90277

Prepared by:

RMC Water and Environment

RMC Water and Environment
15510-C Rockfield Blvd., Suite 200
Irvine, CA 92618

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REPORT SUMMARY

RETROFITS AND UPGRADES

Hollywood Riviera Carwash (HRC) in located in Redondo Beach, California. The car wash facility is equipped with one carwash bay with four rinse steps. Modifications to the facility recommended to reduce potable water consumption include replacement of the carwash pre-rinse spray wand and the automatic carwash rinse nozzles.

CHANGES TO OPERATIONAL PRACTICES

HRC is a gas station and a car wash site that also launders towels on site. The towel laundering operation may be an area where operational changes could result in water savings.

POTENTIAL COST SAVINGS

RMC has worked with HRC identify a project to replace the spray wand and nozzles on the rinse arches, which will reduce potable water usage. Reduction of water use in the laundry facility would also potentially provide savings. The approximate annual estimated cost savings is approximately $7,350 based on potable water and sewer disposal costs.

POTENTIAL PROGRAM INCENTIVE

Based on water savings monitored for a one-year period, and considering the West Basin's **RECIRC & $AVE** Program's (Program) financial incentives available (i.e., maximum $6 per 1,000 gallons of actual water saved for a one-year period, up to the total capital improvement cost), the potential Program cash incentive for HRC is approximately $6,500, however, the incentive may not exceed the cost of the modifications incorporated to realize the water savings.

Introduction

The West Basin Municipal Water District (West Basin) in cooperation with the Metropolitan Water District of Southern California (MET) has developed the **RECIRC & $AVE** Program (Program) for large users of water in industrial process operations and cooling towers to save water, reduce sewer discharge, and save energy. The Program provides funding to West Basin Customers for installing equipment that captures, treats, saves, and reuses water that is normally discharged to the sewer. The Program is made possible through funding from the California Department of Water Resources, the U.S. Department of the Interior Bureau of Reclamation, and your local water agency. West Basin is assisted in conducting the Program by URS Corporation (URS), RMC Water and Environment (RMC), and Maureen Erbeznik and Associates.

Qualifications for participating in the Program include:

- Must be a Customer of West Basin Municipal Water District or one of its water retailers;
- Enroll in the Program before water savings improvements have been made at the facility;
- Install and operate the water savings equipment; and
- Obtain a measured water savings over a monitoring period of mutually agreed upon duration such as six months.

Based on two site visits (October 26, 2012, August 7, 2013), RMC identified Hollywood Riviera Carwash (HRC) in Redondo Beach, California as a potential candidate for this Program. Information collected during the site visits is presented in **Appendix A** – Site Inspection Survey. The goal of the Field and the Equipment Survey of the facility is to obtain additional operational information for projects with the greatest potential for significant water reduction in associated facilities and that meet the qualifications to participate in the Program. The Field and Equipment Survey Report provide a summary of the site investigation and the application of the HRC facility to the Program.

Facility Description

HRC is located in Redondo Beach, California as shown in **Figure 1** located at the end of this report. This facility houses a pump station, a carwash area, a gift shop and a small administrative office. Towels used in the car wash are also laundered on site. The location of HRC facility is shown on Figure 1 in Appendix A. The HRC facility uses approximately 4,800 hundred cubic feet of potable water per year. An initial site visit was conducted on October 26, 2012. Further information was obtained at a subsequent meeting at the facility on August 7, 2013. In April 2013, HRC changed ownership. WBMWD and RMC met with the new owner to review the Recirc and Save Program and obtain more information on the carwash facilities.

POTABLE WATER USE

The California Water Service Company is the local water retailer for HRC. **Appendix B** of this report summarizes the water use records provided by the California Water Service Company. HRC operates seven days a week and closes down on three major holidays and when it rains. The number of days it rained in Redondo Beach from January 2010 to December 2011 is 47 days. Therefore, for the purpose of this report, it is assumed that HRC operates 315 days per year.

Based on water use data provided, HRC used 3.61 million gallons (MG) per year of potable water for process operations during the 12-month period beginning November 2011. The average daily process water use for the HRC facility calculates to approximately 11,470 gallons per working day (GPD).

HRC sewer services are provided by the County Sanitation Districts of Los Angeles County. Currently, wastewater flow from the facility is not metered prior to discharge to the sewer. HRC pays an estimated payment per quarter to LACSD for sewer discharge. This amount is paid for the first three quarters, and then based on estimated sewer discharge flow at the end of the year (percentage of actual water use); the remaining portion is paid in the last quarter. While the percentage of potable water use assumed as sewer discharge is not known, it is estimated to be 90 percent based on similar facilities. On a daily average, HRC discharges approximately 10,500 GPD to the sewer and the annual sewage discharge is around 3.3 MG.

DESCRIPTION OF EXISTING EQUIPMENT USING SIGNIFICANT WATER VOLUME

The majority of water use at HRC is for the carwash process and washing towels. Water is also used in restrooms in the car wash area and for landscape irrigation. Restroom and administrative water use at HRC is minimal compared to other processes. HRC landscaping consists of potted plants which are watered by hand and use a negligible amount of water. A small water fountain is located in the waiting area that recirculates water. All water used at the site is served by one water meter.

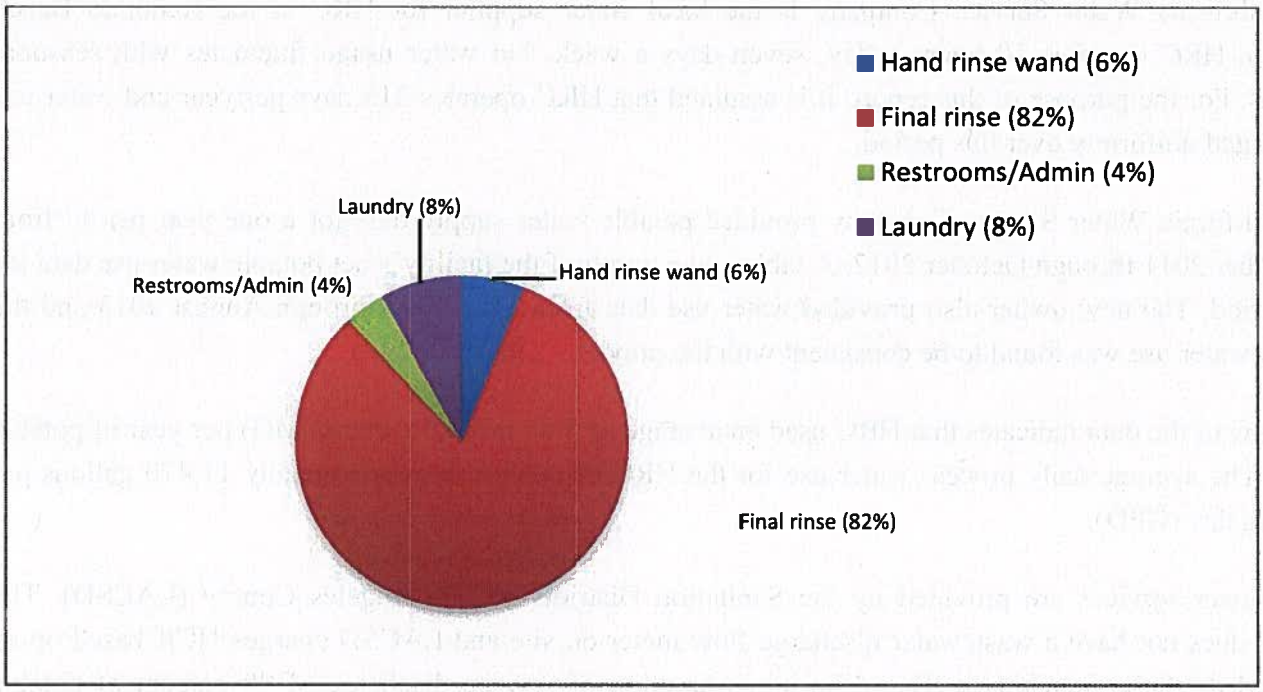
Refer to **Figure 2** located at the end of this report for an illustration of the car wash bay layout. The car wash uses two types of water:

1) The "first rinse" and the "pre-final" arches reuse a portion of drain water collected from the car wash bay. Solids settle in the clarifier tank and clarified water is pumped to the car wash. The first rinse arch contains 13 nozzles with nominal flow of 3 gpm each.

2) There is an initial hand spray wand, a soap arch and two "final rinse" arches that use potable water. Each final rinse arch consists of 11 nozzles with nominal flow of 3 gpm each. The final rinse arch nozzles are set up to spray for approximately 15 seconds.

Several basins and industrial washing machines are used to launder towels. The laundry facility is an area where operational changes such as faucet monitoring and washing machine fill level control could offer water savings.

An estimate of water use by process is presented in the following chart.



Note: Water use by process is estimated based on assumed nozzle flow rates and field verified nozzle spray durations. The following assumptions were used for water use estimates:

5 Loads Laundry per day at 75 gallons per load industrial laundry unit use, plus rinse faucet flow 120 min/day
20 gallons per day hand watering and fountain make-up water
7 employees, 12 gallons per day per employee
1.6 gallons per car customer
3 gpm hand wand flow rate, 1 minute spray per car
2 gpm final rinse nozzle flow rate, 50 seconds spray duration per car

DESCRIPTION OF CONSERVATION TECHNOLOGIES CONSIDERED

HRC is considering upgrading the existing carwash facilities to conserve water. The car wash equipment is approximately 20 years old and is worn, and higher efficiency equipment is available.

Proposed Project:

- Replace pre-rinse wand with more water efficient type
- Replace final rinse nozzles with more water efficient type
- Because rinse water available for reuse will be reduced as potable water consumption is reduced, higher efficiency nozzles are also recommended for the pre-rinse arches. A strainer on the reuse water line may also be beneficial.
- Modify operation of the laundry process by reducing faucet run time and water level in the washing machines.

Information on water efficient car wash nozzles and other equipment is provided in Appendix C. The proposed project is estimated to provide a reduction in potable water use of 30 percent. There may be additional savings in reduction of chemicals with the more efficient nozzles.

POTABLE WATER USE AND SEWER DISCHARGE RATE

The California Water Service Company is the local water supplier for HRC at the Redondo Beach location. HRC operates 10 hours a day, seven days a week, but water usage fluctuates with seasonal patterns. For the purpose of this report, it is assumed that HRC operates 315 days per year and water use is averaged uniformly over this period.

The California Water Service Company provided potable water supply data for a one year period from November 2011 through October 2012. A table and a graph of the facility's net potable water use data for this period. The new owner also provided water use data from May 2013 through August 2013 and the current water use was found to be consistent with the previous data.

A review of the data indicates that HRC used an average of 3.61 million gallons (MG) per year of potable water. The average daily process water use for the HRC calculates to approximately 11,470 gallons per working day (GPD).

HRC sewer services are provided by the Sanitation Districts of Los Angeles County (LACSD). The facility does not have a wastewater discharge flow meter on site and LACSD charges HCR based on an assumed discharge percentage. Based on an assumption of sewage discharge of 90 percent of potable water use, the facility discharges approximately 3.3 MG of wastewater per year.

The potable water from city water line enters the facility and provides potable water supply to the final rinse arches. The water drains to the clarifiers, where the submersible sump pump is located. The sump pump pumps reuse water from clarifiers to the first and pre-final rinse arches. The excess drain water from the clarifiers is discharged to the LACSD sewer line.

IMPACT OF PROCESS CHANGE ON PRODUCT QUALITY

The installation and operation of the proposed changes are not anticipated to impact the quality of the carwash process. HRC may decide to switch out the nozzles on one arch and observe the car washing quality changes before switching out all the nozzles on all the arches.

IMPACT OF PROCESS CHANGE ON SEWER DISCHARGE

Sewer charges are based on flow, pounds of COD and pounds of SS in pounds. The proposed process change is anticipated to reduce sewage flow, but the COD and SS in pounds will remain the same assuming the level of washing needed by the cars remains constant. There may be some reduction in COD if the more efficient nozzles reduce the chemical usage at the facility.

ESTIMATED ANNUAL COST SAVINGS

The water conservation cost savings at HRC are estimated based on the proposed project. The budgetary costs of the improvements are listed in **Table 1**.

Table 1. Estimated Improvement Costs [1]			
Description	**Equipment Cost**	**Installation Cost[2]**	**Total Cost**
Replacement of Wand and Nozzles	$3,000	$3,500	$ 6,500

(1) Improvement costs are based on assumed pricing and may vary.
(2) Installation costs include installation of equipment, piping and engineering costs.

The average water usage at HRC over a 12-month period (i.e., November 2011 to October 2012) was approximately 11,470 GPD or 3.61 MG per year. Based on the data received from manufacturers, the anticipated water savings for the proposed improvements is 30 percent of current water use. The estimated annual water savings, potential cost savings from the potable water supply costs from the California Water Service Company, and potential cost savings from the sewer costs from LACSD is provided in **Table 2**.

Table 2. Summary of Annual Water and Sewer Cost Savings [1]			
Description	**Annual Water and Sewer Savings**		**Annual Savings [2]**
	Gallons per day (gpd)	**Million gallons (MG)**	
Replacement of Wand and Nozzles	3,440	1.08	$7,347

(1) Costs provided in December 2013 dollars.
(2) Cost Savings based on the water cost of $3.8805 per hundred cubic feet of potable water from California Water Service Company and the sewer surcharges of $764 per million gallons per year from LACSD.

A summary of the estimated cost savings for Options A is provided in **Table 3**. The detailed calculations of the cost savings are provided in Appendix E.

Table 3. Summary of Cost Savings [1]				
Description	**Capital Cost [2]**	**Annual Savings [3]**	**Simple Payback (Yr)**	**Simple Payback after receiving incentives (Yr)**
Replacement of Wand and Nozzles	$ 6,500	$7,347	<1 yr	<1 yr

(1) Costs provided in December 2013 dollars. Cost may vary based on equipment installed and may be less than shown.
(2) Capital cost included the capital cost of the equipment, delivery, installation and engineering costs.
(3) Annual savings based on a reduction of potable water use and wastewater discharges into sewer.

Estimated Gas and Electricity Savings

The propose improvements are not expected to increase or decrease the power usage at the facility.

Preliminary Design Drawings and Photographs

Technical equipment cutsheets provided by nozzles manufacturers are provided in **Appendix C.**

Proposed Locations of Monitoring Devices

After the water savings equipment is installed and operational, verification of actual water savings is required to obtain full payment of a Program incentive to HRC. Water savings will be monitored based on the monthly water meter readings and the number of cars washed per month. As the amount of water used per car at each rinse arch is known, the actual water savings can be calculated. Therefore, the actual water savings can be monitored by the existing monitoring devices and through facility car count records.

Impact of Production Changes on Estimated Water Savings

HRC provides gas and carwash for individuals. Per information provided by HCR, the number of car washed varies seasonally throughout the year. The water use at carwash facility increases during summer time and decreases when it rains. For the accuracy of the water conservation realized and to avoid the influent of the seasonal fluctuation throughout the monitoring period, water use will be monitored on a unit basis (i.e., gallons per car). In an effort to determine the current unit rate of water use, HCR provided monthly information on water use and car counter information.

During this period, HRC washed approximately 28,817 cars and used approximately 1.4 MG of potable water. Water use is directly related to the number of cars washed, which also impacts the restroom use and the number of towels to be washed. Dividing the total monthly water use by the total number of car washed for the four months (May through August) provides a factor of 48.6 gallons per car. Thus, the proposed that HRC's car counter information will be monitored over a 6-month period to determine if there are significant changes that may impact the actual water savings.

Potential Program Cash Incentive

With verified water savings monitored for a six month period and considering the Program's financial incentives available, the maximum potential Program cash incentive for HRC is $6.00 per 1,000 gallons of actual water saved over a one-year period, up to the total capital improvement cost.

Program Application and Implementation

Based on a review of the proposed retrofits and equipment upgrades, HRC is considered a viable candidate to apply for the incentive funding under the **RECIRC & $AVE** Program. The next step is for the HRC to sign the standardized contract with West Basin to initiate their acceptance into the Program.

Following acceptance and inclusion, HRC will install the improvements. Upon confirmation of equipment installation, HRC will receive one half of the incentive. HRC will continue to monitor the potable water usage based on the facility flowmeter and car counter information for a six month period. Data would be collected on a monthly basis and compared with previous collected flow and car counter information. Upon equipment installation and confirmation of the anticipated water savings, HRC will receive up to the balance of the cash incentive associated with the confirmed water savings up to the amount calculated in this report or the total capital cost, whichever is less.

Additional Utility Incentive Programs

In addition to the Program under West Basin, other utility incentive programs are also available for industrial customers.

The Southern California Gas Company and Southern California Edison are offering potential cash incentives to qualifying industrial users for reduction in gas and electricity usage. The South Bay Environmental Services Center serves as a regional clearing house for information about programs offered by the Southern California Gas Company and Southern California Edison. Visit www.sbesc.com or call (310) 271-7222 for further information.

The MET's Southern California Water Smart also provides rebates to industrial customers for commonly used plumbing fixtures, such as toilets and urinals. Call Elise Goldman at West Basin (310) 660-6253 or visit socalwatersmart.com for more information on these and other water saving devices.

Program Contact Information

A separate reference table is enclosed in Appendix G with the name, affiliation, phone number, and the e-mail address of the personnel associated with this Program and related incentive programs.

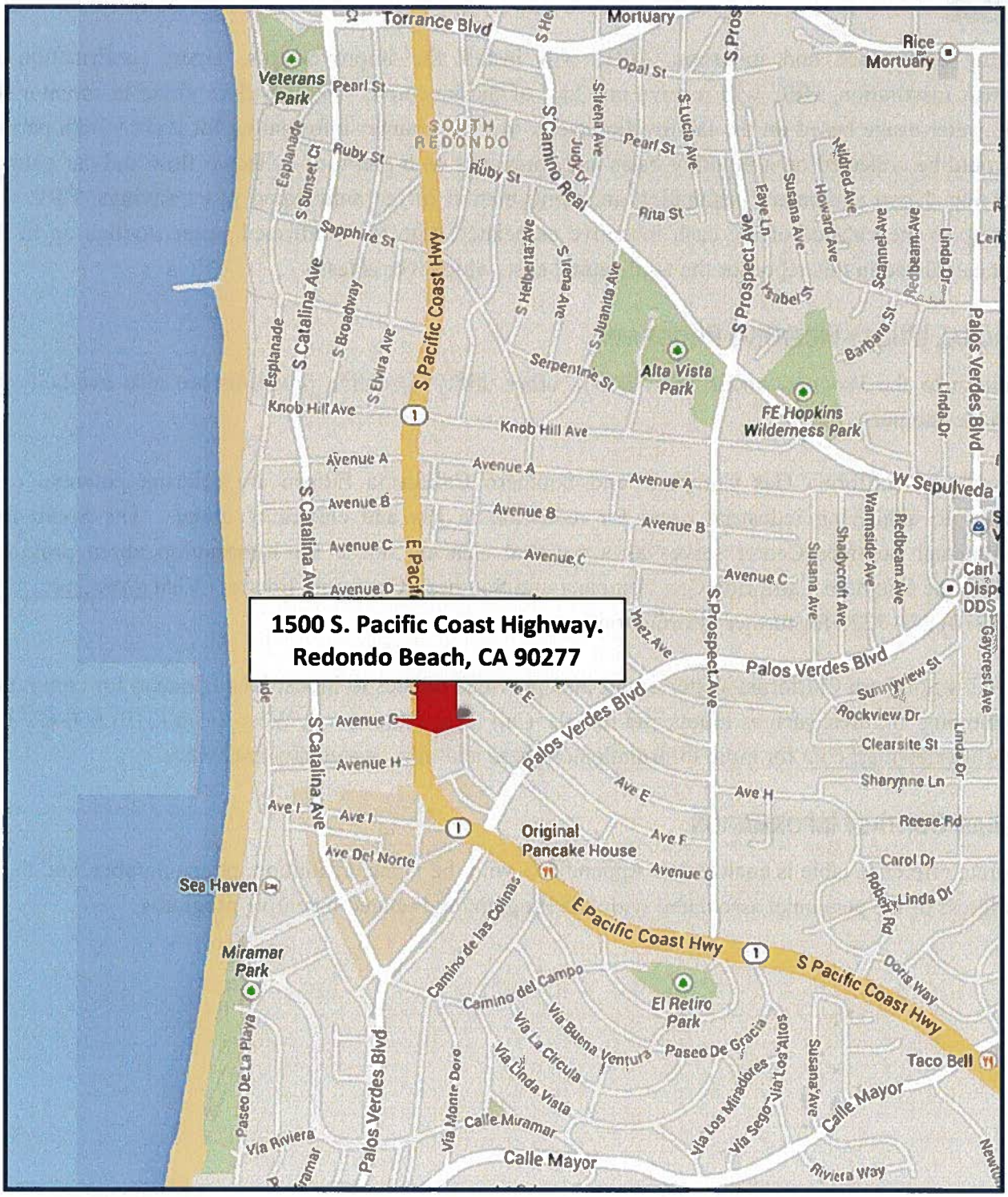


Figure 1a

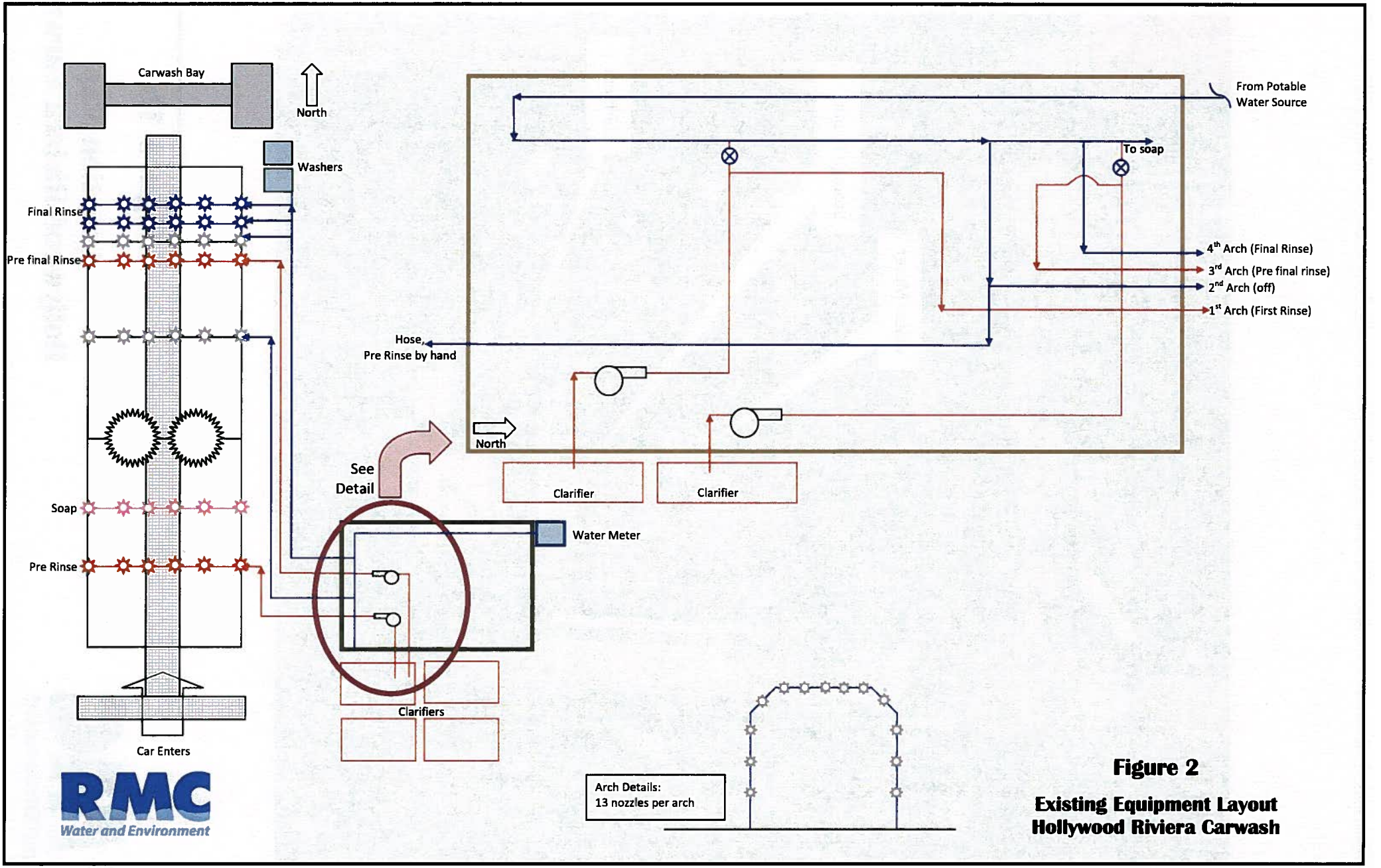
Vicinity Map
Hollywood Riviera Carwash

RMC Water and Environment

Figure 1b

Location Map
Hollywood Riviera Carwash

RMC Water and Environment



RMC
Water and Environment

Figure 2

Existing Equipment Layout
Hollywood Riviera Carwash

17140 South Avalon Boulevard, Suite 210, Carson, CA 90746-1296, 310.217.2411, www.westbasin.org

Appendix A: Hollywood Riviera Carwash.
Recirc & $ave Program: Site Inspection Survey

Company:	**Hollywood Riviera Carwash**
Address:	1500 S. Pacific Coast Highway
City, State, Zip Code:	Redondo Beach, CA 90277
Type of Business:	automatic carwash and gas station
Name of Facility Contact:	**Steve Spunt**
Title:	Owner
Direct Telephone Number:	(949) 842-5645
Email Address:	stevespunt@gmail.com
Facility Hours of Operation:	Summer: 8 am to 6 pm
	Winter: 8 am to Dusk
Number of Work Shifts per Day:	1 shift per day
Facility Days of Operation per Week:	7 days per week

Process Water Reduction

What manufacturing processes use potable water and what percent of total water use?

Hand rinse wand	18 %
First arch (Pre-Rinse) – reuse water	0 %
Second Arch – not used	0 %
Third Arch (Pre-Final Rinse) – reuse water	0 %
Soap and Fourth Arch (Final Rinse) – potable water	65 %
Restrooms / Admin	4 %
Towel Washing	13 %
Landscape – negligible (all potted plants watered by hand)	0 %
Water fountain – negligible (recirculation pump, small pool of water in shade)	0 %

Does Facility have an existing potable water reduction program? ☒ **Yes** ☐ **No**

Describe conservation technologies installed or considered to be installed at facility including what level of planning has already been undertaken.

The facility collects drainage from the car wash, uses a clarifier to settle solids, and reuses the clarified water in the rinse phases of the carwash. Low flow toilets are installed.

Is there any on-site water treatment? ☒ **Yes** ☐ **No**

Briefly describe what streams are treated.

Car wash drainage is clarified and reused for pre-rinse.

Appendix A: Hollywood Riviera Carwash
Recirc & $ave Program: Site Inspection Survey

Is there any on-site recycling of water? ☒ **Yes** ☐ **No**
Briefly describe what streams are recycled.
Car wash drainage is collected, clarified and reused in the pre-rinse cycle.

Does Facility measure water use for each manufacturing process? ☐ **Yes** ☒ **No**

Does Facility measure wastewater discharged to the industrial sewer? ☐ **Yes** ☒ **No**
Approximate amount of water discharged to the sewer? Sewer discharge calculation by Sanitation District. The percentage for the facility is not known but estimated at 90%

Are the processes using industrial water the same as facility hours of operation? ☒ **Yes** ☐ **No**

How long has the Facility been at the current location?
The facility was built in 1977 and renovated in 1991 including new car wash equipment. The new owner has been in effect since 2013.

Who would be responsible for implementing process changes within the facility?
Steve Spunt

How long could the Facility allow implementing and installing a process change?
The renovations could be completed on a rainy day or during the night.

What time frame is required to make the decision to proceed with a process change?
Time frame would depend on the extent of change.

How many active Cooling Towers are at the Facility? Not Applicable

Model Number and Type?

Flow capacity of Cooling Tower(s)?

What kind of controller is used?

Has Facility used of considered other controllers in the past?

Appendix B
Hollywood Riviera Carwash
Recirc & $ave Program
Potable Water Use Data

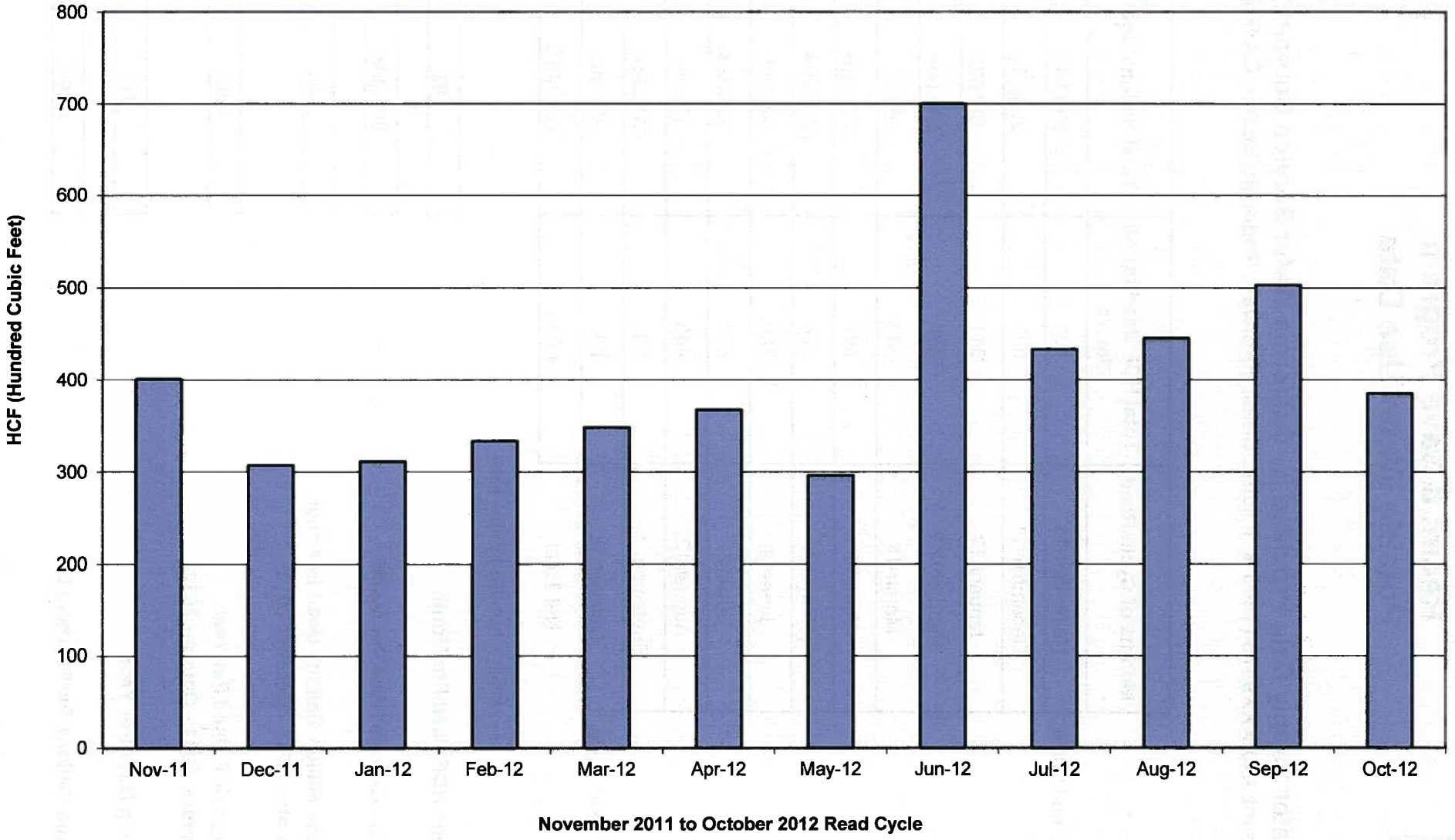
Water Supply Data Provided by California Water Service Company
Account XXXXXX9675 (1500 S. Pacific Coast Highway, Redondo Beach, CA 90277)

	Months of Cycle Read	Total HCF Used for All Meters	Total Gallons Used
Start of Read Cycle	November-11	401	299,948
	December-11	307	229,636
	January-12	311	232,628
	February-12	333	249,084
	March-12	348	260,304
	April-12	367	274,516
	May-12	296	221,408
	June-12	700	523,600
	July-12	433	323,884
	August-12	445	332,860
	September-12	503	376,244
End of Read Cycle	October-12	385	287,980
	Net Total	4,829	3,612,092

HCF = hundred cubic feet

Average HCF Used Per Month	**402**
Average Gallons Used Per Month	**301,008**
Average Million Gallons Used Per Year (November 2011 - October 2012)	**3.61**
Average HCF Used Per Year (November 2011 - October 2012)	**4,829**
Working Days Per Year	**315**
Average Gallons Per Working Day	**11,467**

Appendix B
Hollywood Riviera Carwash
Recirc & $ave Program
Potable Water Use Data



Appendix C - Water Efficient Nozzle Information

Spray Heads

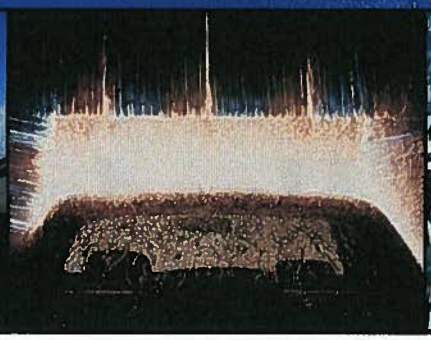
Spraying Systems Co.

Spraying Systems Co.®
Experts in Spray Technology

Spray Nozzles | Spray Control | Spray Analysis | Spray Fabrication

Spray Products for the Car Wash Industry

Reduce operating costs and improve customer satisfaction by maximizing spray performance



Spraying Systems Co. high-performance spray products for improving your car wash operation are available through most OEMs or aftermarket suppliers.

Spray nozzle performance drives car wash quality, cost efficiency and customer satisfaction

As a business owner, you may not spend much time thinking about a little thing like spray nozzles, but the fact is that your car wash is only as good as the spray your nozzles deliver. Depending on how you select and maintain your spray nozzles, they can be a source of major savings or a needless expense.

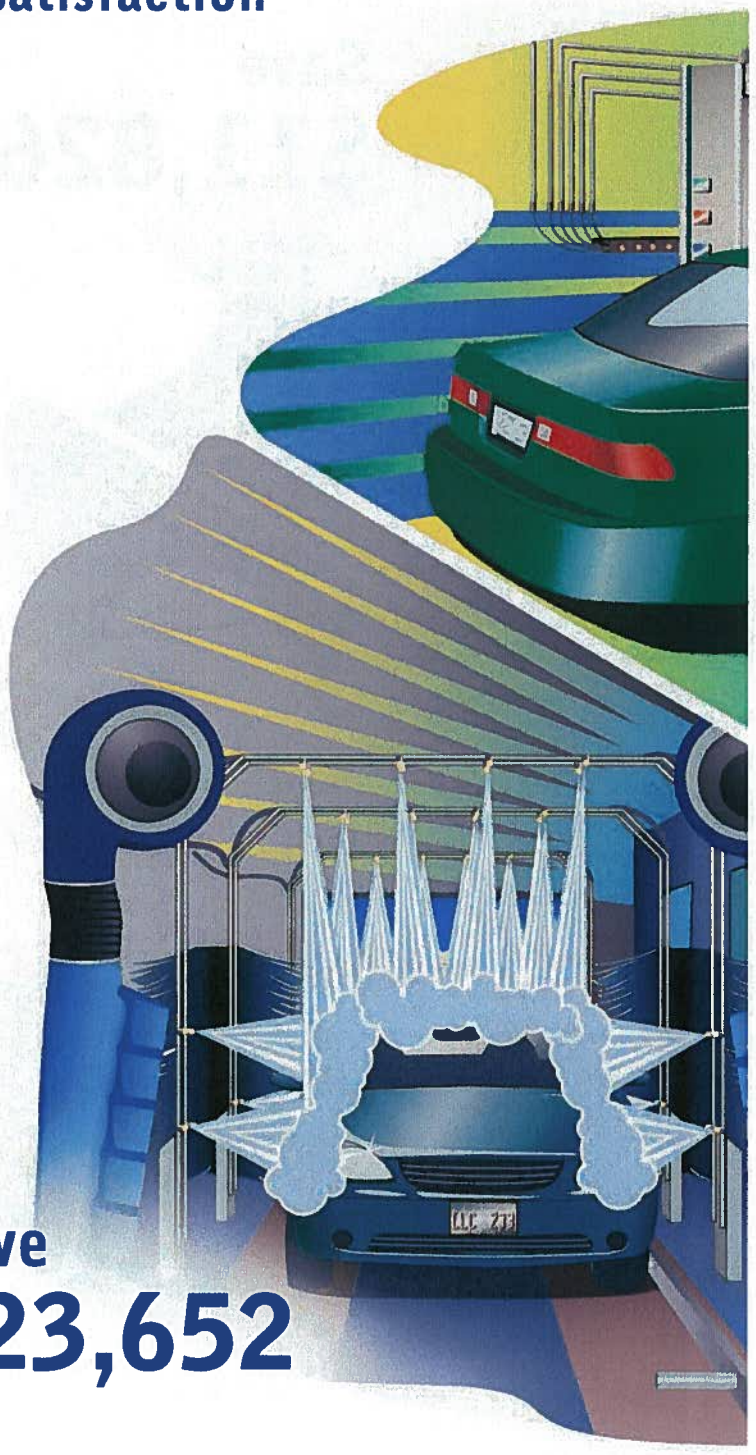
Worn nozzles or using the wrong type of nozzle can easily spray up to 30% more water and chemicals than necessary, which can amount to tens of thousands of dollars each year. Just look at these three examples of typical annual car wash operating expenses. Our examples only calculate the cost of excess water and detergents from unnecessarily higher flow rates. Don't forget to factor in all the additional expenses related to an inefficient spray system:

- **Lost customers as a result of a poor quality wash or excessive downtime**
- **Excessive wastewater and disposal costs**
- **Additional power used by pump equipment to keep up with higher flow rates or pressure losses**
- **Unnecessary labor from increased maintenance**

By optimizing your spray system, you can turn these unnecessary expenses into savings opportunities.

How much can you save? Find out at www.spray.com/carwashsavings.

Simply input some information about your own operation, and the free calculator will calculate your potential savings instantly.



Conveyor Car Wash

Average cars per day:	120
Days open per year:	365
Flow per car:	40 gal
Liquid used:	1,752,000 gal
Wasted water:	262,800 gal
Wasted chemical:	2,300 gal

Annual cost of wasted water and chemical: $23,652

Save $23,652

Inbay Automatic Car Wash

Number of bays:	2
Average cars per day per bay:	40
Days open per year:	365
Flow per car:	30 gal
Liquid used:	876,000 gal
Wasted water:	131,400 gal
Wasted chemical:	1,150 gal

Annual cost of wasted water and chemical: $11,826

Self-Serve Car Wash

Number of bays:	6
Hours of utilization: (18 hours per day x 365 days per year x 15% utilization)	985
Flow rate:	2.5 gpm
Liquid used: (150 gph x 985 hours per year x 6 bays)	886,950 gal
Wasted water:	133,042 gal
Wasted chemical:	1,164 gal

Annual cost of wasted water and chemical: $11,974

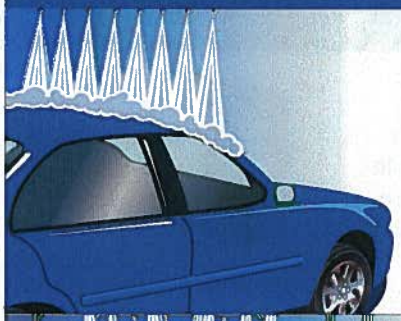
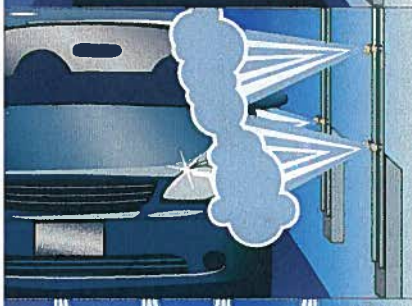
Assumptions

Average cost of water:	$2.50/1,000 gal
Average cost of chemical:	$10/gal
Dilution ratio:	40:1
Chemical usage:	35%
Excess liquid sprayed:	15%

Nozzle Selection Guide – Spray Pattern

Spray Pattern	Spray Characteristics	Spray Angle	Recommended Car Wash Applications	Recommended Nozzles	Page No.
Flat 	Overlapping or aligning spray patterns from adjacent sprays produce uniform distribution.	15° to 110°	Chemical arches or anywhere spray nozzles are aligned to overlap to produce a uniform distribution.	 **VeeJet®**	18–20
Flat high pressure, even spray 	Provides high and uniform impact capabilities. Even spray pattern eliminates the need to overlap patterns from adjacent nozzles.	5° to 65°	Pressure wash or first rinse. Any application where high impact is needed to remove dirt or detergent.	 **WashJet®**	14–17
Flat deflected, tapered 	Medium-sized drops with tapered edges and wide spray angles at lower pressures. Can overlap patterns from adjacent sprays for even coverage. Large free passage reduces clogging.	73° to 153°	Rinse arches and presoak, especially in stages that use recycled water. Good for overlapping adjacent sprays to produce uniform coverage.	 **FloodJet®**	22
Flat deflected, non-tapered 	Medium-sized drops at lower pressure with narrower spray angles. High impact. Large free passage reduces clogging.	15° to 50°	Rinse arches and presoak especially when recycled water is being used. Excellent for any application in which adjacent spray patterns do not overlap.	 **FlatJet®**	21
Full Cone 	Uniform, round and full spray pattern with medium to large drops. Good for covering larger areas.	15° to 125°	Presoak and covering larger areas.	 **FullJet®**	12–13
Solid Stream 	Uniform stream provides maximum impact.	0°	Cleaning grills, rocker panels and wheel wells.	 **WashJet**	14–17
Self-aspirating 	Flat spray pattern, mixes surrounding air with premixed liquid to generate foam. Medium to medium-fine foam stays on vehicle longer. Keeps energy costs down because compressed air is not required.	0° to 80°	Detergent application.	 **FoamJet®**	24–29

Nozzle Selection Guide – Application

Wash Stage	Spray Nozzle Characteristics for Best Performance	Recommended Nozzles	Page No.
 **Presoak**	Pressure: low Flow Rate: low Impact: low Angle: wide Drop Size: large	**FoamJet®** **VeeJet®** (Kynar®) **FloodJet®** **FullJet®**	**24–29** **18–20** **22** **12–13**
 **Wash**	Pressure: high Flow Rate: medium Impact: high Angle: narrow Drop Size: large	**WashJet®**	**14–17**
 **Rinse**	Pressure: low Flow Rate: high Impact: medium Angle: medium Drop Size: large	**VeeJet** **FlatJet®**	**18–20** **21**
 **Wax**	Pressure: low Flow Rate: low Impact: low Angle: medium Drop Size: fine	**VeeJet**	**18–20**
 **Final Rinse**	Pressure: low Flow Rate: low Impact: low Angle: medium to wide Drop Size: fine	**VeeJet** **FloodJet**	**18–20** **22**
 **Self-Serve**	Pressure: high Flow Rate: low to medium Impact: high Angle: narrow Drop Size: medium to large	**WashJet**	**14–17**

The Basics of Nozzle Selection

Spray Pressure and Impact

When looking at the cleaning effectiveness of a spray nozzle, impact is the main criteria to evaluate. Impact is the total force of the spray as it hits the vehicle.

The true measure of cleaning effectiveness is impact per square inch. To calculate impact pressure at 12" from the nozzle, first determine theoretical impact using the formula below. Then, multiply the total force by the percent ratio. The highest unit impact pressure is provided by solid stream nozzles and can be closely approximated by the formula: 1.9 x spray pressure.

$$I = K \times Q \times \sqrt{P}$$

I	Total theoretical spray impact	lbs.
K	Constant	.0526
Q	Flow rate	gpm
P	Liquid pressure	psi

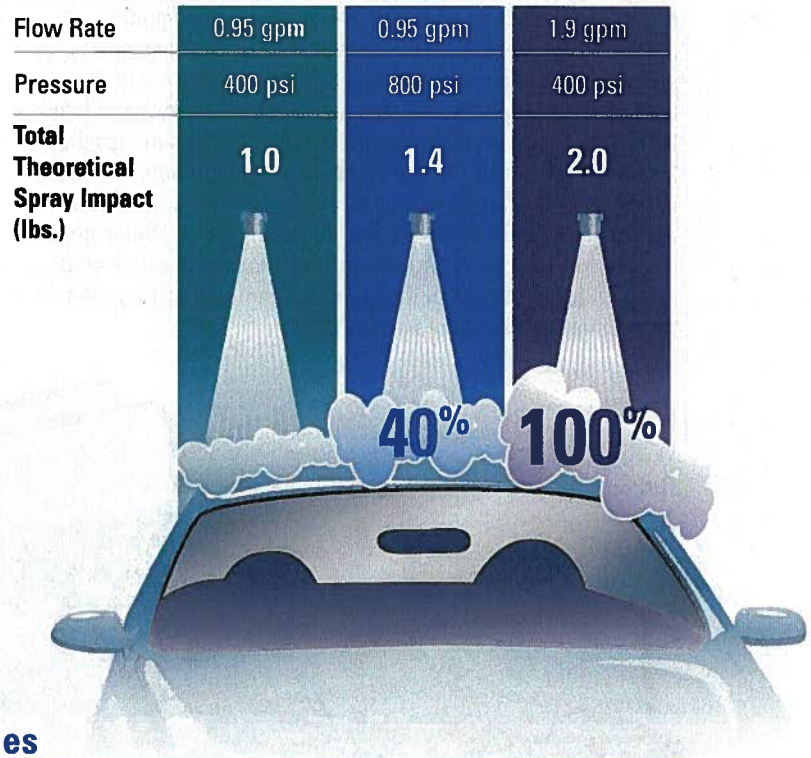
Unit Impact per Sq. Inch of a Flat Fan Spray Pattern at 12" From the Nozzle

Spray Angle	% of Theoretical Total Impact
15°	30%
25°	18%
35°	13%
40°	12%
50°	10%
65°	7%
80°	5%

Maximizing the cleaning impact involves increasing both the mass of the spray and its velocity. This is accomplished by increasing flow rate in gpm, droplet size or psi.

Most people only think about spray pressure when it comes to impact, but increasing pressure can sometimes be counterproductive. High pressure produces smaller droplets, which have less mass and velocity, and therefore less cleaning impact. As a general rule of thumb, increasing flow rate is much more effective than increasing pressure. Doubling the flow rate increases impact as much as 100%, while doubling pressure provides only 40% more impact.

The downside of increasing flow rate is increased water consumption, and the biggest operating cost today for a car wash is water. At a time when water conservation and lower operating costs are a priority, it is possible to increase pressure and maintain cleaning effectiveness with premium high-pressure nozzles.



Standard vs. Premium High-Pressure Nozzles

Premium high-pressure IMEG® WashJet® nozzles are engineered to provide up to 25% greater impact than standard MEG WashJet nozzles at the same flow rate and system pressure. Though slightly more expensive than standard MEG nozzles, premium IMEG nozzles pay for themselves in enhanced cleaning efficiency and water savings. They also have a longer wear life due to the reduced system pressure and need to be replaced less frequently.

	Standard MEG	Premium IMEG
Impact Pressure	17 psi	17 psi
System Pressure	1,500	1,125
Flow Rate	2.10 gpm	1.82 gpm

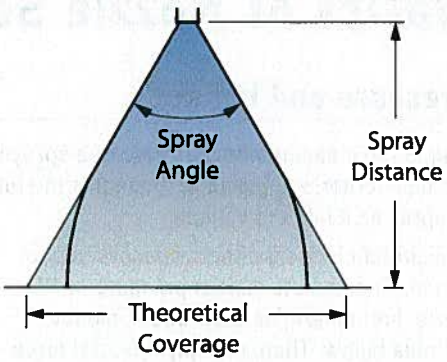
25% More Impact

13% Less Water & Chemicals

Spray Distance

Spray distance dramatically affects impact, and 6 to 8 inches is the ideal distance to achieve the best performance from your spray nozzles. Increasing the nozzle distance just 6" from the car's surface will decrease impact by 50%. Why? Because droplet velocity is reduced due to the frictional drag effects of the air and because the spray pattern is much larger. The same impact force over a larger area results in less impact pressure.

When determining spray distance use a worst case scenario. First, estimate what is likely to be the shortest distance from a vehicle to the spray nozzle. Then, adjust nozzles so that full coverage and overlap is possible with a vehicle at the shortest distance. This will ensure full coverage and overlap with all vehicle types.



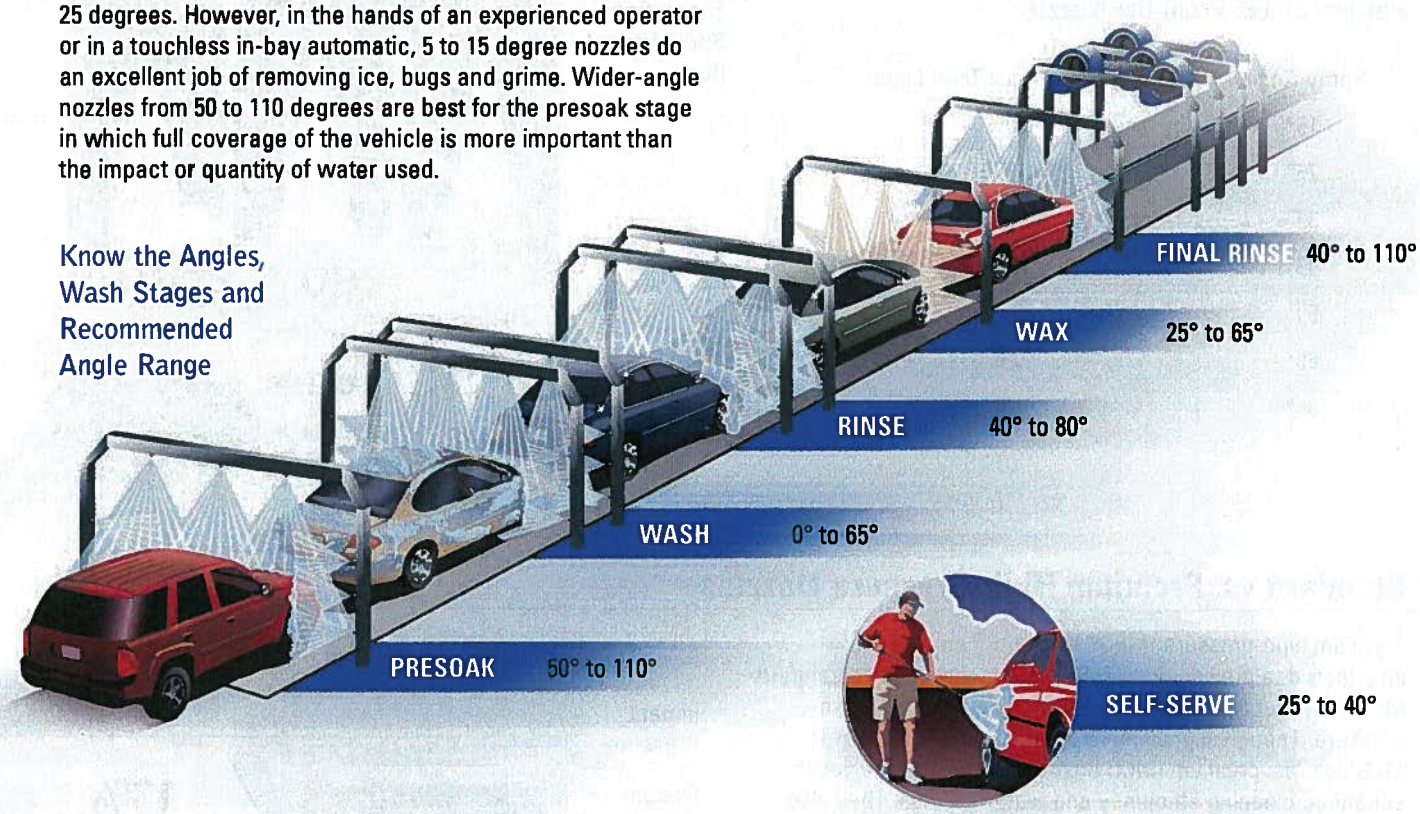
Theoretical Spray Coverage

Spray Angle	At various distances in inches from nozzle orifice					
	6"	8"	10"	12"	15"	18"
15°	1.6"	2.1"	2.6"	3.2"	3.9"	4.7"
25°	2.7"	3.5"	4.4"	5.3"	6.6"	8.0"
40°	4.4"	5.8"	7.3"	8.7"	10.9"	13.1"
65°	7.6"	10.2"	12.7"	15.3"	19.2"	22.9"
80°	10.1"	13.4"	16.8"	20.2"	25.2"	30.3"
110°	17.1"	22.8"	28.5"	34.3"	42.8"	51.4"

Spray Angle and Coverage

Spray angle is the dispersion or width of the spray after it leaves the orifice. We are often asked if pressure affects the spray angle, and it definitely does. At high pressure, spray angles can widen significantly and produce low-impact misting of the spray as it fans out at the edges. Narrower spray angles have more cleaning force per square inch, but they can peel some pin striping, moldings and poor paint jobs. For safety reasons, it is rare to see self-serve tips at less than 25 degrees. However, in the hands of an experienced operator or in a touchless in-bay automatic, 5 to 15 degree nozzles do an excellent job of removing ice, bugs and grime. Wider-angle nozzles from 50 to 110 degrees are best for the presoak stage in which full coverage of the vehicle is more important than the impact or quantity of water used.

Know the Angles, Wash Stages and Recommended Angle Range



Spray Nozzle Maintenance

Extending Spray Nozzle Life

Selecting the right nozzle for each wash stage is just the first step toward optimizing your spray system. The following tactics will help you get more service life from your nozzles.

1 Incorporate nozzle inspection into your regular maintenance program

Damaged spray nozzles waste water and chemicals, decrease cleaning coverage of the vehicles and increase workload on your pumps. With thousands of dollars of profits at stake, you'll want to regularly monitor your spraying system to reveal potential problems. Some nozzle problems, like corrosion or caking, are easy to detect with a visual inspection, but a worn nozzle, the most common problem for a car wash, is almost impossible to detect with the human eye.

Watch for these clues to indicate spray nozzle problems:

Change in pump performance

If you have a positive displacement pump, check the pressure gauge for a drop in system pressure. If there is a drop in pressure, the flow rate will remain constant, but spray velocity and impact will lessen. You may not be wasting water, but the quality of your wash will suffer. Some operators will adjust the unloader valve and use it as a regulator to increase pressure, but this can create high-pressure spikes and damage the pump.

Deterioration of spray pattern

Inspect the spray pattern for uniformity. When nozzles are damaged, worn or clogged the spray pattern is destroyed. Streaks develop and the spray will be heavier or lighter throughout the pattern. The result is inadequate or inconsistent coverage of the vehicle. Customers will experience uneven cleaning or drying, so you'll want to make sure your nozzles are replaced before reaching this point. Customer satisfaction and retention depends on it.

Increased chemical consumption

As the nozzles wear and pressure/impact decreases, some operators increase the concentration of the detergent – a much more costly solution than replacing nozzles.

Flow rate change

If you have a centrifugal pump, an increased flow rate indicates nozzle wear. System pressure will remain the same, enabling you to retain some quality in your wash, but your system will be highly inefficient, wasting costly water and chemicals.

A simple way to detect a flow rate change is with the "Bottle Check"

Tools needed: stopwatch, measuring cup and container

STEP 1:

Spray a new nozzle into the container for a measured amount of time.

STEP 2:

Measure out the amount of water into the measuring cup.

STEP 3:

Divide the amount of water by the collection time. This will give you the gallons per minute rate of the new spray nozzle.

2 Decrease spraying pressure

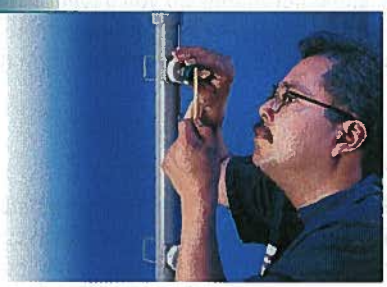
Where circumstances permit, decreasing the pressure will slow the liquid velocity through the orifice and reduce the wear and corrosion rate. You can take advantage of this tactic in the presoak stage where low pressure, small capacity nozzles are very effective because they provide streakless, full coverage. During presoak, it's not the volume or spray impact that's critical – it's where you place the water and chemical.

3 Use care when cleaning spray nozzles

Cleaning nozzles can often restore a defective spray, but it should be done with materials that are much softer than the nozzle orifice. Use toothbrushes, toothpicks or even compressed air. Never use wire brushes, pocket knives, or welder's tip cleaning rasps. It is easy to damage the critical orifice shape (or size) and end up with distorted spray patterns or excess flow. If you are faced with a stubborn clogging problem, soak the orifice in a non-corrosive cleaning chemical to soften or dissolve the substance.

SPRAY TIP

Clean nozzles with a material that is softer than the orifice, like a toothbrush or toothpick.



4 Reduce the quantity of abrasive particles or the concentration of corrosive chemicals

In some stages, you can reduce the amount of abrasive particles in the liquid to reduce wear effects. For example, use recycled water at the start of the car wash, and as the wash progresses use less recycled water until the final rinse where only fresh water is used. Not only does this provide a better quality wash for your customers, but it also reduces the wear on nozzles at the final rinse stage. In stages where chemicals are used, the corrosive activity of a solution may be reduced by using different concentrations or temperatures, depending on the chemicals involved.

5 Add line strainers or use spray nozzles with built-in strainers

When using fresh or recycled water, orifice deterioration and clogging are typical problems. Strainers or spray nozzles with built-in strainers are highly recommended in the presoak cycle. Line strainers not only extend the life of the nozzle but the pump also. The strainer's screen traps the dirt or unwanted material, and it should be made of stainless steel for strength and corrosion resistance. The screen is critical to the operation of the strainer, and an extra screen should be kept on hand for each strainer installed.

T-style strainers

STEP 4:

Take a baseline measurement using a new nozzle in each section of your car wash.

STEP 5:

Repeat the test periodically on the same nozzles and record the date or number of wash cycles since the previous test. As the nozzles begin to wear, the flow rate will increase. Creating a log will help you determine how quickly your nozzles are wearing.

Spray Nozzle Maintenance

Common Causes of Spray Nozzle Problems

Erosion/Wear Life

Erosion is the single biggest cause of nozzle problems in a car wash operation. Gradual abrasion of material from the spray nozzle orifice and internal flow passages cause them to enlarge and/or become distorted. As a result, flow usually increases, pressure may decrease, the spray pattern becomes irregular and liquid drops become larger.

Spray pressure, fluid abrasiveness, nozzle orifice size and chemical compatibility are just a few of the factors that play a role in a nozzle's wear life. You can minimize how quickly your nozzles wear by selecting materials of construction with a higher resistance ratio.

Abrasion Resistance Ratios

Nozzle Material	Resistance Ratio
Brass	1
Kynar®	3
Stainless Steel	4 – 6
Hardened Stainless Steel	10 – 15
Ceramics	90 – 200

For the car wash industry, hardened stainless steel nozzles provide excellent service, are cost effective and resist wear 30% better than regular stainless steel nozzles and up to 15 times better than brass.

Most high-pressure nozzles are currently constructed of hardened stainless steel, however not all manufacturers use the same hardening process, which can lessen the durability of the material. To prove this point, we tested our WashJet® nozzles, made of hardened stainless steel, against a competitor's similar nozzle. The competitor's nozzle reached a 10 percent wear point more than twice as fast as the WashJet nozzle.

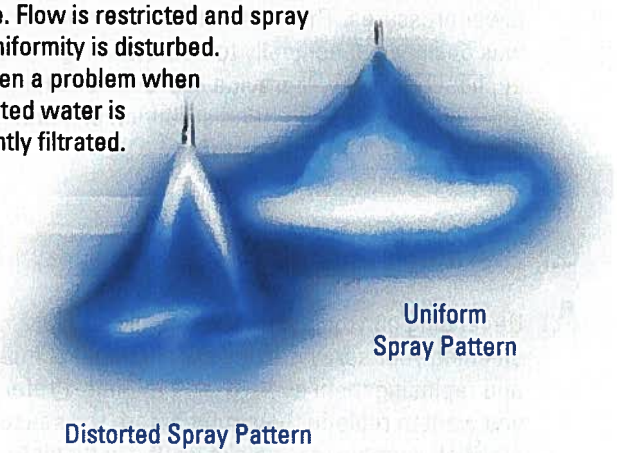
Nozzles with ceramic orifices are able to withstand harsh cleaning chemicals and high temperatures. Nozzles constructed of Kynar, a very tough plastic material, are good choices for high-temperature wax sealing applications.

Caking

Build-up of material on the inside, on the outer edges or near the orifice is caused by liquid evaporation. A layer of dried solids remains and obstructs the orifice or internal flow passages.

Clogging

Unwanted solid particles can block the inside of the orifice. Flow is restricted and spray pattern uniformity is disturbed. This is often a problem when re-circulated water is insufficiently filtrated.



Distorted Spray Pattern

Accidental Damage

Damage can occur if a spray nozzle is dropped or scratched during installation, operation or cleaning. This a common occurrence in self-service car washes, since many customers often let spray wands fall onto, or scrape against, the concrete floor of the bay.

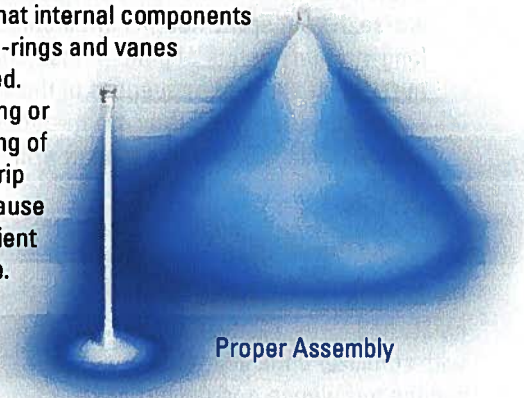
Corrosion

Spray nozzle material can also break down due to the chemical qualities of the sprayed material or the environment. The effect is similar to that caused by erosion and wear, with possible additional damage to the outside surfaces of the spray nozzle.

Corroded

Improper Assembly

Some spray nozzles require careful re-assembly after cleaning so that internal components such as gaskets, O-rings and vanes are properly aligned. Improper positioning or even over-tightening of nozzle caps can strip threads and can cause leaking and inefficient spray performance.



Improper Assembly

Frequently Asked Questions

Q: Can I use a standard "fan" nozzle for the high-pressure wash portion of my car wash?

A: A standard VeeJet® or UniJet® "fan" type nozzle is not the best choice for high-pressure applications. The orifice is designed to provide a great spray pattern at lower pressures. The WashJet® product line, however, was designed specifically to operate in high-pressure applications and will provide improved cleaning effectiveness and a better distribution of impact across the entire spray pattern.

Q: How often should I replace my spray nozzles?

A: Depending on your system, we would suggest cleaning your spray nozzles every couple of months and replacing them every 6 to 12 months. Preferably, you want to replace them right before the season in which your business picks up. It is difficult to determine when your wash needs new nozzles because it depends on so many factors. How good is your filtration or recycling system? How corrosive are your chemicals? At what temperature and pressure are you spraying? All these factors affect how your nozzles wear. When you replace your nozzles, take note of the difference in spray appearance, pressure reading for your system and the flow rate. You might be surprised at how much waste in water and chemical your car wash was operating with before the replacement.

Q: Do guide vanes really help with the cleaning effectiveness of my wash?

A: In most cases, yes they can. The guide vane reduces turbulence to help the spray nozzle provide a much more even impact force for cleaning cars. However, there are a few cases where the vane can actually make things worse. If your spray nozzles are installed at the end of a long straight section of pipe or hose, then the vane can hurt the cleaning effectiveness of the spray. Only use stabilizer vanes when they are threaded directly into an elbow or into the side of a pipe or arch.

SPRAY TIP

If your fluid system has a lot of twists and turns, request nozzles with stabilizer vane inserts to reduce turbulence and deliver more cleaning impact.

Q: My water bill is going up and my Bottle Check tests show that my flow rate is up, but my nozzles are fine and the spray pattern looks nice and clean. What is going on?

A: Simply put, your nozzles are wearing normally. A nozzle can be spraying up to 30% over capacity with no streaks or other visual problems. Close monitoring and maintenance are critical to understanding what happens to the nozzles in your system over time.

Q: After a car passes the foam sticks on my conveyor, the foam drips out the bottom hole and all that chemical is wasted. How can I solve this problem?

A: Normally, we would recommend that every nozzle in your entire system has a check valve installed immediately behind it. That way, after the car passes and the pressure in the arch drops, the check valve shuts off preventing all the water and chemical from draining out. An additional benefit is that when the next car comes down the line, your arch is already filled and the nozzles spray immediately. Unfortunately, it is extremely difficult to use either an in-line or diaphragm type check valve on pre-generated foam. It just does not work well. One alternative is to replace your foam sticks with FoamJet® nozzles. These nozzles are self-aspirating and generate the foam after the liquid passes the check valve. This gives you the added benefit of eliminating your compressed air requirement and allows you to control the foam's capacity and spray angle.

Q: I have seen a lot of plastic nozzle tips available, but I am concerned about where to use them. Where are the best applications for plastic nozzles in my car wash?

A: Plastic nozzles are perfect solutions to low pressure applications with corrosive chemicals. Constructed of molded Kynar®, the plastic VeeJet spray nozzles are more economical than metal nozzles, withstand a variety of temperature ranges, and are resistant to acids, bases and oxidizing agents. Additionally, they are rated up to 500 psi and have a surprisingly high wear resistance. You can confidently use plastic nozzles in the presoak, rinse and wax sections of your wash.

FEATURES AND BENEFITS

- Solid cone-shaped spray pattern with round impact area.
- Unique vane design with large flow passages provides superior control and uniform distribution.
- Standard angles 50° to 80° at 10 psi.
- Wide-angle solid cone-shaped spray pattern with round impact area and spray angles from 120° to 125° at 10 psi.

GG

Removable cap and vane
1/8" to 1/4" NPT or BSPT (M)

GG-W

Removable cap and vane
1/8" to 1/4" NPT or BSPT (M)

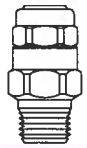
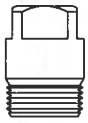
HH

One-piece body
1/8" to 1/4" NPT or BSPT (M)

HH-W

One-piece body
1/8" to 1/4" NPT or BSPT (M)

DIMENSIONS AND WEIGHTS

Standard	Nozzle Type	Inlet Conn. (in.)	Length (in.)	Dia. (in.)	Hex (in.)	Net Weight (oz.)
	GG, GG-W (M)	1/8	1-9/32	–	9/16	3/4
		1/4	1-9/16	–	11/16	1-1/2
	HH, HH-W (M)	1/8	7/8	1/2	–	1/2
		1/4	29/32	17/32	–	1/2

Based on largest/heaviest version of each type.

MATERIALS

Material	Material Code	Nozzle Type	
		GG, GG-W	HH, HH-W
Brass	(none)	●	●
Mild Steel	I	●	●
303 Stainless Steel	SS	●	●
316 Stainless Steel	316SS	●	●
Polyvinyl Chloride	PVC	●	●

Other materials available upon request.

PERFORMANCE DATA

*At the stated pressure in psi.

Inlet Conn. (in.)	Nozzle Type		Capacity Size	Capacity (gallons per minute)*						Spray Angle (°)*	
	GG	HH		10	20	30	40	60	80	20	80
1/8	●	●	1	.10	.14	.17	.19	.23	.26	58	53
	●	●	1.5	.15	.21	.25	.28	.34	.39	65	59
	●	●	2	.20	.28	.33	.38	.46	.52	50	46
	●	●	3	.30	.41	.50	.57	.68	.78	65	59
	●	●	3.5	.35	.48	.58	.66	.80	.91	50	46
	●	●	5	.50	.69	.83	.95	1.1	1.3	65	59
1/4	●	●	6.5	.85	.89	1.1	1.2	1.5	1.7	50	46
	●	●	10	1.0	1.4	1.7	1.9	2.3	2.6	67	61

*At the stated pressure in psi.

Inlet Conn. (in.)	Nozzle Type		Capacity Size	Capacity (gallons per minute)*						Spray Angle (°)*	
	GG-W	HH-W		10	20	30	40	60	80	10	80
1/8	●		1.5W	.15	.21	.25	.28	.34	.39	120	88
	●	●	2.8W	.28	.39	.46	.53	.64	.73	120	102
	●	●	4.3W	.43	.59	.71	.81	.98	1.1	120	102
	●		5.6W	.56	.77	.93	1.1	1.3	1.5	120	102
	●	●	8W	.80	1.1	1.3	1.5	1.8	2.1	120	103
1/4	●		10W	1.0	1.4	1.7	1.9	2.3	2.6	120	103
	●		12W	1.2	1.7	2.0	2.3	2.7	3.1	120	103
	●	●	14W	1.4	1.9	2.3	2.6	3.2	3.6	120	103

ORDERING INFO

STANDARD SPRAY NOZZLE

1/4	GG	–	SS	10
Inlet Conn.	Nozzle Type		Material Code	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

Features and Benefits

- High pressure, high impact solid stream (0°) or flat fan spray pattern.
- Spray angles of 5° to 80° at operating pressures from 300 to 4000 psi.
- Uniform distribution by using internal guide vane to stabilize liquid turbulence.
- Longer wear life and flow control accuracy with specially hardened stainless steel construction.
- IMEG – Optimized fluid dynamics to minimize turbulence and maximize spray performance with our patented design and superior chemical/corrosion resistance provided by a hardened shield.

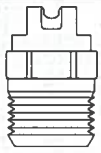
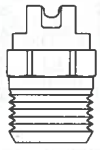
MEG

1/8" to 1/4" NPT or BSPT (M)

IMEG®

1/8" to 1/4" NPT or BSPT (M)

Dimensions and Weights

Standard	Nozzle Type	Inlet Conn. (in.)	Length (in.)	Hex. (in.)	Flats (in.)	Net Weight (oz.)
	MEG (M)	1/8	7/8	1/2	5/16	5/8
		1/4	29/32 flat 1-1/64 solid	9/16	13/32	3/4
	IMEG (M)	1/8	7/8	1/2	5/18	5/8
		1/4	1-15/64	9/16	13/32	3/4

Based on largest/heaviest version of each type.

Ordering Info

STANDARD SPRAY NOZZLE

1/4	MEG	–	15	04
Inlet Conn.	Nozzle Type		Spray Angle	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

STANDARD SPRAY NOZZLE

1/8	MEG	–	65	05
Inlet Conn.	Nozzle Type		Spray Angle	Capacity Size

Performance Data

MEG

*At the stated pressure in psi.

Nozzle Type and Spray Angle														Capacity Size	Capacity (gallons per minute)*								
1/8 MEG							1/4 MEG																
0°†	5°	15°	25°	40°	50°	65°	0°†	5°	15°	25°	40°	50°	65°		300	400	500	700	800	1500	2000	2500	3000
									●					01	.27	.32	.35	.42	.50	.61	.71	.79	.87
									●					015	.41	.47	.53	.63	.75	.92	1.1	1.2	1.3
●	●	●	●	●			●	●	●	●	●		●	02	.55	.63	.71	.84	1.0	1.2	1.4	1.6	1.7
													●	025	.68	.79	.88	1.0	1.3	1.5	1.8	2.0	2.2
●		●	●	●	●		●	●	●	●	●	●	●	03	.82	.95	1.1	1.3	1.5	1.8	2.1	2.4	2.6
							●		●	●	●			035	.96	1.1	1.2	1.5	1.8	2.1	2.5	2.8	3.0
●		●	●	●	●	●	●	●	●	●	●	●	●	04	1.1	1.3	1.4	1.7	2.0	2.4	2.8	3.2	3.5
●		●	●	●		●	●		●	●	●		●	045	1.2	1.4	1.6	1.9	2.3	2.8	3.2	3.6	3.9
●	●	●	●	●	●	●	●	●	●	●	●	●	●	05	1.4	1.6	1.8	2.1	2.5	3.1	3.5	4.0	4.3
●		●	●	●	●	●	●	●	●	●	●	●	●	055	1.5	1.7	1.9	2.3	2.8	3.4	3.9	4.3	4.8
●	●	●	●	●	●	●	●	●	●	●	●	●	●	06	1.6	1.9	2.1	2.5	3.0	3.7	4.2	4.7	5.2
●		●	●	●	●	●	●	●	●	●	●	●	●	08	2.2	2.5	2.8	3.3	4.0	4.9	5.7	6.3	6.9
●		●	●	●	●	●	●		●	●	●	●	●	10	2.7	3.2	3.5	4.2	5.0	6.1	7.1	7.9	8.7
●				●			●	●	●	●	●	●	●	12	3.3	3.8	4.2	5.0	6.0	7.3	8.5	9.5	10.4

†0° = Solid Stream.

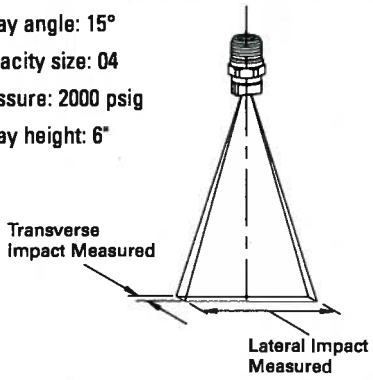
IMEG®

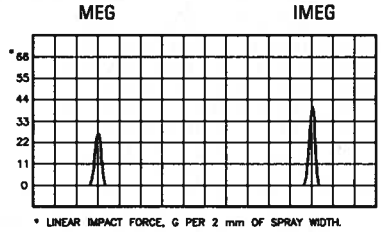
*At the stated pressure in psi.

Inlet Conn. (in.)	Spray Angle at 40 psi								Capacity Size	Capacity (gallons per minute)*												
	5°	10°	15°	25°	40°	50°	65°	80°		300	400	500	600	700	800	1000	1500	2000	2500	3000	3500	4000
1/8, 1/4	●	●	●	●	●	●	●	●	03	.82	.95	1.1	1.2	1.3	1.3	1.5	1.8	2.1	2.4	2.6	2.8	3.0
	●	●	●	●	●	●	●	●	035	.96	1.1	1.2	1.4	1.5	1.6	1.8	2.1	2.5	2.8	3.0	3.3	3.5
	●	●	●	●	●	●	●	●	04	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.4	2.8	3.2	3.5	3.7	4.0
	●	●	●	●	●	●	●	●	045	1.2	1.4	1.6	1.7	1.9	2.0	2.3	2.8	3.2	3.6	3.9	4.2	4.5
	●	●	●	●	●	●	●	●	05	1.4	1.6	1.8	1.9	2.1	2.2	2.5	3.1	3.5	4.0	4.3	4.7	5.0
	●	●	●	●	●	●	●	●	055	1.5	1.7	1.9	2.1	2.3	2.5	2.8	3.4	3.9	4.3	4.8	5.1	5.5
	●	●	●	●	●	●	●	●	06	1.6	1.9	2.1	2.3	2.5	2.7	3.0	3.7	4.2	4.7	5.2	5.6	6.0
	●	●	●	●	●	●	●	●	085	1.8	2.1	2.3	2.5	2.7	2.9	3.3	4.0	4.6	5.1	5.6	6.1	6.5
	●	●	●	●	●	●	●	●	07	1.9	2.2	2.5	2.7	2.9	3.1	3.5	4.3	4.9	5.5	6.1	6.5	7.0
	●	●	●	●	●	●	●	●	075	2.1	2.4	2.7	2.9	3.1	3.4	3.8	4.6	5.3	5.9	6.5	7.0	7.5
	●	●	●	●	●	●	●	●	08	2.2	2.5	2.8	3.1	3.3	3.6	4.0	4.9	5.7	6.3	6.9	7.5	8.0

MEG and IMEG Impact Data

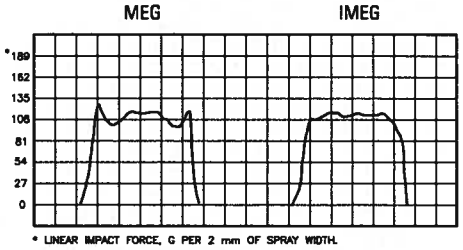
Spray angle: 15°
Capacity size: 04
Pressure: 2000 psig
Spray height: 6"





Transverse Impact

IMEG provides 25 to 100% more impact (dependent on nozzle size and angle)



Lateral Impact

IMEG provides more evenly distributed impact

QCMEG

1/4" quick-connect

QCIMEG

1/4" quick-connect

FEATURES AND BENEFITS

- High impact flat fan spray pattern with uniform distribution.
- Spray angles range from 0° to a 40° flat spray.
- One-piece body design is constructed of hardened stainless steel.
- QCIMEG™ offers optimized fluid dynamics to minimize turbulence and maximize spray performance.
- Incorporates the convenience of a quick connect/disconnect design.
- Protective nozzle guards are color-coded for easy identification of spray angles.
- Locating ribs on nozzle guards for fast alignment and easy spray pattern direction.
- Streamlined internal passage optimizes fluid dynamics and provides maximum performance, minimum turbulence.
- A 302 Stainless Steel guide vane further stabilizes turbulent flow and improves pattern quality and cleaning efficiency.
- QCEM – Soap nozzle available in brass.

PERFORMANCE DATA

QCMEG

*At the stated pressure in psi.

Spray Angle at 40 psi				Capacity Size	Capacity (gallons per minute)*												
0°† (Red)	15° (Yellow)	25° (Green)	40° (White)		300	400	500	600	700	800	1000	1500	2000	2500	3000	3500	4000
		●	●	02	.55	.63	.71	.77	.84	.89	1.0	1.2	1.4	1.8	1.7	1.9	2.0
●	●	●		03	.82	.95	1.1	1.2	1.3	1.3	1.5	1.8	2.1	2.4	2.6	2.8	3.0
●	●	●	●	035	.96	1.1	1.2	1.4	1.5	1.6	1.8	2.1	2.5	2.8	3.0	3.3	3.5
●	●	●	●	04	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.4	2.8	3.2	3.5	3.7	4.0
●	●	●	●	045	1.2	1.4	1.6	1.7	1.9	2.0	2.3	2.8	3.2	3.6	3.9	4.2	4.5
●	●	●	●	05	1.4	1.6	1.8	1.9	2.1	2.2	2.5	3.1	3.5	4.0	4.3	4.7	5.0
●	●	●	●	055	1.5	1.7	1.9	2.1	2.3	2.5	2.8	3.4	3.9	4.3	4.8	5.1	5.5
●	●	●	●	06	1.6	1.9	2.1	2.3	2.5	2.7	3.0	3.7	4.2	4.7	5.2	5.6	6.0
●	●	●	●	065	1.8	2.1	2.3	2.5	2.7	2.9	3.3	4.0	4.6	5.1	5.8	6.1	6.5
●	●	●	●	07	1.9	2.2	2.5	2.7	2.9	3.1	3.5	4.3	4.9	5.5	6.1	6.5	7.0
●	●	●	●	075	2.1	2.4	2.7	2.9	3.1	3.4	3.8	4.6	5.3	5.9	6.5	7.0	7.5
●	●	●	●	08	2.2	2.5	2.8	3.1	3.3	3.6	4.0	4.9	5.7	6.3	6.9	7.5	8.0
	●	●	●	09	2.5	2.8	3.2	3.5	3.8	4.0	4.5	5.5	6.4	7.1	7.8	8.4	9.0
●	●	●	●	10	2.7	3.2	3.5	3.9	4.2	4.5	5.0	6.1	7.1	7.9	8.7	9.4	10.0
●	●	●	●	12	3.3	3.8	4.2	4.6	5.0	5.4	6.0	7.3	8.5	9.5	10.4	11.2	12.0
	●		●	15	4.1	4.7	5.3	5.8	6.3	6.7	7.5	9.2	10.6	11.9	13.0	14.0	15.0

†0° = Solid Stream.

PERFORMANCE DATA

QCIMEG™

*At the stated pressure in psi.

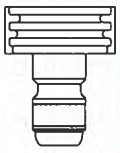
Spray Angle at 40 psi			Capacity Size	Capacity (gallons per minute)*												
15° (Yellow)	25° (Green)	40° (White)		300	400	500	600	700	800	1000	1500	2000	2500	3000	3500	4000
	●	●	02	.55	.63	.71	.77	.84	.89	1.0	1.2	1.4	1.6	1.7	1.9	2.0
●	●	●	03	.82	.95	1.1	1.2	1.3	1.3	1.5	1.8	2.1	2.4	2.6	2.8	3.0
●	●	●	035	.96	1.1	1.2	1.4	1.5	1.6	1.8	2.1	2.5	2.8	3.0	3.3	3.5
●	●	●	04	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.4	2.8	3.2	3.5	3.7	4.0
●	●	●	045	1.2	1.4	1.6	1.7	1.9	2.0	2.3	2.8	3.2	3.6	3.9	4.2	4.5
●	●	●	05	1.4	1.6	1.8	1.9	2.1	2.2	2.5	3.1	3.5	4.0	4.3	4.7	5.0
●	●	●	055	1.5	1.7	1.9	2.1	2.3	2.5	2.8	3.4	3.9	4.3	4.8	5.1	5.5
●	●	●	06	1.6	1.9	2.1	2.3	2.5	2.7	3.0	3.7	4.2	4.7	5.2	5.6	6.0
●	●	●	065	1.8	2.1	2.3	2.5	2.7	2.9	3.3	4.0	4.6	5.1	5.6	6.1	6.5
●	●	●	07	1.9	2.2	2.5	2.7	2.9	3.1	3.5	4.3	4.9	5.5	6.1	6.5	7.0
●	●	●	075	2.1	2.4	2.7	2.9	3.1	3.4	3.8	4.6	5.3	5.9	6.5	7.0	7.5
●	●	●	08	2.2	2.5	2.8	3.1	3.3	3.6	4.0	4.9	5.7	6.3	6.9	7.5	8.0
●	●	●	09	2.5	2.8	3.2	3.5	3.8	4.0	4.5	5.5	6.4	7.1	7.8	8.4	9.0

QCEM

*At the stated pressure in psi.

Spray Angle at 40 psi			Capacity Size	Capacity (gallons per minute)*							
25°	50°	65°		300	500	800	1000	1500	2000	2500	3000
●		●	40	11.0	14.1	17.9	20	24	28	32	35
	●		50	13.7	17.7	22	25	31	35	40	43

DIMENSIONS AND WEIGHTS

Standard	Nozzle Type	Length (in.)	Dia. (in.)	Net Weight (oz.)
	QCMEG QCIMEG	1-7/32	31/32	3/4

Based on largest/heaviest version of each type.

ORDERING INFO

STANDARD SPRAY NOZZLE WITH GUIDE VANE

QCMEG – 15 05

Nozzle Type | Spray Angle | Capacity Size

QCIMEG – 15 04

Nozzle Type | Spray Angle | Capacity Size

STANDARD SPRAY NOZZLE WITHOUT GUIDE VANE

SAQCMEG – 15 05

Nozzle Type | Spray Angle | Capacity Size

SAQCIMEG – 15 04

Nozzle Type | Spray Angle | Capacity Size

H-DT

Below 1 gpm at 40 psi
1/8" to 1/4" NPT or BSPT (F)

H-DU

1 gpm and above at 40 psi
1/8" to 1/4" NPT or BSPT (F)

H-U

1 gpm and above at 40 psi
1/8" to 1/4" NPT or BSPT (M)

H-VV

Below 1 gpm at 40 psi
1/8" to 1/4" NPT or BSPT (M)

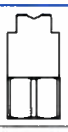
H-VVL

Below 1 gpm with strainer
1/8" to 1/4" NPT or BSPT (M)

FEATURES AND BENEFITS

- Flat spray pattern distributes the liquid as a flat- or sheet-type spray.
- Uniform distribution over a wide range of flow rates and pressures.
- Spray angles available from 0° (solid stream) to 110° at 40 psi.
- Specially tapered spray pattern is ideal for use in manifold and header applications.
- Unobstructed flow passages minimize clogging.
- 12686 strainer will fit H-1/8VV VeeJet nozzle.
- 12687 strainer will fit H-1/4VV VeeJet nozzle.

DIMENSIONS AND WEIGHTS

Standard	Nozzle Type	Inlet Conn. (in.)	Length (in.)	Hex. (in.)	Net Weight (oz.)
	H-VV (M)	1/8	7/8	1/2	1/2
		1/4	29/32	9/16	3/4
	H-VVL (M)	1/6	1-13/32	1/2	3/4
		1/4	1-1/2	9/16	1
	H-DT (F)	1/6	3/4	1/2	1/2
		1/4	25/32	5/8	3/4
	H-U (M)	1/8	7/8	1/2	1/2
		1/4	1	9/16	3/4
	H-DU (F)	1/8	1-1/6	1/2	3/4
		1/4	1-1/4	5/8	1-1/4

Based on largest/heaviest version of each type.

PERFORMANCE DATA

*At the stated pressure in psi.

Nozzle Type/ Inlet Conn. (in.)										Capacity Size	Equiv. Orifice Dia. (in.)	Capacity (gallons per minute)*						
H-VV		H-VVL		H-DT		H-DU		H-U										
1/8	1/4	1/8	1/4	1/8	1/4	1/8	1/4	1/8	1/4			20	40	60	80	100	200	300
●	●	●	●	●						01	.026	.07	.10	.12	.14	.16	.22	.27
●	●	●	●	●	●					02	.035	.14	.20	.24	.28	.32	.45	.55
●	●	●	●	●	●					03	.043	.21	.30	.37	.42	.47	.87	.82
●	●	●	●	●	●					04	.050	.28	.40	.49	.57	.63	.89	1.1
			●	●	●					045	.053	.32	.45	.55	.84	.71	1.0	1.2
●	●	●	●	●	●					05	.056	.35	.50	.61	.71	.79	1.1	1.4
●	●			●	●					055	.059	.39	.55	.87	.78	.87	1.2	1.5
●	●	●	●	●	●					06	.061	.42	.60	.73	.85	.95	1.3	1.6
●	●			●	●					065	.064	.46	.85	.80	.92	1.0	1.5	1.8
●	●	●		●	●					07	.066	.49	.70	.86	.99	1.1	1.6	1.9
●	●									075	.068	.53	.75	.92	1.1	1.2	1.7	2.1
●	●	●	●	●	●					08	.071	.57	.80	.98	1.1	1.3	1.8	2.2
●										085	.073	.60	.85	1.0	1.2	1.3	1.9	2.3
●	●		●	●	●					09	.075	.64	.90	1.1	1.3	1.4	2.0	2.5
●	●	●	●	●	●	●	●	●	●	10	.079	.71	1.0	1.2	1.4	1.6	2.2	2.7
●	●	●	●	●	●	●	●	●	●	15	.094	1.1	1.5	1.8	2.1	2.4	3.4	4.1
						●	●	●	●	20	.109	1.4	2.0	2.4	2.8	3.2	4.5	5.5
						●	●	●	●	30	.133	2.1	3.0	3.7	4.2	4.7	6.7	8.2
						●	●	●	●	40	.153	2.8	4.0	4.9	5.7	6.3	8.9	11.0
							●	●	●	50	.172	3.5	5.0	6.1	7.1	7.9	11.2	13.7
							●		●	60	.188	4.2	6.0	7.3	8.5	9.5	13.4	16.4
						●	●		●	70	.203	4.9	7.0	8.6	9.9	11.1	15.7	19.2

Most capacities may be available in the following spray angles: 0°, 15°, 25°, 40°, 50°, 65°, 80°, 95° and 110°.

MATERIALS

Material	Material Code	Nozzle Type				
		H-VV	H-VVL	H-DT	H-U	H-DU
Brass	(none)	●	●	●	●	●
303 Stainless Steel	SS	●	●	●	●	●

Other materials available upon request.

Mesh Selection Guide	
Orifice Dia. (in.)	Recommended Screen Mesh
Up through .018	200
.019 through .031	100
.032 and larger	50

ORDERING INFO

STANDARD SPRAY NOZZLE

H	1/4	VV	–	SS	110	10
Nozzle Prefix	Inlet Conn.	Nozzle Type		Material Code	Spray Angle	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

VEEJET STRAINER

12687	–	SS	–	100
Strainer Type		Material Code		Mesh Size

H-VV-CKY

Kynar VeeJet Nozzle
1/4" NPT or BSPT (M)

FEATURES AND BENEFITS

- Color-coded for ease of spray angle identification.
- Available in eight different angles: 25°, 40°, 50°, 65°, 80°, 95°, 110° and 120°.
- Constructed of Kynar® for excellent chemical resistance.
- Nozzle body is standard hex size and has a flange for easy installation and removal using a standard socket wrench.
- Flats on the VeeJet nozzle facilitate proper alignment of spray pattern.
- Optional removable strainer.

PERFORMANCE DATA

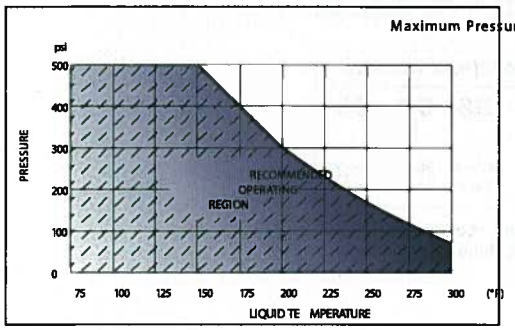
*At the stated pressure in psi.

Nozzle Inlet Conn. NPT or BSPT (M)	Spray Angle at 40 psi								Capacity Size	Capacity (gallons per minute)*										
	25° Green	40° White	50° Blue	65° Purple	60° Light Green	95° Gray	110° Light Blue	120° Light Purple		5	10	20	30	40	60	80	100	200	300	500
1/4		●	●	●	●	●	●	●	02	.07	.10	.14	.17	.20	.24	.28	.32	.45	.55	.71
				●					025	.09	.13	.18	.22	.25	.31	.35	.40	.56	.68	.88
	●	●	●	●	●	●	●	●	03	.11	.15	.21	.26	.30	.37	.42	.47	.67	.82	1.1
		●	●	●	●	●	●	●	04	.14	.20	.28	.35	.40	.49	.57	.63	.89	1.1	1.4
		●	●	●	●	●	●	●	05	.18	.25	.35	.43	.50	.61	.71	.79	1.1	1.4	1.8
	●	●	●	●	●	●	●	●	06	.21	.30	.42	.52	.60	.73	.85	.95	1.3	1.6	2.1
	●	●		●	●				07	.25	.35	.49	.61	.70	.86	.99	1.1	1.6	1.9	2.5
	●	●	●	●	●	●	●	●	08	.28	.40	.57	.69	.80	.98	1.1	1.3	1.8	2.2	2.8
	●	●		●	●				10	.35	.50	.71	.87	1.0	1.2	1.4	1.6	2.2	2.7	3.5

DIMENSIONS AND WEIGHTS

Nozzle Type	Inlet Conn. (in.)	Length (in.)	Dia. (in.)	Net Weight (oz.)
H-VV-CKY (M) 	1/4	7/8	5/8	1/10

Based on largest/heaviest version of each type.



ORDERING INFO

STANDARD SPRAY NOZZLE

H	1/4	VV	–	CKY	65	06
Nozzle Prefix	Inlet Conn.	Nozzle Type		Material Code	Spray Angle	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

For Nozzle Series	Strainer Order No.
H1/4VV–	12687-*-**

*Material Code
(no material code = Brass;
SS = 303 Stainless Steel)
**Screen Mesh

P

FEATURES AND BENEFITS

1/4" to 1/2" NPT or BSPT (M)

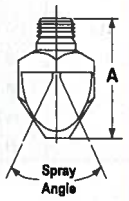
- Very high impact flat spray pattern with narrow spray angle, sharply defined edges and uniform spray distribution.
- Solid one-piece design with deflector plane.
- Large unobstructed flow passage minimizes clogging.

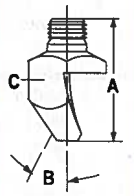
PERFORMANCE DATA

P

*At the stated pressure in psi.

Spray Angle (°) at 40 psi	Inlet Conn. (in.)			Capacity Size	Capacity (gallons per minute)*								Spray Angle (°)*			Dimensions			
	1/4	3/8	1/2		15	20	30	40	60	80	100	150	15	40	100	A Length (in.)	B Deflection Angle (°)	Net Weight (oz.)	Standard
50	●			05	.31	.35	.43	.50	.61	.71	.79	.97	33	50	60	1-7/32	60	1	
	●			10	.61	.71	.87	1.0	1.2	1.4	1.6	1.9	34	50	60	1-7/32	60	1	
	●	●		25	1.5	1.8	2.2	2.5	3.1	3.5	4.0	4.8	42	50	59	1-5/8	42	3	
	●	●		40	2.4	2.8	3.5	4.0	4.9	5.7	6.3	7.7	39	50	60	1-27/32	45	3	
		●		60	3.7	4.2	5.2	6.0	7.3	8.5	9.5	11.8	42	50	53	2-5/32	37	5	
40		●		40	2.4	2.8	3.5	4.0	4.9	5.7	6.3	7.7	31	40	50	2-3/8	35	5	
		●		50	3.1	3.5	4.3	5.0	6.1	7.1	7.9	9.7	31	40	49	2-1/2	33	7	
		●		60	3.7	4.2	5.2	6.0	7.3	8.5	9.5	11.6	32	40	49	2-27/32	33	8	
35	●			10	.61	.71	.87	1.0	1.2	1.4	1.6	1.9	18	35	39	1-7/16	36	2	
	●	●		20	1.2	1.4	1.7	2.0	2.4	2.8	3.2	3.9	24	35	40	1-21/32	30	2	
		●		25	1.5	1.8	2.2	2.5	3.1	3.5	4.0	4.8	24	35	39	1-15/16	28	3	
		●		30	1.8	2.1	2.6	3.0	3.7	4.2	4.7	5.8	26	35	41	2-1/16	28	3	
		●		40	2.4	2.8	3.5	4.0	4.9	5.7	6.3	7.7	28	35	38	2-9/32	26	4	
		●		50	3.1	3.5	4.3	5.0	6.1	7.1	7.9	9.7	31	35	38	2-1/2	23	5	
			●	60	3.7	4.2	5.2	6.0	7.3	8.5	9.5	11.6	29	35	39	2-7/8	27	8	
15	●			10	.61	.71	.87	1.0	1.2	1.4	1.6	1.9	–	15	23	1-7/8	22	2	
	●			20	1.2	1.4	1.7	2.0	2.4	2.8	3.2	3.9	–	15	19	2-1/8	19	2	
		●		30	1.8	2.1	2.6	3.0	3.7	4.2	4.7	5.8	6	15	24	2-27/32	25	4	
		●		40	2.4	2.8	3.5	4.0	4.9	5.7	6.3	7.7	8	15	21	3-5/8	18	8	
		●		50	3.1	3.5	4.3	5.0	6.1	7.1	7.9	9.7	9	15	20	3-9/16	15	6	
			●	60	3.7	4.2	5.2	6.0	7.3	8.5	9.5	11.6	10	15	19	4-15/16	14	12	





MATERIALS

Material	Material Code	Nozzle Type
		P
Brass	(none)	●
Mild Steel	I	●
303 Stainless Steel	SS	●
316 Stainless Steel	316SS	●

Other materials available upon request.

ORDERING INFO

STANDARD SPRAY NOZZLE

3/8	P	–	SS	50	60
Inlet Conn.	Nozzle Type		Material Code	Spray Angle	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

K

1/8" to 1/2" NPT or BSPT (M)

FEATURES AND BENEFITS

- Wide-angle flat fan spray pattern with uniform distribution and medium impact.
- Unobstructed flow passages minimize clogging.
- Precision engineered for dependable, accurate control of deflection and spray angle.

PERFORMANCE DATA

K

*At the stated pressure in psi.

Inlet Conn. (in.)				Capacity Size	Capacity (gallons per minute)*						Spray Angle (°)*	
1/8	1/4	3/8	1/2		10	15	20	30	40	60	20	60
●	●			2	.20	.24	.28	.35	.40	.49	113	129
●	●			2.5	.25	.31	.35	.43	.50	.61	122	133
●	●			3	.30	.37	.42	.52	.60	.73	112	126
●				4	.40	.49	.57	.69	.80	.98	123	132
●	●			5	.50	.61	.71	.87	1.0	1.2	128	142
●	●			7.5	.75	.92	1.1	1.3	1.5	1.8	119	134
●	●			10	1.0	1.2	1.4	1.7	2.0	2.4	133	145
●	●			12	1.2	1.5	1.7	2.1	2.4	2.9	139	153
●	●			15	1.5	1.8	2.1	2.6	3.0	3.7	113	123
●	●			18	1.8	2.2	2.5	3.1	3.6	4.4	120	131
●	●			20	2.0	2.4	2.8	3.5	4.0	4.9	122	133
		●		30	3.0	3.7	4.2	5.2	6.0	7.3	110	121
		●	●	40	4.0	4.9	5.7	6.9	8.0	9.8	126	136
			●	50	5.0	6.1	7.1	8.7	10.0	12.2	131	140
			●	60	8.0	7.3	8.5	10.4	12.0	14.7	134	142
			●	70	7.0	8.6	9.9	12.1	14.0	17.1	137	146
			●	80	8.0	9.8	11.3	13.9	16.0	19.6	138	149

MATERIALS

Material	Material Code	Nozzle Type K
Brass	(none)	●
303 Stainless Steel	SS	●
316 Stainless Steel	316SS	●
Polyvinyl Chloride	PVC	●

Other materials available upon request.

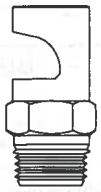
ORDERING INFO

STANDARD SPRAY NOZZLE

1/8	K	–	SS	2
Inlet Conn.	Nozzle Type		Material Code	Capacity Size

BSPT connections require the addition of a "B" prior to the inlet connection.

DIMENSIONS AND WEIGHTS

Standard	Nozzle Type	Orifice Dia. Nom. (in.)	Length (in.)	Hex. (in.)	Net Weight (oz.)
	K (M)	1/8	1	7/18	1/2
		1/4	1-7/32	9/16	1
		3/8	1-3/4	11/16	2
		1/2	2	7/8	4

Based on largest/heaviest version of each type.

UniJet Bodies

- T female or TT male inlet connections

T female body or

TT male body

Screen strainer

Spray tip

Tip retainer

UniJet Spray Tips

A typical UniJet assembly consists of a T female body or TT male body, screen strainer, spray tip and tip retainer.

TPU

Standard spray tip

Features and Benefits

- Flat fan spray pattern with uniform distribution.
- Spray angles available in 0°, 15°, 25°, 40°, 65°, 80° and 110°.
- Lower cost – nozzle body can be reused – only spray tips are replaced.
- Recessed orifices to protect against damage.
- A large choice of interchangeable spray tips, body types/sizes, materials, spray angles and accessories.
- T and TT bodies are compatible with FoamJet® spray tips. See pages 25 and 27.

Performance Data

TPU

*At the stated pressure in psi.

Capacity Size	Equiv. Orifice Dia. (in.)	Capacity (gallons per minute)*							
		10	20	30	40	60	80	100	200
01	.026	.05	.07	.09	.10	.12	.14	.16	.22
015	.032	.08	.11	.13	.15	.18	.21	.24	.34
02	.035	.10	.14	.17	.20	.24	.28	.32	.45
03	.043	.15	.21	.26	.30	.37	.42	.47	.67
04	.050	.20	.28	.35	.40	.49	.57	.63	.89
045	.053	.23	.32	.39	.45	.55	.64	.71	1.0
05	.056	.25	.35	.43	.50	.61	.71	.79	1.1
06	.081	.30	.42	.52	.60	.73	.85	.95	1.3
07	.066	.35	.49	.61	.70	.86	.99	1.1	1.6
08	.071	.40	.57	.69	.80	.98	1.1	1.3	1.8
09	.075	.45	.64	.78	.90	1.1	1.3	1.4	2.0
10	.079	.50	.71	.87	1.0	1.2	1.4	1.6	2.2
12	.087	.80	.85	1.0	1.2	1.5	1.7	1.9	2.7

Other body types may be available. Contact representative for further information.

Materials

Material	Material Code	Spray Tip	Bodies	
		TPU	T	TT
Brass	(none)	●	●	●
303 Stainless Steel	SS	●	●	●
Nylon	NYB		●	●

Other materials available upon request.

Ordering Info

TIP ONLY

TPU	–	110	10	–	SS
Tip Type		Spray Angle	Capacity Size		Material Code

BSPT connections require the addition of a "B" prior to the nozzle body inlet connection.

1. Choose Spray Tip (See Page 26)

QJFJP		FJ	
	COMPATIBLE WITH: ● Split-Eyelet with Check Valve ● Split-Eyelet without Check Valve (for QJ7421-NY body only) ● Pipe Thread with Check Valve (for QJ8355-NY-BL and QJ8360-NY-BL bodies only)		COMPATIBLE WITH: ● Split-Eyelet without Check Valve ● Pipe Thread with Check Valve ● Pipe Thread without Check Valve

2. Choose Body Style (See Page 27)

Split-Eyelet with Check Valve		Split-Eyelet without Check Valve	
	Connection Specifications:		**Connection Specifications:**
 **QJ17560A-NY-BL**	1/2", 3/4" or 1" pipe Outlet: QuickJet®	 **QJ7421-NYB**	1/2", 3/4" or 1" pipe Outlet: QuickJet
 **QJ22187-NYB**	1/2", 3/4" or 1" pipe Outlet: QuickJet	 **7421***	1/2", 3/4" or 1" pipe Outlet: 11/16"–16 thd
		 **25775****	1/2", 3/4" or 1" pipe Outlet: 11/16"–16 thd

*Tip retainer choice determined by material:
For brass bodies: use CP1325.
For stainless steel bodies: use CP1325-SS.

**Tip retainer choices:
CP18032-NYB or CP8027-NYB.

See page 28 for more information on tip retainers and check valves.

FJP-PP		FJP-VS	
	COMPATIBLE WITH: ● Split-Eyelet without Check Valve ● Pipe Thread with Check Valve ● Pipe Thread without Check Valve		COMPATIBLE WITH: ● Split-Eyelet without Check Valve ● Pipe Thread with Check Valve ● Pipe Thread without Check Valve

Pipe Thread with Check Valve		Pipe Thread without Check Valve	
	Connection Specifications:		**Connection Specifications:**
 **8360-NY-BL, 8360-1/4-NY-BL**	Inlet: 1/4" M Outlet: 11/16"–16 thd or 1/4" F	 **T†**	Inlet: 1/4" F Outlet: 11/16"–16 thd
 **8355-NY-BL**	Inlet: 1/4" F Outlet: 11/16"–16 thd	 **TT†**	Inlet: 1/4" M Outlet: 11/16"–16 thd
 **QJ8355-NY-BL**	Inlet: 1/4" F Outlet: QuickJet®	 **QJ1/4T-NYB**	Inlet: 1/4" F Outlet: QuickJet
 **QJ8360-NY-BL**	Inlet: 1/4" M Outlet: QuickJet	 **QJ1/4TT-NYB**	Inlet: 1/4" M Outlet: QuickJet

Add 21950-BL to part number for check valve if needed.

For 1/4" M inlet and 1/4" F outlet, order 8360-1/4-NY-BL and CP8027-NYB tip retainer. Add 21950-BL to part number for check valve if needed.

†ForT orTT in nylon:
Tip retainer: Use CP18032-NYB or CP8027.
ForT orTT in brass:
Tip retainer: Use 1325.
ForT orTT in stainless steel:
Tip retainer: Use 1325-SS.

See page 28 for more information on tip retainers and check valves.

FJ

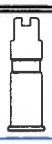
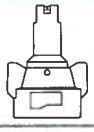
FJP-PP, FJP-VS

QJFJP

Features and Benefits

- **Key feature overview for FJ and FJP-PP:**
  - FoamJet nozzles deliver a superior wash with highly aerated lasting foam.
  - Made of chemical-resistant and durable material.
  - Plastic FoamJet nozzles are color-coded for easy capacity identification.
  - Available in UniJet® body assemblies for fast, easy maintenance.
- **Key feature overview for QJFJP and FJP-VS:**
  - QuickJet® FoamJet and FJP-VS nozzles deliver a superior wash with an even spray pattern.
  - Choice of 40° or 80° spray angles and wide range of spray patterns.
  - Nozzles provide even coverage in headers and manifolds where multiple nozzles are needed.
  - QJFJP offers easy installation and maintenance with quarter turn automatic alignment.
  - Blue, color-coded check valve on QJFJP saves on chemical usage.
  - Available in UniJet body assemblies for fast, easy maintenance.
  - See Also:
    Bulletin 567C, FoamJet and New QuickJet FoamJet Nozzles.

Dimensions and Weights

Standard	Nozzle Type	Length (in.)	Net Weight (oz.)
	FJ	1-3/4	1
	FJP-PP	1-9/16	1/4
	FJP-VS	1-15/32	1/4
	QJFJP	2-1/16	5/8

Based on largest/heaviest version of each type.

Performance Data

*At the stated pressure in psi.

Capacity Size		Capacity (gallons per minute)*		Spray Angle (°)								
				FJ			FJP-PP				QJFJP FJP-VS	
Orifice	Colort	40	60	0°	40°	80°	20°	40°	65°	80°	40°	80°
015	Green	.15	.18				●	●	●	●	●	●
02	Yellow	.20	.24				●	●	●	●	●	●
03	Blue	.30	.37		●		●	●	●	●	●	●
04	Red	.40	.49			●	●	●	●	●	●	●
05	Brown	.50	.61			●	●	●	●	●	●	●
06	Gray	.60	.73	●		●	●	●	●	●	●	●
08	White	.80	.98	●		●	●	●	●	●	●	●
10	Lt. Blue	1.0	1.22	●		●	●	●	●	●		
15		1.5	1.8	●								
20		2.0	2.5	●								
25		2.5	3.1	●								
30		3.0	3.7	●								

†Color Inserts for FJP, QJFJP and FJP-VS Series.

Ordering Info

STANDARD SPRAY TIP			
FJP	25	04	PP
Spray Tip	Spray Angle	Capacity Size	Material Code

STANDARD SPRAY TIP		
QFJP	80	04
Spray Tip	Spray Angle	Capacity Size

QJ17560A-NY-BL

Quick-connect diaphragm check valve nozzle body
Maximum pressure of 300 psi
Fits 1/2", 3/4" or 1" pipe

QJ22187-NYB

Quick-connect diaphragm check valve body with side mounting
Fits 1/2", 3/4" or 1" pipe

QJ7421-NYB

Quick-connect split eyelet nozzle body
Fits 1/2", 3/4" or 1" pipe
Maximum pressure of 150 psi

7421

Split-eyelet nozzle body
Fits 1/2", 3/4" or 1" pipe
Maximum pressure of 250 psi

25775

Split-eyelet nozzle body
Fits 1/2", 3/4" or 1" pipe
Maximum pressure of 150 psi

8360-NY-BL

Diaphragm check valve nozzle body
Maximum pressure of 125 psi
1/4" NPT (M)

8360-1/4-NY-BL

Quick-connect diaphragm check valve nozzle body
Maximum pressure of 300 psi
1/4" NPT (M)
Outlet 1/4" NPT or BSPT (F)

8355-NY-BL

Diaphragm check valve nozzle body
Maximum pressure of 125 psi
1/4" or 1/8" NPT (F)

QJ8360-NY-BL

Quick-connect diaphragm check valve nozzle body
Maximum pressure of 300 psi
1/4" NPT (M)

QJ8355-NY-BL

Quick-connect diaphragm check valve body
1/4" F

QJ1/4T-NYB

Quick-connect nozzle body
Maximum pressure of 300 psi
1/4" NPT (F)

QJ1/4TT-NYB

Quick-connect nozzle body
Maximum pressure of 300 psi
1/4" NPT (M)

Threaded Body Styles

	1/4" Inlet		Outlet	Materials
	M	F		
8360	●		11/16"–16 thread	Nylon
8360-1/4	●		1/4" (F)	Nylon
8355		●	11/16"–16 thread	Nylon
T		●	11/16"–16 thread	Brass, 303 Stainless Steel, Nylon
TT	●		11/16"–16 thread	Brass, 303 Stainless Steel, Nylon
QJ1/4T		●	QuickJet®	Nylon
QJ1/4TT	●		QuickJet	Nylon
QJ8360	●		QuickJet	Nylon
QJ8355		●	QuickJet	Nylon

Split-Eyelet Body Styles

	1/2" Pipe	3/4" Pipe	1" Pipe	Outlet	Materials
25775	●	●	●	11/16"–16 thread	Nylon
7421	●	●	●	11/16"–16 thread	Brass, 303 Stainless Steel
QJ17560A	●	●	●	QuickJet	Nylon
QJ22187	●	●	●	QuickJet	Nylon
QJ7421	●	●	●	QuickJet	Nylon

Order check valve separately.

Add 21950-BL to part number for 8360, 8355, QJ8360 and QJ17560A.

1325, 8027 TIP RETAINERS

ORDERING INFO

TIP RETAINER		
CP1325	–	SS
Model No.		Material Code

TIP RETAINER		
CP8027	–	NYB
Model No.		Material Code

18032A TIP RETAINER

ORDERING INFO

TIP RETAINER		
CP18032A	–	NYB
Model No.		Material Code

21950 CHECK VALVE

ORDERING INFO

CHECK VALVE				
21950	–	2	–	NYB
Model No.		Opening Pressure		Material Code

FEATURES AND BENEFITS

- **Key feature overview for 1325 and 8027 tip retainers:**
  - Used to hold nozzle assembly together.
  - Inlet connection 11/16"-16 female thread.
- **Key feature overview for 18032A tip retainer:**
  - Winged cap allows quick change of spray tips with no tool required.
  - Inlet connection 11/16"-16 female thread.
- **Key feature overview for 21950 check valve:**
  - Choice of opening pressures – 2 psi, 8 psi or 20 psi.
  - Use at pressures up to 300 psi.
- **Key feature overview for 11370 and 11950 jet stabilizers:**
  - Increase spray projection distance and spray impact on flat spray tips which are mounted at a 90° angle to the liquid supply line.
  - Reduce turbulence that is created when the liquid turns the corner in a manifold, tee or elbow and reduce distortions in the spray pattern.
  - 11370 jet stabilizer is available in 1/8", 1/4", 3/8" and 1/2" connections.

JET STABILIZERS

11370

11950

ORDERING INFO

JET STABILIZER		
11370 –	SS –	1/8x1/8
Stabilizer Type	Material Code	Conn. Size

BSPT connections require the addition of a "B" prior to the inlet connection.

MATERIALS

Material	Material Code	Tip Retainer Type			Check Valve	Jet Stabilizer Type	
		CP1325	CP8027	CP18032A	21950	11950†	11370
Brass	(none)	●				●	●
Stainless Steel	SS	●				●	●
Nylon	NYB		●	●	●		

Other materials available upon request.
†Stainless steel guide vane.

SPECIFICATIONS

Strainers	Model	Construction	Screen
	5053	Brass	Stainless steel with 24, 50, 100, 200 mesh
	8079	Polypropylene	Stainless steel with 24, 50, 100, 200 mesh
	6051	Stainless steel	Stainless steel with 24, 50, 100, 200 mesh
	4514 Slotted	Brass	Milled slot equivalent 16, 25, 50 mesh
		Aluminum	Milled slot equivalent 16, 25 mesh
		Nylon	Milled slot equivalent 16, 25, 50 mesh
	4067 Cup	Stainless steel	Stainless steel with 50, 100, 200 mesh
	7630 Disc	Stainless steel	Stainless steel with 50, 100, 200 mesh
	4193A with check valve*	Aluminum Brass Stainless steel Polypropylene	Stainless steel with 24, 50, 100, 200 mesh

*Built-in check valve and stainless steel springs with opening pressures of 5, 10, 20 or 40 psi.

ORDERING INFO

STRAINER

6051	–	SS	–	50
Strainer Type		Material Code		Mesh Size

STRAINER

4193A	–	SS	–	5	–	50SS
Strainer Type		Material Code		Spring Opening Pressure (psi)		Mesh Size

STRAINER

4514	–	NY	–	10
Strainer Type		Material Code		Slot Width

MATERIALS

Material	Material Code	Strainer Type						
		5053	8079	6051	4514-10 (50 Mesh)	4514-20 (25 Mesh)	4514-32 (16 Mesh)	4193A
Brass	(none)	●			●	●	●	●
Aluminum	AL					●	●	●
Nylon	NY				●	●	●	
Stainless Steel	SS			●				●
Polypropylene	PP		●					●

Other materials available upon request.

Mesh Selection Guide	
Orifice Dia. (in.)	Recommended Screen Mesh
Up through .018	200
.019 through .031	100
.032 and larger	50

36275

Male inlet/female outlet
1/8" to 3/4" NPT or BSPT

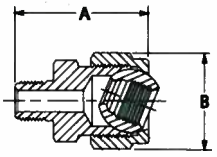
37235

Male inlet 1/4" to 1/2" NPT

FEATURES AND BENEFITS

- Allow positioning of spray for more exact control of spray direction and reduced over-spraying.
- Smooth finished surfaces assure leak-proof connections.
- 36275 – Maximum pressure 300 psi
  - Available in brass and 303 Stainless Steel
- 37235 – Maximum pressure 125 psi
  - Maximum temperature 180°F
  - ProMax® (polypropylene) body with a polyphthalamide cap and an EPDM rubber O-ring (Viton® optional)
  - Data Sheets 37235-1, 37235-2

SPECIFICATIONS

Adjustable Ball Fitting Type	Inlet Conn. (in.)	Outlet Conn. (in.)	Total Included Angle of Adjustment	Dimensions		Net Weight (oz.)	Standard
				A (in.)	B (in.)		
36275	1/8	1/8	45°	1-3/8	31/32	2	
	1/4	1/4		1-9/16	1-3/32	3	
	1/4	1/8		1-9/16	1-3/32	3-1/8	
	3/8	3/8		1-25/32	1-3/8	5-1/2	
	3/8	1/4		1-3/8	1-25/32	5-3/4	
	1/2	1/2		2-7/32	1-21/32	10	
	1/2	1/4		1-7/8	1-3/8	5-3/4	
	1/2	3/8		1-7/8	1-3/8	5-3/8	
	3/4	3/4		2-13/32	1-29/32	17	

Based on largest/heaviest version of each type.

MATERIALS

Material	Material Code	Ball Fitting Type
		36275
Brass	(none)	●
303 Stainless Steel	SS	●
316 Stainless Steel	316SS	●

If inlet and outlet connections are different sizes, material options are brass or 303 Stainless Steel. Other materials available upon request.

ORDERING INFO

36275 ADJUSTABLE BALL FITTING

36275	–	1/2	x	1/2	–	SS
Ball Fitting Type		Inlet Conn.		Outlet Conn.		Material Code

BSPT connections require the addition of a "B" prior to the inlet connection.

CV

In-line drip-free shut-off
1/8" to 1/4" NPT or BSPT

12328

Diaphragm-type
1/2" to 3/4" NPT or BSPT

FEATURES AND BENEFITS

- Either valve type provides positive drip-free shut-off to maintain line pressure during on-and-off spraying cycles.
- 12328 valves offer line flows without pressure drop throughout the valve.
- Prevent back flow.
- Maximum pressure at 150 psi.
- Cracking pressure/spring rating at 5, 10 or 20 psi.
- O-ring (Viton®) soft-seat provides positive seal – no leakage.
- See Also:
  - Bulletin 593, CV Series Inline Check Valves
  - Data Sheet 12527

SPECIFICATIONS

Check Valve	Maximum Pressure (psi)	Maximum Flow Rate (gpm)	Spring Rates	Opening Pressure (psi)	Inlet Connection	Outlet Connection
AACV	150	2	5, 10 or 20 psi	–	1/8 or 1/4 NPT or BSPT (F)	1/8 or 1/4 NPT or BSPT (F)
BACV	150	2	5, 10 or 20 psi	–	1/8 or 1/4 NPT or BSPT (M)	1/8 or 1/4 NPT or BSPT (F)
ABCV	150	2	5, 10 or 20 psi	–	1/8 or 1/4 NPT or BSPT (F)	1/8 or 1/4 NPT or BSPT (M)
BBCV	150	2	5, 10 or 20 psi	–	1/8 or 1/4 NPT or BSPT (M)	1/8 or 1/4 NPT or BSPT (M)
12328	125	15	–	7	1/2 or 3/4 NPT or BSPT (M)	1/2 or 3/4 NPT or BSPT (F)

ORDERING INFO

BALL-TYPE CHECK VALVES

1/4	ABCV	–	SS	5
Inlet/ Outlet Conn.	Check Valve Type		Material Code	Spring Rating (psi)

DIAPHRAGM CHECK VALVE

12328	–	1/2	–	NYB
Check Valve Type		Inlet/ Outlet Conn.		Material Code

BSPT connections require the addition of a "B" prior to the inlet connection.

MATERIALS

Material	Material Code	Valve Type	
		CV	12328
Brass	(none)	●	
Stainless Steel	SS	●	
Nylon	NYB		●

FEATURES AND BENEFITS

- Throttling valves regulate flow in systems equipped with centrifugal pumps.
- Adjustable pressure relief valves accurately control spray line pressures – liquid waste caused by excessive pressures is minimized as excess liquid is bypassed back to the liquid source or pump inlet.
- **Key feature overview for 23520-PP throttling valve:**
  - Compact throttling valve with adjusting cap and lock ring.
  - Polypropylene construction features excellent chemical resistance.
- **Key feature overview for 23120-PP pressure relief valve:**
  - Polypropylene body with nylon adjusting cap means excellent chemical resistance.
  - Easily hand-adjustable pressure relief valve.
  - Maintain line pressure with adjustable locknut.
- **Key feature overview for 8460 pressure relief valve:**
  - Diaphragm design pressure relief valve.
  - Aluminum housing with nylon inlet body.
  - Fairprene® diaphragm seals off all working parts from contact with liquid and provides responsive, chatter-free operation.
  - Features additional port for pressure gauge installation.
- **Key feature overview for 9840 pressure relief valve:**
  - Diaphragm design pressure relief valve.
  - Aluminum and brass housing with nylon inlet body.
  - Fairprene diaphragm seals off all working parts from contact with liquid and provides responsive, chatter-free operation.
  - Features additional port for pressure gauge installation.
- **Key feature overview for 6815 pressure relief valve:**
  - Piston-type pressure relief valve.
  - Full flow with minimum pressure loss due to extra large valve passage.
  - Free-floating seat design improves overall speed and sensitivity of the valve action.
  - Aluminum, brass or stainless steel construction.
- **Key feature overview for 110 pressure relief valve:**
  - Piston-type pressure relief valve.
  - Guide vane seat stabilizes flow and reduces chatter.
  - Removable valve bonnet for service without disturbing fluid line connections.
  - Full flow with minimum pressure loss due to extra large valve passage.
  - Free-floating seat design improves overall speed and sensitivity of the valve action.
  - Aluminum, brass or stainless steel construction.

23520-PP

Throttling valve

23120-PP

Pressure relief valve

8460

Pressure relief valve (Aluminum housing/ nylon inlet body)

9840

Pressure relief valve (Aluminum or brass body)

6815

Pressure relief valve – extra large passage

110

Pressure relief valve – extra large passage with guide vane seat

SPECIFICATIONS

Inlet/Outlet Pipe Conn. (in.)	Operating Pressure Max. (psi)	Valve Type						
		23520-PP	23120-PP	8460	9840	6815	6815-HSS	110
1/4	Up to 300							●
	300 to 700							●
	700 to 1000							●
3/8	Up to 300							●
	300 to 700							●
	700 to 1000							●
1/2	Up to 50					●		
	Up to 150	●	●					
	Up to 300			●	●	●		
	300 to 700					●		
	700 to 1200					●	●	
3/4	Up to 50					●		
	Up to 150	●	●					
	Up to 300			●	●	●		
	300 to 700					●		
	700 to 1200					●	●	

MATERIALS

Material	Material Code	Valve Type					
		23520-PP	23120-PP	8460	9840	6815*	110
Brass	(none)				●	●	●
Hardened Stainless Steel	HSS					●	
Nylon/Aluminum	NY			●			
Polypropylene	PP	●	●				

*Brass only for operating pressures up to 700 psi; hardened stainless steel only for pressures from 700 to 1200 psi.

ORDERING INFO

THROTTLING VALVE

23520	–	1/2	–	PP
Valve Type		Inlet/ Outlet Conn.		Material Code

PRESSURE RELIEF/REGULATING VALVE

9840	–	1/2
Valve Type		Inlet/ Outlet Conn.

PRESSURE RELIEF/REGULATING VALVE

6815	–	1/2	–	50
Valve Type		Inlet/ Outlet Conn.		Pressure Rating (psi)

BSPT connections require the addition of a "B" prior to the inlet connection.

Contact your local sales representative for pressure ratings.

60

AA70

FEATURES AND BENEFITS

- Sturdy design and materials including nylon handles and trigger guards, forged brass valve bodies, Buna-N or Viton® stem seals, TEFLON® valve seats and stainless steel working parts mean long, productive equipment life.
- Ergonomic designs assure positive control and operator comfort even at maximum flow and pressure conditions.
- Optional "weep" feature (AA70, PW4000 and 30A) helps prevent freezing in cold conditions.

PW4000A

PW4000AS

30A

SPECIFICATIONS

Model Type	Model	Pressure (psi)	Capacity (gpm)	Temperature (°F)	Inlet Conn.	Outlet Conn.	Length (in.)	Width (in.)	Height (in.)	Net Weight (oz.)	Special Features
	60	2500	6	300	3/8" NPT or BSPT (F)	11/16"–16 THD	8-3/4	1-7/16	6-1/2	16	Stainless steel body available.
	AA70	5000	10	300	3/8" NPT or BSPT (F)	1/4" NPT or BSPT (F)	7.83	1.35	7.56	25	Heavy-duty. Ergonomic/balanced to reduce operator fatigue.
	PW4000A	4000	10	300	1/4", 3/8" NPT or BSPT (F)	1/4", 3/8" NPT or BSPT (F)	8-3/4	1-1/4	7-3/4	24	Fatigue-reducing trigger.
	PW4000AS	4000	10	300	1/4", 3/8" NPT or BSPT (F) swivel	1/4", 3/8" NPT or BSPT (F)	8-3/4	1-1/4	7-3/4	24	Bottom trigger pivot and inlet swivel.
	30A	1500	5	200	1/4" NPT or BSPT (F)	11/16"–16 THD	8	1-1/8	6-9/16	15	Trigger lock. Nylon handle. Trigger guard.
	30L	250	5	200	1/4" NPT or BSPT (F)	11/16"–16 UniJet® THD	8	1-1/8	6-9/16	15	Trigger lock. Nylon handle. Trigger guard.
	30L-PP	150	5	120	1/4" NPT or BSPT (F)	11/16"–16 UniJet THD	8	1-1/8	6-9/16	9	Polypropylene handle. Trigger guard. Trigger lock.

GunJet® AND TriggerJet® SPRAY GUNS

30L

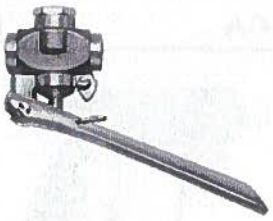
30L-PP

50800-PP-1/4

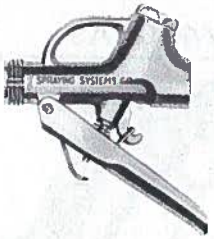
50800-15-PP-1/4

22650-PP

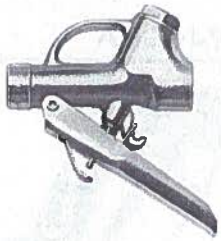
36



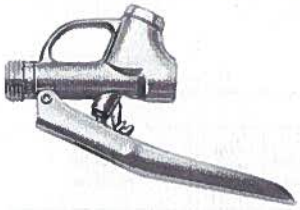
4688



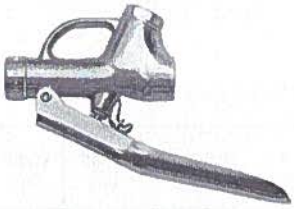
6104



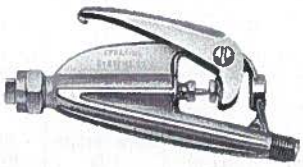
6466



6590



31



SPECIFICATIONS

Specialty Spray Guns	Pressure (psi)	Capacity (gpm)	Inlet Conn.	Outlet Conn.	Special Features
50800 TriggerJet	100	1.5	1/4" or 3/8" hose or 1/4" NPT or BSPT (F)	11/16"–16 THD	Polypropylene strainer located inside handle to prevent tip clogging.
50800-15-PP-1/4 TriggerJet	100	1.5	1/4" NPT or BSPT adapter	11/16"–16 THD	Trigger lock permits gun to be locked open for continuous flow. Strainer in handle to prevent tip clogging. Use with any standard UniJet tip.
22650-PP, 22670-PP TriggerJet	150	2	1/4" or 3/8" hose or 1/4" NPT or BSPT (F)	11/16"–16 THD	Corrosion resistant polypropylene construction. Trigger lock. UniJet strainer available. Durable Viton® diaphragm.
36 Trigger Valve	150	7	1/4" or 3/8" NPT or BSPT (F)	1/4" or 3/8" NPT or BSPT (F)	Trigger lock. Brass or stainless steel.
4688 Trigger Valve	250	2	1/4" NPT or BSPT (F)	11/16"–16 THD	Trigger lock. Brass or stainless steel.
6104 Trigger Valve	250	2	1/4" NPT or BSPT (F)	1/4" NPT or BSPT (F)	Trigger lock. Brass or stainless steel.
6466 Trigger Valve	250	2	1/4" NPT or BSPT (F)	11/16"–16 THD	Extra long trigger.
6590 Trigger Valve	250	2	1/4" NPT or BSPT (F)	1/4" NPT or BSPT (F)	Extra long trigger.
31 GunJet	500	5	1/4" NPS (M) or NPT or BSPT (F)	11/16"–16 THD	Drip-free shut-off. Trigger lock (optional).

ORDERING INFO

COMPLETE SPRAY GUN ASSEMBLY

22650	–	PP	–	1/4
GunJet Type		Material Code		Inlet Conn.

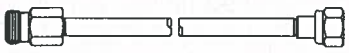
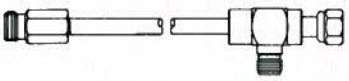
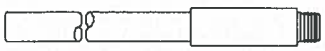
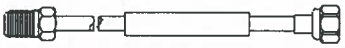
SPRAY GUN COMPATIBILITY

Extension No.	Length Available in. (mm)	Spray Guns								
		30	60	31	36-1/4	4688	6466	6104	8590	22650
9004-SS	8 (203)	●	●	●		●	●			
	12 (305)	●	●	●		●	●			
	18 (457)	●	●	●		●	●			
	24 (610)	●	●	●		●	●			
	36 (914)	●	●	●		●	●			
11806	8 (203)	●	●	●		●	●			
	12 (305)	●	●	●		●	●			
	18 (457)	●	●	●		●	●			
	24 (610)	●	●	●		●	●			
	36 (914)	●	●	●		●	●			
20400-1/4M	18 (457)	●*	●*		●			●	●	
	36 (914)	●*	●*		●			●	●	
15699	8 (203)			●		●	●			
	18 (457)			●		●	●			
	24 (610)			●		●	●			
	36 (914)			●		●	●			
	48 (1219)			●		●	●			
9527	8 (203)			●		●	●			
	18 (457)			●		●	●			
	24 (610)			●		●	●			
	38 (914)			●		●	●			
	48 (1219)			●		●	●			

Extension No.	Length Available in. (mm)	Spray Guns								
		30	60	31	36-1/4	4688	6466	6104	8590	22650
12086	8 (203)			●		●	●			
	18 (457)			●		●	●			
	24 (610)			●		●	●			
	36 (914)			●		●	●			
7715	8 (203)			●		●	●			
	12 (305)			●						
	18 (457)			●						
	24 (610)			●						
	30 (762)			●						
	36 (914)			●						
	48 (1219)			●						
6671	8 (203)			●		●	●			
	18 (457)			●		●	●			
	24 (610)			●		●	●			
	30 (762)			●		●	●			
	36 (914)			●		●	●			
	48 (1219)			●		●	●			
22865	15 (381)									●
	24 (610)									●

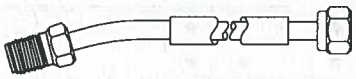
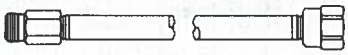
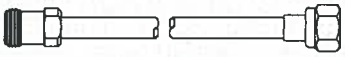
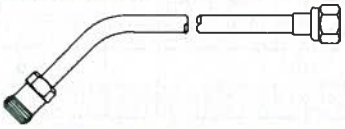
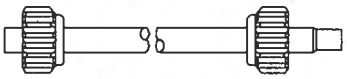
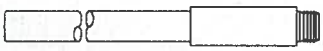
*Use with 14643-1/4-SSP stainless steel adapter.

SPECIFICATIONS

Gun Extension	Extension No.	Maximum Pressure (psi)	Inlet Conn.	Outlet Conn.	Extension Material	Special Features
	9004-SS	4000	11/16"–16 THD	11/16"–16 THD	Stainless steel	–
	11806	4000	11/16"–16 THD 1/4" NPS (M) liquid recirculating	11/16"–16 THD 1/4" NPS (M) liquid recirculating	Brass	Stainless steel only available in 8" length.
	20400	3000	1/4" NPT or BSPT (M)	1/4" NPT or BSPT (M) or 1/8" NPT or BSPT (F)	Stainless steel or zinc-plated steel	–
	15699	1000	11/16"–16 THD	11/16"–16 THD	Brass	Rubber insulated (48" length not rubber insulated).

GunJet® Spray Gun Extensions

Specifications

Gun Extension	Extension No.	Pressure (psi)	Inlet Conn.	Outlet Conn.	Extension Material	Special Features
	9527	1000	11/16"–16 THD	11/16"–16 THD	Brass	Curved, rubber insulated.
	12086	1000	11/16"–16 THD	11/16"–16 THD	Brass	–
	7715	250	11/16"–16 THD	11/16"–16 THD	Brass 8"	–
		500	11/16"–16 THD	11/16"–16 THD	Brass (18", 24" and 36" lengths also available in stainless steel)	–
	6671	125	11/16"–16 THD	11/16"–16 THD	Brass (36" lengths also available in stainless steel)	Curved body.
	22665	150	11/16"–16 THD	11/16"–16 THD	Polypropylene	–
	20400	3000	1/4" NPT or BSPT (M)	1/4" NPT or BSPT (M) or 1/8" NPT or BSPT (F)	Stainless steel or zinc-plated steel	–

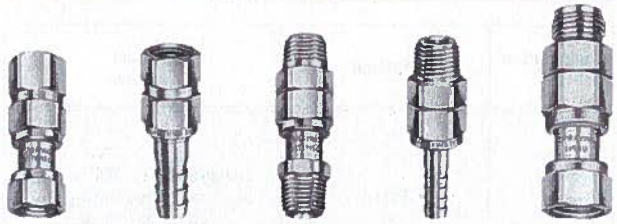
Ordering Info

COMPLETE EXTENSION ASSEMBLY

7715 – 18 – SS

Extension Type	Extension Length (inches)	Material Code

11990



Maximum 1000 psi

9765

Maximum 4000 psi

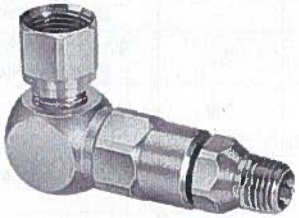
15950

Maximum 3000 psi

21550

Maximum 1500 psi

21550-90NP



Maximum 1500 psi

36560

Maximum 2000 psi

8510

Maximum 4000 psi
Strainer swivel

13212

3/4" garden hose thread (F) inlet connection
3/8", 1/2" NPT or BSPT (M) outlet connection

14269

3/4" garden hose thread (F) inlet connection
1/4" NPS (F) or 1/4" NPT (F) outlet connection

4676

11/16"–16 THD (F) inlet connection
1/8", 1/4", 3/8", 1/2", 3/4 NPT or BSPT (F) outlet connection

14643

11/16"–16 THD (F) inlet connection
1/8", 1/4 NPT or BSPT (F) outlet connection

ORDERING INFO

SPRAY GUN CONNECTORS
11990-6
Swivel Type

OUTLET ADAPTER		
4676	1/4	SS
Adapter Type	Inlet Conn.	Material Code

SWIVEL CONNECTORS	
21550-90NP	1/4
Swivel Type	Inlet Conn.

Call for ordering information for other swivels and strainers.

SPECIFICATIONS

Model No.	Inlet Conn.	Outlet Conn.	Maximum Pressure (psi)	Temperature (°F)	Material	Special Features
11990	1/4" to 1/2" NPT or BSPT (F)	–	1000	180	Brass	Leakproof hose, 360° swivel eliminates hose kinking and operator fatigue.
	–	1/4" NPT or NPS (F)				
	1/4" to 1/2" NPT or BSPT (M)	–				
	–	1/4" NPS (M)				
	–	1/4" to 1/2" NPT or NPS (F)				
15950	3/8" NPT or BSPT (M)	3/8" NPT or BSPT (F)	3000	200	Brass or stainless steel	–
21550	1/4", 3/8" NPT or BSPT (F)	1/4", 3/8" NPT or BSPT (M)	1500	200	Brass	–
9785	1/4" NPS (M)	1/4" NPS (F)	4000	–	Stainless steel	–
21550-90NP	1/4", 3/8" NPT (M)	3/8" NPT or BSPT (F)	1500	200	Delrin® bearings and Buna-N O-ring	Ceiling-mount.
36560	3/8" NPT (M)	3/8" NPS (F)	2000	200	Nickel-plated brass	Boom swivel designed for ceiling mount.
8510 Strainer	1/4" NPS (M)	1/4" NPS (F)	4000	–	Stainless steel	Choice of screen mesh sizes. Internal support prevents screen collapse at high pressure.
13212	3/4" garden hose thread (F)	3/8", 1/2" NPT or BSPT (M)	150	–	Brass	–
14269	3/4" garden hose thread (F)	1/4" NPS (F) or 1/4" NPT (F)	125	–	Brass	–
4676	11/16"–16 THD (F)	1/8", 1/4", 3/8", 1/2", 3/4" NPT or BSPT (F)	1000	–	Brass and nickel-plated brass	–
			2000	–	303 Stainless Steel	–
			125	–	Nylon	–
14643	11/16"–16 THD (F)	1/8", 1/4" NPT or BSPT (F)	4000	–	Nickel-plated steel	–

11990

Connection Type	Swivel Ordering No.	Connection Thread Sizes (NPT/BSPT or NPS)		Approx. Overall Length (in.)
Female x Female	11990-7	1/4" (F) NPT/BSPT	1/4" (F) NPT/BSPT	2-1/16
	11990-20	3/8" (F) NPT/BSPT	1/4" (F) NPS	1-3/4
Male x Male	11990-8	1/4" (M) NPT/BSPT	1/4" (M) NPT/BSPT	2-1/4
	11990-13	1/4" (M) NPT/BSPT	1/4" (M) NPS	2-1/4
	11990-15	3/8" (M) NPT/BSPT	3/8" (M) NPT/BSPT	2-5/16
	11990-18	1/2" (M) NPT/BSPT	1/2" (M) NPT/BSPT	2-3/4
Male x Female	11990-9	1/4" (M) NPT/BSPT	1/4" (F) NPT/BSPT	2-3/18
	11990-21	3/8" (M) NPT/BSPT	1/4" (F) NPS	2

Connection Type	Swivel Ordering No.	Connections		Approx. Overall Length (in.)	For Hose ID (in.)
		Thread Sizes (NPT/BSPT or NPS)	Shank Dia. (in.)		
Female x Hose Shank	11990-60	1/4" (F) NPS	.281	2-5/8	1/4
Male x Hose Shank	11990-62	1/4" (M) NPT/BSPT	.281	2-5/16	1/4
	11990-63	1/4" (M) NPS	.281	2-3/8	1/4
	11990-64	1/4" (M) NPT/BSPT	.406	2-15/32	3/8

AA707

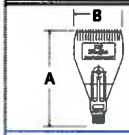
AA727

FEATURES AND BENEFITS

PERFORMANCE DATA

Rzyp° I tzz0 Vae t Fdae	Vt yp e "p	I I "I nt° dt p	I I "I nt° *ncy,			
			32 "-t	52 "-t	82 "-t	;2 "-t
316 *U,	CC929	33	704	;08	3802	4405
		37	806	3406	4302	4;06
		45	3206	3;04	5405	6702
316 *U. M	CC949 CC949/M	33	702	:0	3606	3;0
		37	80	340	4305	4;08
		45	;0	3:06	520	6506

DIMENSIONS AND WEIGHTS



Based on largest/heaviest version of each type.

MATERIALS

Ul °p tl w	Ul °p tl w I top	Vt yp e "p	
		CC949	CC929
CFd aW- °tn	*tzp,	●	●
atw"spz ypzp d vtpp	ck	●	●
d°l tzyp- - d°ppw	dd	●	●
agJM	Sk		●

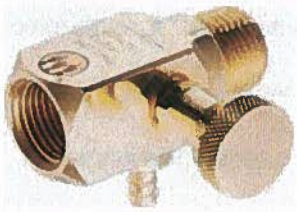
ORDERING INFO

WINDJET NOZZLE			
AA707	- 1/4	-	11
Vt yp e "p	Rzyp° I tzz0		I I "I nt° dt p

WINDJET NOZZLE				
AA727	- 1/4	- RY	-	15
Vt yp e "p	Rzyp° I tzz0	Ul °p tl w I top		I I "I nt° dt p

BSPT connections require the addition of a "B" prior to the nozzle number.

50580



Adjustable

13340

Fixed

FEATURES AND BENEFITS

- **Key feature overview for 50580 Adjustable Siphon Injector:**
  - Provides the flexibility to easily adjust and lock-in different mixture ratios.
  - Numbered index adjustment screw enables measured and repeatable siphon control.
  - Lock-nut to secure settings from system vibrations.
  - Needle valve design to ensure precise control of flow.
  - Easy open check-valve design on siphon inlet.
  - Flow range: 0.5 to 6.0 gpm.
  - See also Bulletin 552B and Data Sheet 50580 for flow capacity and ordering information.
- **Key feature overview for 13340 Fixed Siphon Injector:**
  - Calibrated to provide proper siphoning when matched with system flow rates.
  - Easy open check-valve design on siphon inlet.
  - See also: Bulletin 552B and Data Sheet 13340 for specific siphon rate and ordering information.

SPECIFICATIONS

Model Number	Maximum Pressure (psi)	Inlet Connection	Outlet Connection	Siphon Inlet Connection	Maximum Temperature (°F)	Approximate Weight (oz.)	Material
50580	4000	3/8" or 1/2" NPT or BSPT (F)	3/8" or 1/2" NPT or BSPT (M)	.281" Dia. Hose Barb or 1/4" NPT or BSPT (M)	300	8	Brass
13340	4000	3/8" or 1/2" NPT or BSPT (F)	3/8" or 1/2" NPT or BSPT (M)	.281" Dia. Hose Barb or 1/4" NPT or BSPT (M)	300	6-1/2	Brass

Other materials available upon request.

ORDERING INFO

ADJUSTABLE SIPHON INJECTOR

50580	–	3/8	–	5
Model No.		Inlet/ Outlet Conn.		Capacity Size

ADJUSTABLE SIPHON INJECTOR

50580	–	1/2	–	20	–	1/4
Model No.		Inlet/ Outlet Conn.		Capacity Size		Siphon Conn.

FIXED SIPHON INJECTOR

13340	–	3/8	–	1	–	73
Model No.		Inlet/ Outlet Conn.		Siphon Conn.		Metering Orifice

BSPT connections require the addition of a "B" prior to the inlet connection.

SPRAYING SYSTEMS CO.'S TRADEMARK USAGE

The following is a current list of Spraying Systems Co.'s trademarks registered in the United States. Some marks are registered in other countries as well.

AirJet®
AutoJet®
CasterJet®
ChemSaver®
Clip-Eyelet®
ConeJet®
DeflectoJet®
DescaleJet®
DistriboJet®
Drip Free™
DripSafe™
FlatJet®
FloMax®
FloodJet®
FoamJet®
FogJet®
FullJet®
GunJet®
IMEG®
iSpray®
MeterJet®
MiniFogger® II
ProMax®
PulsaJet®
QCIMEG™
QJ®
QJA®
QJJA®
QuickJet®
QuickMist®
Rokon®
RotoClean®
SpiralJet®
SprayDry®
Spraying Systems Co.®
SprayLogic®
TriggerJet®
UltraStream®
UniJet®
VeeJet®
WashJet®
WhirlJet®
WindJet®

REGISTERED TRADEMARK CREDITS

American Express®	American Express Company
AMPCO® 8	AMPCO-Pittsburgh Corporation
ANSI®	American National Standards Institute
ASME®	American Society of Mechanical Engineers (ASME, ASME International)
ASTM®	ASTM International
CARPENTER® 20	Carpenter Technology Corporation
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Discover®	Discover Financial Services
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HASTELLOY®	Haynes International, Inc.
INCONEL®	Special Metals Corporation
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Kynar®	Arkema, Inc.
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MasterCard®	MasterCard International
MONEL®	Special Metals Corporation
PEEK™	Victrex plc Corporation
POM-DELRIN®	E.I. du Pont de Nemours and Company
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Seller's acceptance of any order is expressly subject to Buyer's assent to each and all of the terms and conditions set forth below and Buyer's assent to these terms and conditions shall be conclusively presumed from Buyer's receipt of this document without prompt written objection thereto or from Buyer's acceptance of all or any part of the goods ordered. No addition to or modification of said terms and conditions shall be binding upon Seller unless specifically agreed to by Seller in writing. If Buyer's purchase order or other correspondence contains terms or conditions contrary to or in addition to the terms and conditions set forth below, acceptance of any order by Seller shall not be construed as assent to such contrary or additional terms and conditions or constitute a waiver by Seller of any of the terms and conditions.

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(11) Patents

The Seller shall not be liable for any costs or damages incurred by the Buyer as a result of any suit or proceeding brought against Buyer so far as based on claims (a) that use of any product, or any part thereof, furnished hereunder, in combination with products not supplied by the Seller or (b) that a manufacturing or other process utilizing any product, or any part thereof furnished hereunder, constitute either direct or contributory infringement of any patent of the United States. The Buyer shall hold the Seller harmless against any expense or loss resulting from infringement of patents or trademarks arising from compliance with Buyer's designs or specifications or instructions.

(12) Complete Agreement

The terms and conditions set forth herein, together with any other documents incorporated herein by reference constitute the sole and entire agreement between Buyer and Seller with respect to any order superseding completely any oral or written communications. No additions to or variations from such terms and conditions whether contained in Buyer's purchase order, any shipping release or elsewhere shall be binding upon Seller unless expressly agreed to in writing by Seller.

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- An error on our part: Seller will credit you for the product and shipping costs, up to one year from ship date.
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Returns are subject to inspection.

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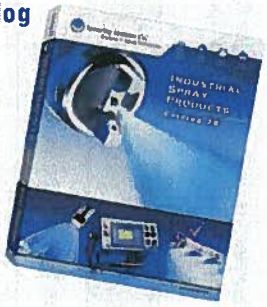
Adjustable and Fixed Siphon Injectors

Bulletin 552B

Adjustable siphon injectors feature a numbered index dial that enables increased control of chemical mixture dilutions and savings on costly chemical usage.

Industrial Spray Products Catalog

Catalog 70



Our full product-line catalog is the most comprehensive resource for spray nozzles and accessories. You'll find nozzle performance data, technical information and tips to improve quality and lower costs in your spray operation.

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Appendix D
Hollywood Riviera Carwash
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive
Replacement of Sprayer and Nozzles

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: California Water Service Company Rates (1) $4.500 Per HCF	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) $764 Per Mgal/yr	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	11,467	3.61	4,829	402	$ 21,731	$ 2,760	$ 24,490
Estimated Water Savings (3)	3,440	1.08	1,449	121	$ 6,519	$ 828	$ 7,347

(1) Quantity Rates of $3.88 per HCF is effective October 1, 2012. Quantity Rates do not include meter service fee or surcharges authorized by the California Water Service Company.
(2) 2012 - 2013 LACSD Wastewater Treatment Surcharges:
a. Total Flow Volume Per Year (Mgal/yr) x $764.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $135.10
c. Total Suspended Solids Per Year (1000 of lbs) x $382.10
For this preliminary estimate, surcharges b and c are assumed to be constant and are omitted from the Wastewater Treatment Surcharges Calculation
(3) Replacement of the spray wand and spray nozzles, and operational changes in laundry are estimated to reduce water consumption by approximately 30%

Total Work Days Per Year
315 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	1.08 Mgal/yr	
Maximum Potential Water Reduction Incentive	Incentive payment of $6.00 per 1,000 gallons of actual water saved over a one-year period, up to the total capital improvement cost	$ 6,502

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 7,347
Potential Program Cash Incentives	$ 6,502
Potential Annual Cost Savings	$ 13,849

Appendix E
Hollywood Riviera Carwash
Recirc & $ave Program
Program Contact Information

Name	Affiliation	Phone	Email
Elise Goldman	West Basin Municipal Water District	(310) 660-6253	EliseG@westbasin.org
Tricia Butler	RMC Water and Environment	(949) 587-1700	TButler@rmcwater.com
Miluska Propersi	RMC Water and Environment	(310) 566-6460	MPropersi@rmcwater.com
Water Service	City of Inglewood	(310) 412-5320	www.cityofinglewood.org
South Bay Environmental Services Center	Southern California Edison	(310) 371-7222	www.sbesc.com
South Bay Environmental Services Center	Southern California Gas Company	(310) 371-7222	www.sbesc.com
Elise Goldman	So Cal Water Smart	(310) 660-6253	socalwatersmart.com

Airometrix Mfg., Inc.
Air Compressor Performance Testing

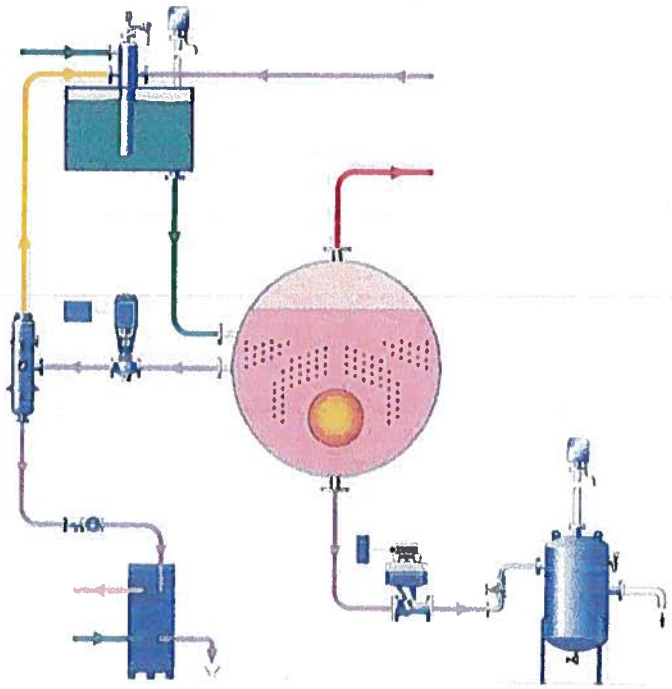
spirax sarco

Steam and Condensate System "Best Practices" Audit

American Apparel Dyeing & Finishing, Inc.

Hawthorne, CA

October 2012



ASSESSMENT CONDUCTED BY:

Carl Preusser, CEM: Spirax Sarco Inc.

Executive Summary

Airometrix Mfg., Inc. and Spirax Sarco were contracted by Southern California Gas (SoCalGas) to perform a steam system audit and steam trap survey at American Apparel Dyeing & Finishing, Inc. (American Apparel) in Hawthorne, CA in October of 2012. The following report contains the results of the steam and condensate system audit and the steam trap survey, and identifies energy savings opportunities at the plant. Daniel Farina gave site support from American Apparel. Carl Preusser of Spirax Sarco conducted the steam and condensate system audit and Brian Wilcox conducted the steam trap survey. Dave Evans of Airometrix Mfg., Inc., and Ken Pacis of SoCalGas were also involved with the audit.

There are energy conservation opportunities at the American Apparel facility in Hawthorne, CA. The three primary sections for the report that follows are **Energy Conservation Measures, Operational & Maintenance Measures**, and the **Steam Trap Survey Results.**

Energy Conservation Measures

Energy Conservation Measures (ECMs) are items that provide energy savings by reducing fuel and other utility costs.

ECM Project	Annual Therm Savings	Annual Water Savings (Gallons)	CO2 Emissions Reduction (klbs/yr)	Annual Cost Savings	Implementation Budget Estimate	Simple Payback (Yrs)	Incentive Eligible (Y,N,N/A)
ECM #1 Implement a Steam Metering Program	Indirect	Indirect	Indirect	Indirect	$30,000	NA	N
ECM #2 Replace Failed Steam Traps	31,687	294,513	368	$12,739	$13,025	1.0	Y
ECM #3 Replace Missing and Damaged Insulation	22,609	0	264	$13,000	$22,631	1.7	y
ECM #4 Return Condensate to the Feedwater System	43,262	3,271,539	503	$36,160	$180,000	5.0	Y
ECM #5 Upgrade Dye Machines to Reduce Water Usage	122,292 87,500	22,239,743	1,421	$187,282 (Note 1)	$1,000,000	5.3	Y
Total	219,850	25,805,795	2,556	$249,181	1,245,656	4.9	

Note 1: Project approval by American Apparel will be based on additional operating cost considerations such as water savings incentives from the City of El Segundo.

ECM's Considered but Not recommended

ECM #6: Install Blow-down Heat Recovery

The estimated fuel cost savings is around $3,000 per year for a simple payback of 8 years or more.

ECM #7: Restore Operation of Boiler Economizers

The estimated fuel cost savings is around $7,000 per year. The scope of work would involve replacing the two failed economizers and installing a storage tank with circulating loop (this is necessary because feedwater flow is intermittent, controlled by on/off feedwater pump operation). The project budget is likely to exceed $60,000, for a payback of more than 8 years.

Operation and Maintenance Measures

Operational & Maintenance Measures (O&Ms) are items that improve performance, reliability, and safety, reduce maintenance, or improve overall system efficiency. These items have no or limited impact on energy usage and are therefore, not eligible for incentives.

O&M Project	Budgetary Cost	Benefit/ Description
O&M #1 Address Improperly Installed Traps	TBD	Ensure Proper Condensate Drainage
O&M #2 Replace Hot Reservoir	TBD	Avoid Unplanned Replacement Due to Tank Failure
O&M #3 Install Steam Separators and Additional Drip Legs	TBD	Improve Steam Quality and Reduce the Possibility of Waterhammer
O&M #4 Address Missing and Improperly Installed Strainers	TBD	Prevent Fouling of Steam Traps and Control Valves, Prevent Waterhammer
O&M #5 Replace Atmospheric Deaerator with Pressurized Unit	TBD	Reduced Oxygen Content in Feedwater; Reduced Corrosion

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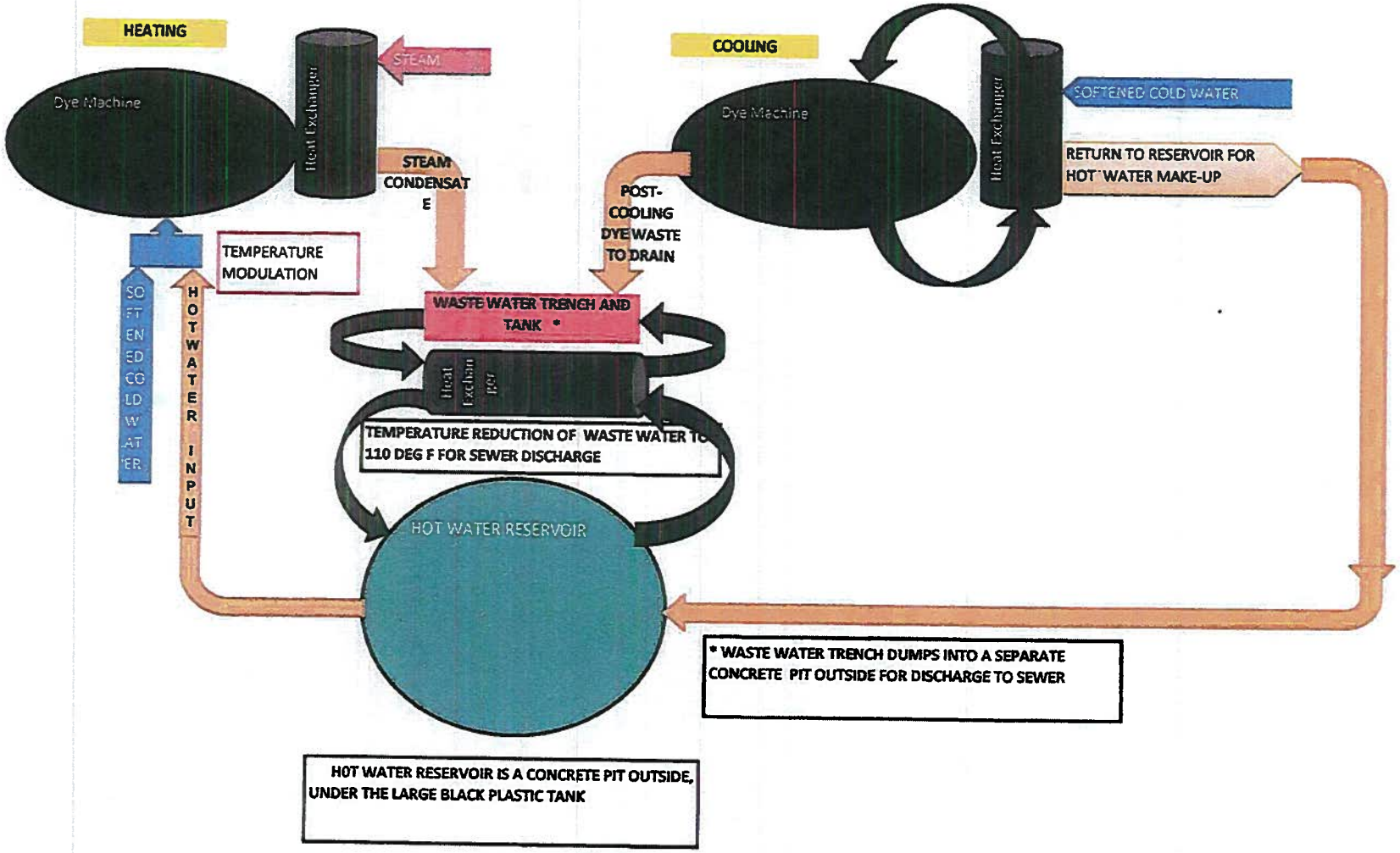
Introduction

Airometrix Mfg., Inc. and Spirax Sarco were contracted by Southern California Gas (SoCalGas) to perform a steam system audit and steam trap survey at American Apparel Dyeing & Finishing, Inc. (American Apparel) in Hawthorne, CA in October of 2012. The following report contains the results of the steam and condensate system audit and the steam trap survey, and identifies energy savings opportunities at the plant. Daniel Farina gave site support from American Apparel. Carl Preusser of Spirax Sarco conducted the steam and condensate system audit and Brian Wilcox conducted the steam trap survey. Dave Evans of Airometrix Mfg., Inc., and Ken Pacis of SoCalGas were also involved with the audit.

Purpose of the Assessment

This Steam and Condensate System Audit had the following main objectives:

- Conduct a Best Practices Steam & Condensate System Audit Using the DOE's Steam System Assessment Tool
- Report on findings and potential savings
- Provide an "Action Steps Forward" listing of potential improvement projects for prioritization and implementation based on Safety, Reliability, Energy Savings and overall system efficiency
- Provide Project Cost estimates for implementation for agreed upon projects


HEATING
STEAM
Dye Machine
Heat Exchanger
STEAM CONDENSATE
TEMPERATURE MODULATION
SOFTENED COLD WATER
HOT WATER INPUT
COOLING
Dye Machine
Heat Exchanger
SOFTENED COLD WATER
RETURN TO RESERVOIR FOR HOT WATER MAKE-UP
POST-COOLING DYE WASTE TO DRAIN
WASTE WATER TRENCH AND TANK *
Heat Exchanger
TEMPERATURE REDUCTION OF WASTE WATER TO 110 DEG F FOR SEWER DISCHARGE
HOT WATER RESERVOIR
* WASTE WATER TRENCH DUMPS INTO A SEPARATE CONCRETE PIT OUTSIDE FOR DISCHARGE TO SEWER
HOT WATER RESERVOIR IS A CONCRETE PIT OUTSIDE, UNDER THE LARGE BLACK PLASTIC TANK

USDOE Steam System Assessment Tool Analysis

Portions of our analysis were performed using the Department of Energy's Steam System Assessment Tool (SSAT). Modeling assumptions are as follows:

- The operating schedule is assumed to be 24 hours per day, 5 days per week for a total of 6,240 hours per year.
- Raw makeup water and sewer cost is a total of $6.54 per 1,000 gallons.
- The total cost of fuel (including commodity and transportation charges) is assumed to be $3.4123 per million BTU (based projected costs provided by customer).
- Boiler combustion efficiency is assumed to be 82.9%.This is a weighted average of the boiler efficiencies according to gas usage records and the latest boiler tuneup report.
- The hourly fuel consumption by the boilers is assumed to be 7,623 SCFH. This is based on the calculated annual operating hours and on gas consumption records submitted by American Apparel
- Steam generating conditions are assumed to be 100 psig, 99% dry.
- The blowdown rate is assumed to be 5.75%. This is based on calculations using conductivity records from the boiler logs.
- The rate of condensate return is assumed to be zero. For purposes of recovery, the condensate is assumed to be at a temperature of 200 degrees F.
- Boiler blowdown heat recovery is not in place.
- Makeup water is assumed to be at 70 degrees F.

American Apparel Sewer and Water- 2012 Data

Month	CCF Water	Water Fees	Sewer Fees	Total Fees
Jan	10059	$35,169.68	$7,732.99	$42,902.67
Feb	208	$214.41	$277.03	$491.44
March	6115	$49,589.30	$18,577.35	$68,166.65
April	9697	$29,158.88	$11,285.89	$40,444.77
May	8509	$25,575.13	$10,510.94	$36,086.07
June	8703	$26,170.52	$11,094.03	$37,264.55
July	8887	$26,723.81	$11,299.55	$38,023.36
Aug	12335	$37,081.84	$15,357.10	$52,438.94
Totals:	64513	$229,683.57	$86,134.88	$315,818.45

Average Water Fee/CCF = $3.56

Average Sewer Fee/CCF = $1.34

Average total (sewer and water) cost per CCF = $4.90

$0.00654 per gallon

$6.54 per 1000 gallon

Appendix G: Equipment Upgrade Evaluation (ECM #5)

American Apparel: Evaluation of Proposed Dye Machine Upgrade

Given: Existing tube type machines, total number = 6

Average steam load per dye machine is 386.4285714 pounds per hour
based on water usage process steam demand derived from gas consumption and
SSAT model. Current water usage per pound of product is 82.5 lb
Total Product Throughput is currently 1328 lb/hour
With 14 active machines, product throughput per machine is 94.8571429 lb/hour
Average Water Demand Per Machine is therefore 7,825.71 lb/hr
The plant manager's proposal is to replace six tube type dye machines
with 4 new generation machines. The water use per pound of product
for these new machines, relative to the existing equipment, is 40%
These (4) new machines will have the same production output as the
existing (6) machines.

Assumptions:

1) The ratio of hot water demand to total water demand is the same for the new machines. 48.9%
2) The reduction in steam demand is directly proportional to the reduction in total process water demand.

To Find: 1) Reduction in steam and water demand.
2) Total cost savings

Solution:

Steam Demand Reduction:

The steam demand for the existing 6 machines is 2318.57143 lb/hour
The new steam demand (at the same production level) will be 927.428571 lb/hr
for a steam demand reduction of 1391.14286 lb/hour

Water Demand Reduction:

The six existing machines have a total water demand of 46954 lb/hour
The four new machines, at the same production level, would
have a water demand of 18782 lb/hr
for a direct water demand reduction of 28173 lb/hr
3382 gallons/hr
In addition, the steam demand reduction results in a water demand reduction of
182 gallons/hr,
for a total water demand reduction of 3564 gallons/hr
With an operating schedule of 6240 hours/ year= 22,239,743 gallons/yr
At a combined water and sewer cost of $6.54 per 1000 gallons,
the cost reduction in due to reduced water demand is $145,552.08 per year

From SSAT the fuel cost reduction is $41,730 per year

The total cost reduction is $187,282.08 per year

17140 South Avalon Boulevard, Suite 210, Carson, CA 90746-1296, 310.217.2411, www.westbasin.org

INDUSTRIAL PROCESS WATER AND COOLING TOWER WATER REDUCTION PROGRAM

EQUIPMENT SURVEY REPORT

prepared for:

Lekos Dye and Finishing

3131 Harcourt Street
Compton, CA 90221

Prepared by:

RMC Water and Environment
15510-C Rockfield Blvd., Suite 200
Irvine, CA 92618

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Appendix C: Manufacturer's Equipment Information

Appendix D: Estimated Program Funding

Appendix E: Program Contact Information

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Appendix A

REPORT SUMMARY

RETROFITS AND UPGRADES

The Lekos dyeing process is comprised of pre-washing, dyeing, and rinsing. Currently, Lekos operates a total of 17 dyeing machines: 14 are high pressure, high-temperature (200 degrees Celsius) and 3 of the machines are atmospheric, low-temperature (85 degrees Celsius). Of the 14 high temperature machines, there are 6 "newer" and 8 "older" machines. The capacity of each dyeing machine ranges from 400 to 1,700 kilograms. Replacement of two of the older machines would reduce the amount of potable water used and is not expected to significantly impact operations. The new dyeing machines would reduce potable water use for dyeing on a unit basis by between 35 and 50 percent, potentially resulting in a facility-wide savings of approximately 14 percent.

CHANGES TO OPERATIONAL PRACTICES

The newer water-efficient dyeing machines also are capable of a wider range of dyeing processes, and the capacity of the new machines will be selected to optimize the facility production. With the replacement of the two older machines, Lekos plant management will have more flexibility to maximize the use of water-efficient machines and to reduce the use of the older less efficient machines that remain installed.

POTENTIAL COST SAVINGS

Lekos is considering replacing two of their dyeing machines with two new water-efficient dyeing machines. The total estimated cost savings is approximately $93,387 per year, based on potable water and sewer disposal costs. The estimated water savings is roughly 20.4 million gallons per year or 27,273 hundred cubic feet.

POTENTIAL PROGRAM INCENTIVE

Based on water savings monitored for a one-year period, and considering the West Basin Municipal Water District (West Basin) in cooperation with the Metropolitan Water District of Southern California (MET) **RECIRC & $AVE** Program's (Program's) financial incentives available (i.e., $3 per 1,000 gallons of actual water saved for a one-year period), the potential Program cash incentive for Lekos is approximately $61,200.

INTRODUCTION

The West Basin Municipal Water District (West Basin) in cooperation with the Metropolitan Water District of Southern California (MET) has developed the **RECIRC & $AVE** Program (Program) for large users of water in industrial process operations and cooling towers. The Program provides funding to West Basin Customers for installing equipment that captures, treats, saves, and reuses water that is normally discharged to the sewer. The Program is made possible through funding from the California Department of Water Resources, the U.S. Department of the Interior Bureau of Reclamation, and your local water agency. West Basin is assisted in conducting the Program by URS Corporation (URS), RMC Water and Environment (RMC), and Maureen Erbeznik and Associates.

Qualifications for participating in the Program include:

- Must be a Customer of West Basin Municipal Water District or one of its water retailers;
- Enroll in the Program before water savings improvements have been made at the facility;
- Install and operate the water savings equipment; and
- Obtain a measured water savings over a monitoring period of mutually agreed upon duration such as six months.

Based on the results of a Field Survey Report issued on September 6th, 2012, RMC identified Lekos Dye and Finishing (Lekos) in Compton, California as a potential candidate for this Program. The goal of the Equipment Survey of the facility is to obtain additional operational information that possesses the highest capacity for significant water reduction in their facilities and that meet the qualifications to participate in the Program. The Equipment Survey Report provides a summary of the site investigation and the application of the Lekos facility to the Program.

FACILITY DESCRIPTION

Lekos provides high quality textile dyeing and finishing services for private customers. The facility washes, dries, dyes, and irons fabrics for its customers. Operations take place in the Lekos facility in Compton, California which houses a small administrative office, textile dyeing machines and other equipment associated with textile finishing processes.

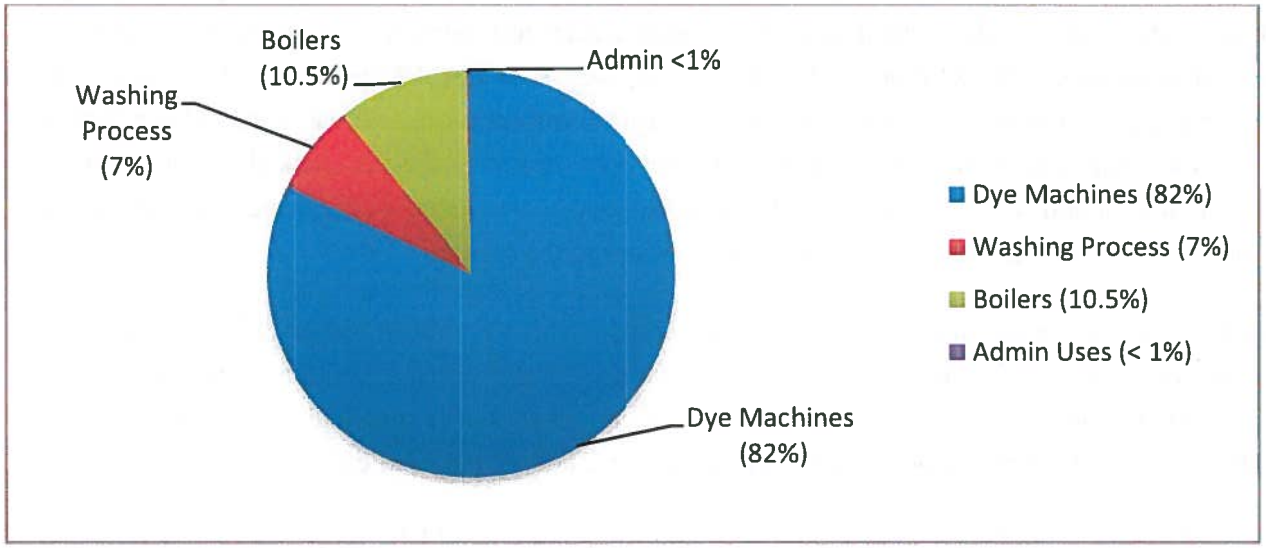
The location of the Lekos facility is shown on **Figure 1** in **Appendix A**. Lekos is considered a relatively large user of potable water at approximately 203,660 hundred cubic feet per year based on water records from calendar year 2012. An initial site visit was conducted on July 6, 2012. Further information was obtained at subsequent meetings and site visit at the facility on September 21, 2012 and November 2, 2012. Water use monitoring was conducted during 2013 to provide data that could validate assumptions on relative water usage based on process, eg white vs black textile dyeing.

DESCRIPTION OF EQUIPMENT USING SIGNIFICANT WATER VOLUME

The majority of water use at the Lekos facility is for textile dyeing and finishing processes although there are also landscape irrigation uses and use in on-site boilers.

The following equipment uses significant quantities of potable water at Lekos:

- 17 dyeing process:
  - 14 high-temperature (6 newer and 8 older)
  - 3 atmospheric (lower temperature)
  - Washing
- Steam Boilers (15.44 mg/yr)
- Admin Uses (0.46 mg/yr)



Lekos operates a total of seventeen dyeing machines. The capacities of the dye machines vary based on type of machine and age. Fourteen of the dye machines operate under high-pressure and high-temperature (200 degrees Celsius) and three of the machines operate under atmospheric, low-temperature (85 degrees Celsius) conditions. Of the fourteen high temperature machines, there are six "newer" and eight "older" machines. It is assumed that the seventeen dye machines account for about 82 percent of the water used at the facility.

After the dyeing process, the fabrics are washed. Once the fabric has finished washing, it is rinsed, pressed, and dropped into a bin for transportation to dryers.

Lekos operates two boilers that provide steam and hot water to the washing and dyeing processes. The total water used in the boilers annually is about 15.4 MG. It is estimated that the steam losses associated with the boilers can account for up to 4.5 MG per year.

Administrative water uses at Lekos is minimal compared to other processes. The front entrance of the main building at Lekos is landscaped but uses minimal water estimated at 0.03 MG annually. Employee use of water is estimated to be 0.43 mg/yr.

DESCRIPTION OF CONSERVATION TECHNOLOGIES CONSIDERED

In the Field Survey Report, two potential options were identified for water conservation:

1. Installation of Dye Wash Water Treatment and Recycle System
2. Replacement of Older Dye Machines with Newer Water Efficient Dye Machines

While Lekos is interested in a facility Wash Water Treatment and Recycle System (Option 1), high capital cost and O&M cost for the current facility and high waste flow rates will result in an unfavorable payback period associated with Option 1. Installation of Newer Water Efficient Dye Machines was determined to have a favorable payback period based on initial information, and was selected for further evaluation in this Equipment Survey. Once water efficient dye machines are installed, the cost to install and operate a treatment and recycle system will be reduced based on reduced water usage, and may result in a favorable return on investment. Option 1 may be revisited in the future.

Lekos is considering the replacement of two older machines with two newer water-efficient machines (Option 2). One new water-efficiency machine will replace an old atmospheric pressure, low-temperature machine (DA-18) and the other would be installed in the location of DA-17 machine which is completely removed. The capacity of the new machines is proposed to be 2,000 kg per load each.

Based on manufacturer's published information, the new machines would be more water efficient and would reduce water use by 35 to 50 percent. When this usage rate was applied to the capacity of the proposed new machines, an estimated overall facility-wide water use reduction of 10 to 14 percent was predicted.

POTABLE WATER USE AND SEWER DISCHARGE RATE

The California Water Service Company potable water rate at the time of the analysis presented in this report is $ 2.8662 per HCF is effective April 1, 2011. The total estimated wastewater treatment surcharge cost savings for Lekos is calculated using a LACSD Wastewater Treatment Surcharge Rate of Total Flow Volume of $746 per Mgal based on LACSD's 2010-2011 Wastewater Treatment Surcharge Statement. For this estimate, surcharges for Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), and Average Peak Flow Rate are assumed to be constant. Although the concentration of these constituents may increase with the reduction of water usage, the total mass (lbs) of COD and TSS would remain the same.

DESCRIPTION OF EQUIPMENT USING SIGNIFICANT WATER VOLUME

Lekos provided 2012 production and water usage data for the purpose of estimating potential water savings and for outlining a method of verifying actual water savings after the implementation of the project. It is well known that water usage varies by process, with dyeing of "white" textiles requiring less water than dyeing "black" or "colored" textiles. The water usage varies further depending on the age and manufacture of the dyeing machine. By analyzing the data provided, RMC would determine if there was a consistent production demand by process, and if an average unit water use per process could be determined. The assumptions developed from the analysis would be determined based on field water use measurements.

Based on the 2012 production data, it was determined that the Lekos facility did meet a fairly consistent production demand, as shown in Table 1:

Table 1. Average Annual Percent Dyeing Process Production and Water Use

	Minimum		Maximum		Average	
	% Prod	% Wtr Use	% Prod	% Wtr Use	% Prod	% Wtr Use
White Dyeing	33	10	39	18	35	14
Black Dyeing	8	10	20	27	14	18
Color Dyeing	40	55	56	75	49	66
Re-Dyeing	3	1	5	3	4	2

The monthly average for 2012 of textile dyeing is shown in **Table 2**:

Table 2. Average Monthly Production by Process

White: 13,171 pounds

Black: 5,087 pound

Color: 40,507 pounds

Re-Dye: 1,363 pounds

The following usage rates presented in **Table 3** in gallons of water per pound of textile dyed were assumed and found to predict the actual water usage within about 5 percent:

Table 3. Range of Water Use by Process			
	Water Usage Estimated, Gallons per Pound		
	Annual Average	Minimum	Maximum
White Dyeing	5	4	7
Black Dyeing	17	12	20
Color Dyeing	17	12	20
Re-Dyeing	8	6	9

For two weeks in August 2013, flow meters were installed on DA-16 and AK-8 to measure the water usage for each machine. The data obtained, while somewhat limited, confirmed the relationship between the water use estimated by process from the 2012 data provided.

WATER SAVINGS CALCULATIONS

The manufacturer literature and water usage charts predict an estimated water savings of 35 to 50 percent with the new equipment. In order to maximize water reduction, it was assumed that the new machines would be used for the higher volume color dying processes. Based on manufacturer provided information and actual production data, it was assumed that approximately 8,000 lbs per day during each of the 300 production days per year could be processed with the new machines. This would result in savings between 14.4 and 20.4 million gallons per year, or 10 to 14 percent of the facility-wide water use. For the purpose of calculating the estimated water and sewer savings, as well as the incentive, a savings of 14 percent was assumed. The actual incentive would be determined by flow monitoring after the implementation of the project.

IMPACT OF PROCESS CHANGE ON PRODUCT QUALITY

Dyeing quality with the new machines is anticipated to be equal or better than the existing equipment. The new equipment technology reduces loss of water by reconfiguring piping, faster draining to allow more cycles per day, reuse of residual heat and better control, none of which are anticipated to impact product quality.

IMPACT OF PROCESS CHANGE ON SEWER DISCHARGE

The new machines will decrease the overall sewer discharge by reducing the overall water usage. The total amount of COD and TSS in pounds is not anticipated to change with the new equipment.

Estimated Annual Cost Savings

The water conservation cost savings are based on the retrofit option of providing two new high-efficiency dying machines which will replace one existing machine and offset some volume from other existing machines. The budgetary costs of the improvements are listed in **Table 4**.

Table 4. Estimated Improvement Costs[1]

Description	Equipment Cost	Installation Cost	Total Cost
Theis "iMaster H20" Fabric Dyeing Machine Type 140/3	$550,600	$275,300	$826,000

(1) Equipment and installation costs are estimated from the quotes provided by Thies manufacturer. Installation costs include installation of equipment, electrical, instrumentation and engineering costs.

The estimated water savings were based on average 2012 operating data and an estimated savings of up to 14 percent of water facility wide. The estimated annual water savings, potential cost savings from the potable water supply costs from the California Water Service Company and potential cost savings from the sewer costs from LACSD is provided in **Table 5**.

Table 5. Summary of Annual Water and Sewer Cost Savings[1]

Description	Annual Water and Sewer Savings		Annual Savings [2]
	Gallons per day (gpd)	Million gallons (MG)	
Two new dye machines	68,000	20.4	$93,387

(1) Costs provided in 2013 dollars.
(2) Cost Savings based on the water cost of $2.8662 per hundred cubic feet of potable water from California Water Service Company and the sewer surcharges of $764 per million gallons per year from LACSD.

Estimated Gas and Electricity Savings

The proposed improvements are expected also to provide power savings at the facility. The newer equipment reuses residual heat in the dyeing process.

Preliminary Design Drawings and Photographs

The following technical preliminary design data are provided in Appendix C:

- Technical design data and engineering drawings for new equipment provided by Theis;
- Proposed location of the two new efficiency dyeing machines is in the existing location of DA-17 and designated location of DA-18 which has been removed from the facility.

PROPOSED LOCATIONS OF MONITORING DEVICES

After the water savings equipment is installed and operational, verification of actual water savings is required to obtain full payment of a Program incentive to Lekos. Water use associated with the dyeing process will be estimated based on overall water usage measured by the facility water meter, less the estimated use from administration, boiler and washing operations. Water savings will be monitored based on monthly water meter readings and the pounds of fabric produced. Therefore, the actual water savings can be monitored by the existing monitoring devices and through the facility production records.

IMPACT OF PRODUCTION CHANGES ON ESTIMATED WATER SAVINGS

In order to estimate the actual percent water savings at Lekos, the pounds of production by process (white, black, colored, re-dye) will be required as well as the corresponding monthly water use.

Lekos provides textile dyeing and finishing services for multiple clients. Per information provided by Lekos, the amount of production can vary throughout the year, depending on the amount of production requested. However, the data were observed to maintain a relatively uniform percentage breakdown of whites, blacks, colors and re-dye production during 2012. Should the relative percentages remain constant and the production level in pounds per month remain similar, the overall reduction of process water use will be a good indication of water use reduction and is recommended for confirmation of water use reduction.

Should the percentages by process vary from the averages shown in Table 1 and/or the average monthly production in pounds shown in Table 2, then a more detailed analysis will be required. The actual pounds of fabric by process would be multiplied by the estimated water use rates provided in Table 3 to determine the estimated water use that would have been used based on previous operations. This predicted water use would be compared to the actual water use to determine the approximate savings.

POTENTIAL PROGRAM CASH INCENTIVE

With verified water savings monitored for six month period, and considering the Program's financial incentives available the potential Program cash incentive for Lekos is approximately $3.00 for 1,000 gallons of actual water saved over a one-year period, up to the total capital improvement cost. Additional details are provided in Appendix E.

PROGRAM APPLICATION AND IMPLEMENTATION

Based on a review of the proposed retrofits and equipment upgrades, Lekos is considered a viable candidate to apply for incentive funding for the **RECIRC & $AVE** Program.

The next step is for the Lekos to sign the standardized contract with West Basin to initiate their acceptance into the Program. Following acceptance and inclusion, Lekos will monitor the flow meters and laundry production for a six month period. Flow data would be collected on a monthly basis and compared with previous annual water usage rates. Upon equipment installation and confirmation of the anticipated water savings, Lekos will receive up to the balance of the cash for the actual water saved.

Additional Utility Incentive Programs

In addition to the Program under West Basin, other utility incentive programs are also available for industrial customers.

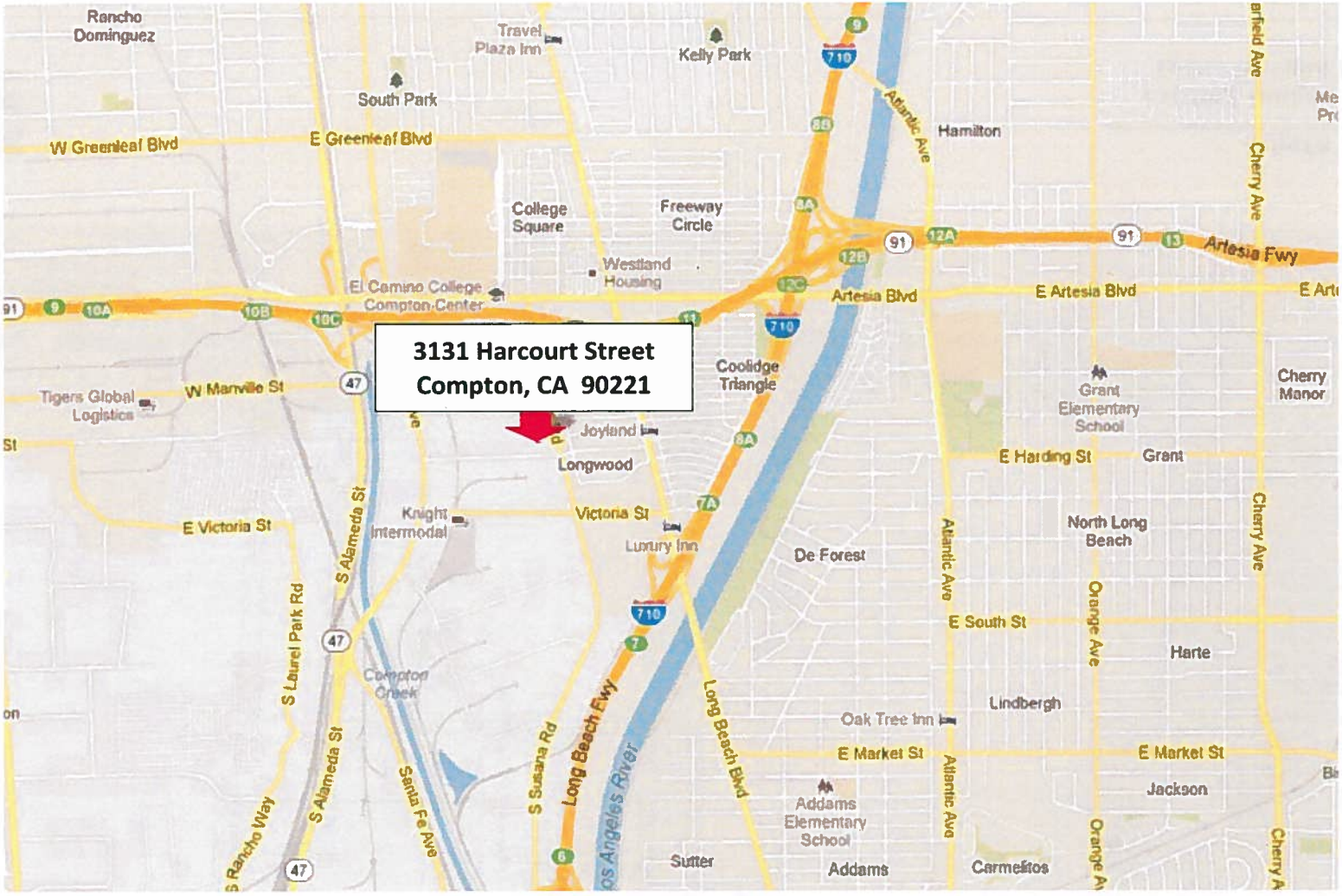
The Southern California Gas Company and Southern California Edison (SCE) are offering potential cash incentives to qualifying industrial users for reduction in gas and electricity usage. The South Bay Environmental Services Center (SBESC) serves as a regional clearing house for information about programs offered by the Southern California Gas Company and Southern California Edison. Visit www.sbesc.com or call (310) 371-7222 for further information.

The MET's Save Water, Save-A-Buck Program also provides rebates to industrial customers for commonly used plumbing fixtures, such as toilets and urinals. Call Elise Goldman at West Basin (310) 660-6253 or visit www.mwdsaveabuck.com for more information on these and other water saving devices.

Program Contact Information

A separate reference table is included in Appendix F with the name, affiliation, phone number, and the e-mail address of the personnel associated with this Program and related incentive programs.

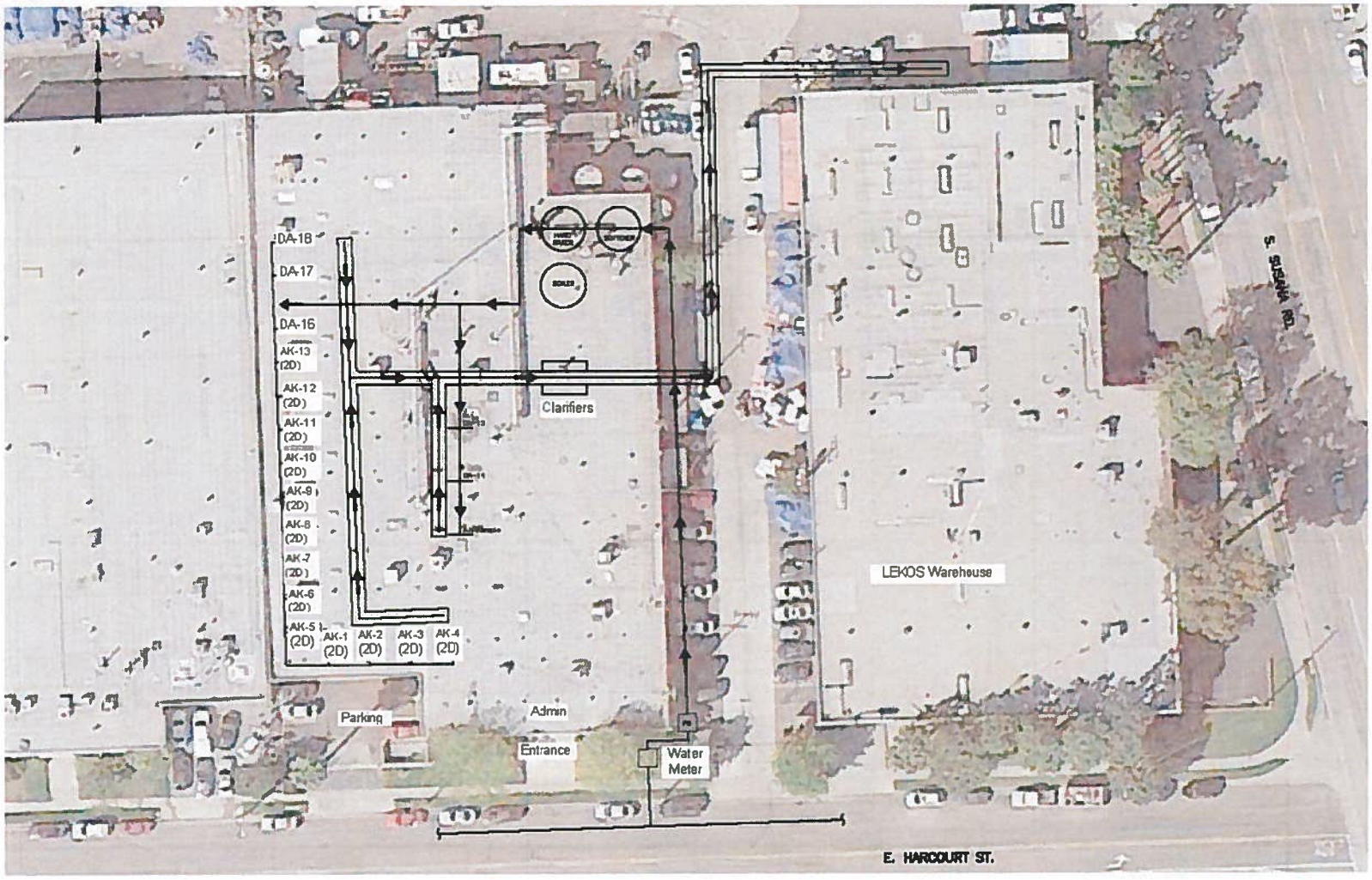
Appendix A



RMC
Water and Environment

Figure 1

Location Map
Lekos Dye and Finishing



RMC Water and Environment

Figure 2

Existing Equipment Layout
Lekos Dye and Finishing

Appendix B
Lekos Dye and Finishing
Recirc & $ave Program
Potable Water Use Data

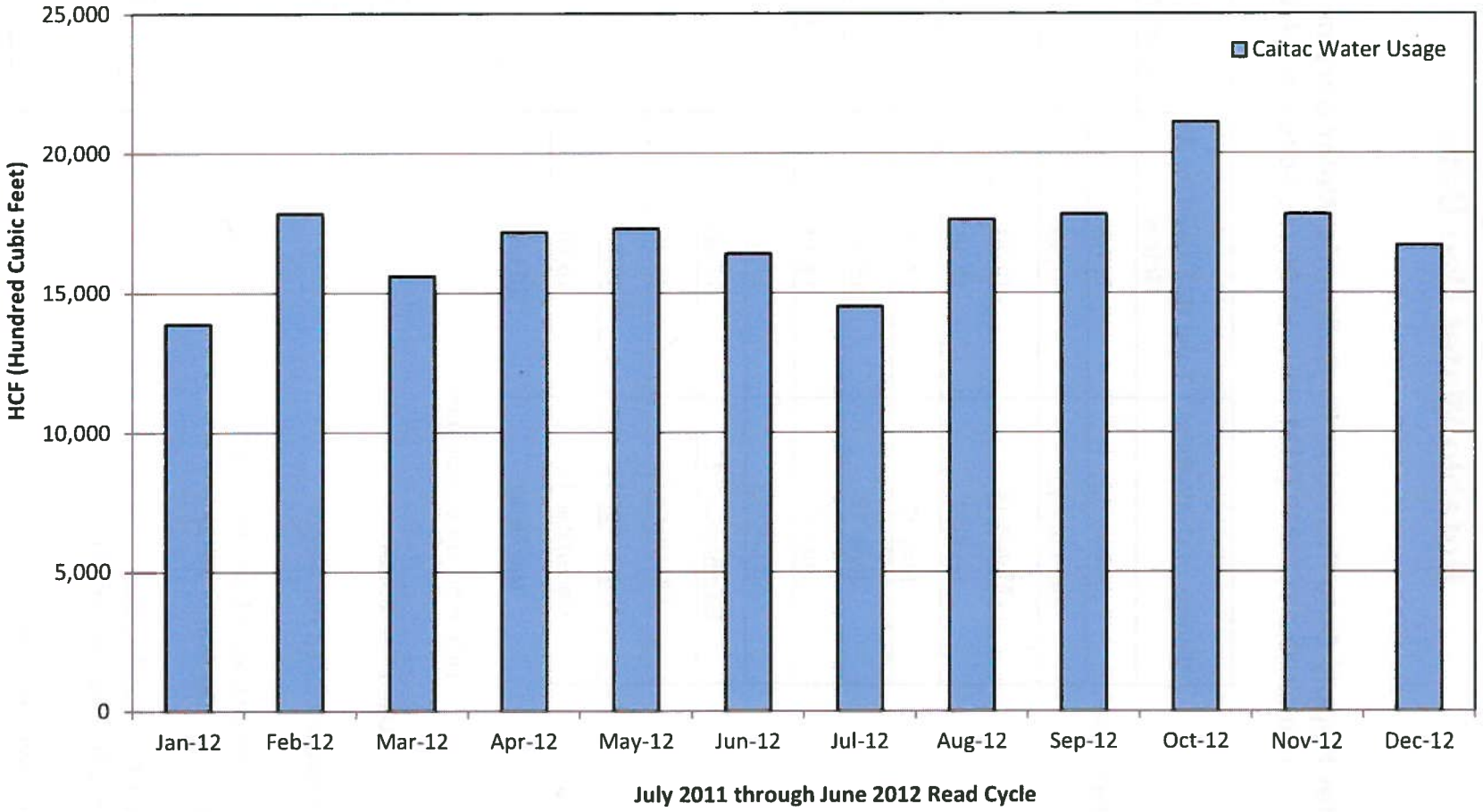
Water Supply Data Provided by California Water Service Company
Account XXXXXX2933 (3131 Harcourt Street, Compton, CA 90221)

	Months of Cycle Read	Total HCF Used for All Meters	Total Gallons Used
Start of Read Cycle	January-12	13,865	10,371,020
	February-12	17,836	13,341,328
	March-12	15,597	11,666,556
	April-12	17,167	12,840,916
	May-12	17,288	12,931,424
	June-12	16,389	12,258,972
	July-12	14,495	10,842,260
	August-12	17,613	13,174,524
	September-12	17,804	13,317,392
	October-12	21,113	15,792,524
	November-12	17,799	13,313,652
End of Read Cycle	December-12	16,697	12,489,356
	Net Total	203,663	152,339,924

HCF = hundred cubic feet

Average HCF Used Per Month	**16,972**
Average Gallons Used Per Month	**12,694,994**
Average Million Gallons Used Per Year (January 2012 - December 2012)	**152.34**
Average HCF Used Per Year (January 2012 - December 2012)	**203,663**
Working Days Per Year	**300**
Average Gallons Per Working Day	**507,800**

Appendix B-1
Lekos Dye and Finishing
Recirc & $ave Program
Total Potable Water Usage



Appendix C

P.O.Box 36010, Rock Hill, SC 29732, Tel. (803) 366 4174, Fax. (803) 366 8103
E-Mail: info@thiesmachine.com • http://www.ThiesTextilmaschinen.de

Messrs.
Lekos

Los Angeles, C.A.

USA

Our Ref: vk-RM
Date: 11.09.2012

QUOTATION NO. 12.11.3816.CHAE

Dear Mr. Lee,

Thanking you for your enquiry we are pleased to submit our estimate as per attached Terms of Delivery for Export Supplies, as follows:

1 "iMaster H2O" Fabric Dyeing Machine Type 140/3 750 kg

Technical Data (Thies-Standard):

Voltage: 460 V / 60 Hz / 3 phases
Steam: 6-8 bar, saturated steam
Altitude: up to 1000 m height above sea level

Technical Data differing from Thies-Standard might require technical modification regarding the equipment of the machines and/or accessories. Unless otherwise agreed, additional costs arising due to these modifications are not included in our prices.

Regards

Gary Spampinato

T H I E S Corp, USA

Cc: Beth Baker/Ronald Schrell

P.O.Box 36010, Rock Hill, SC 29732, Tel. (803) 366 4174, Fax. (803) 366 8103
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1 "iMaster H2O" Fabric Dyeing Machine Type 140/3 750 kg

Nominal capacity:	approx. 250 kg per tube
Total capacity:	approx. 750 kg per machine
Liquor ratio:	approx. min. 1:3,7 depending on the kind of fabric
Operating temperature:	140°C

All parts coming into contact with the processing liquor are manufactured from stainless steel(material1.4571/1.4404/1.4362), forged parts material 1.4401, cast steel parts material 1.4408.

- Round dyeing kier (0), 2250 mm dia.
- iJBox with Teflon linings
- Adjustable chamber
- Frequency controlled plaiter (0.2)
- Analog level on dye vessel
- Circulation pump (3) incl. motor
- Transport winch (83)
- Frequency controlled, individual winch drive for 90-500 m/min (83.1)
- Heating and cooling valves (12.10, 13.10) with continuously regulating proportional valve (12/13)
- Piston control valves, stainless steel condensate/cooling water outlet (12.11/13.11)
- Tubular heat exchanger (29)
- Smart Dose System
- Automated addition tank (700), incl.
  - drain valve (711)
  - water valve (790)
  - automatic liquor reversal (717)
  - steam lid
  - analog level (797)
  - analog dosing incl. function 'additions'
  - mixing valve (715)
  - pressure pump (726) including dosing valve (705) and return flap (30)
- Kier pressure regulation (drain temperature < 92 °C)
- Water inlet (390)
- Drain (11)
- Unloading winch (84)
- Safety valve (14)
- Compressed air inlet (59) / compressed air outlet (15)
- Pneumatic unit / control block
- Manual
- Spare parts (wear and tear)

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euro

Basic equipment including AMSE/UL
with:

Addition tank with heating coil

Stirring device (799)

Addition tank with salt feeding via injector

Self-cleaning Filter (800)

Second water valve (391) at dyeing kier

Water meter MID (86)

Second drain valve (11.1)

Seam detector (57.1) for sampling and unloading,
- magnetic system with switch box
- with rope/fabric circulation control

Operating platform (85) with three steps

Stock Tank 100% liquor volume (600), vertical

Heat exchanger in special execution with additional valve combination suitable for the cooling/rinsing process - Function 2500 - CCR

Electronic control T 858 - installation at the dyeing kier - incl.:
* Industrial PC THIES T 858 incl. 8.4" TFT screen
  Touch screen and keyboard, Ethernet card
* Control cabinet with power unit
* Batch parameters
* RINSEtronic (only possible with stock tank or 2 water valves + water meter)
* Temperature Manager (only possible with stock tank + 2 water valves)
* Differential pressure measurement
* Drainage by use of compressed air

control cabinet in stainless steel

Frequency inverter for pump motor

Total price for 1 machine: **€ 204.285,00**

P.O.Box 36010, Rock Hill, SC 29732, Tel. (803) 366 4174, Fax. (803) 366 8103
E-Mail: info@thiesmachine.com • http://www.ThiesTextilmaschinen.de

Prices quoted are ex works Germany. Prices quoted are valid for a period of 30 days.

Terms of Payment: 25% down payment with order, 60% on notification machine is ready for delivery, and balance (15%) after startup, latest 45 days after delivery.

The machine will remain the property of Thies Corporation until payment is received in full and will be secured by Uniform Commercial Code financing statement.

Delivery: Approximately 6 months ex works after receipt of down payment and order and finalization of all technical and commercial details.

Erection: The price quoted does ***not*** include installation. The cost for assembling (erecting), mounting, and startup would be to your account at our prevailing rates. A copy of our rate schedule is attached.

Our delivery does ***not*** include the following:

- Any items expressly excluded in quotation above
- Foundations/site preparation, as well as any other site preparatory work, including grouting
- Electrical wiring, including materials and/or labor
- Circuit breaker in main electrical supply line (if required by local regulations)
- Material and/or labor for connection of the machine to plant services (steam, compressed air, water, drains, etc.)
- Any federal or local surcharges or taxes
- Installation and/or startup of machinery by Thies personnel

Insurance: Full coverage is to be maintained by the customer until full payment is made.

Guarantee: The machine will carry our normal guarantee against defective parts or quality of workmanship.

Terms of Sale: See attached Terms of Sale.

NOTE: ELECTRIC COMPONENTS INCLUDED IN THIS QUOTATION ARE RATED AT 460 VOLTS. IF YOUR PLANT VOLTAGE IS ANYTHING OTHER THAN 460 VOLTS, A PRICE ADJUSTMENT WILL NEED TO BE MADE.

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Rate Schedule for Thies Service Personnel

Effective January 1, 2012

1. Technicians

Per working hour	$75.00
Per travel hour	$75.00
Per hour overtime	$112.50
Per hour on holidays	$150.00
Living expenses per day	IRS per diem
Mileage	At rate of time

2. Engineers

Per working hour	$100.00
Per travel hour	$100.00
Per hour overtime	$150.00
Per hour on holidays	$200.00
Living expenses per day	IRS per diem
Mileage	At rate of time

TRAVEL EXPENSES SUCH AS AIR FARE, CAB, RENTAL CAR, ETC., WILL BE BILLED AT ACTUAL COST.

S

iMASTER H_2O

Go green with Thies

TEXTILMASCHINEN Thies

www.ThiesTextilmaschinen.de

MASTERING RESOURCES INTELLIGENTLY

Neues Denken in einer neuen Zeit

iMaster H_2O – die Innovationsmaschine

Die Herausforderungen für den Textilveredler von heute sind enorm. Eine signifikante Verteuerung von Wasser und Abwasser zwingt zu einem deutlich sensibleren Umgang mit Ressourcen, zu neuem Denken und zu Effizienzsteigerungen.

Die neue **iMaster H_2O** bietet die Summe der Erfahrungen aus 40 Jahren Kurzflottenfärbetechnologie. Exzellente Laufeigenschaften, effizienter Einsatz von Ressourcen und kürzere Prozesszeiten machen Ihre Investition in die neue **iMaster H_2O** zu einer lohnenden Entscheidung für Sie und führen außerdem zu einer nachhaltigen Schonung der Umwelt.

Eine Erhöhung der Produktionsleistung bei einer gleichzeitig, verbesserten Sicherheit im Verfahrensablauf bietet dem textilen Unternehmen neue Perspektiven in der Anwendung.

iMaster H_2O – lassen Sie sich inspirieren vom Erfolg durch Innovation.

New thinking for a new age

iMaster H_2O – the innovative machine

Today, the world of textile finishing faces enormous environmental challenges. Significant increases in the cost of water and effluent treatment, plus pressure to conserve resources, call for a rethink of efficiencies and the production process.

The new **iMaster H_2O** is the culmination of 40 years' experience in short liquor ratio dyeing. With its excellent running conditions, optimum use of inputs and reduced process times, the new **iMaster H_2O** represents a sound investment for any dye house, at the same time ensuring minimum environmental impact and ongoing sustainability.

With its increased productivity and enhanced reliability, the **iMaster H_2O** offers new perspectives and opportunities for all progressive textile companies.

iMaster H_2O – Innovation – Success. Let yourself be inspired.

Nueva filosofía para nuevos tiempos

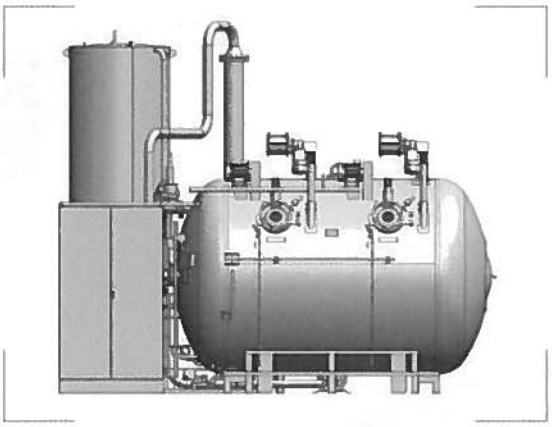
iMaster H_2O – la máquina innovadora

El mundo del acabado textil está afrontando enormes desafíos. El aumento significante de los costos del agua y del tratamiento de los efluentes obliga a un uso más prudente de los recursos, así como al desarrollo de nuevas ideas y conceptos para una producción industrial más eficiente.

La nueva **iMaster H_2O** ofrece la suma de más de 40 años de experiencia en el campo de la tintura en baño corto. Sus excelentes propiedades de marcha, su uso eficiente de los recursos, su bajo consumo y unos tiempos de proceso reducidos hacen que la **iMaster H_2O** resulte ser una inversión lucrativa para usted, contribuyendo al mismo tiempo a minimizar el impacto ambiental.

La **iMaster H_2O** ofrece nuevas perspectivas en la aplicación práctica gracias a una mayor eficiencia productiva, asociada a una óptima seguridad operacional.

iMaster H_2O ¡Inspírese en el éxito mediante la innovación!



Technische Details:

- **innenliegende Haspel** mit Einzelantrieb
- frequenzgeregelter Pumpenmotor
- Warenumlaufkontrolle
- Nahtsuchgerät
- elektropneumatische Ausführung aller Absperrorgane
- 8,4"-TFT-Touchscreen-Controller
- Betriebstemperaturen bis 140 °C
- nominale Speicherkapazitäten von 100 kg, 200 kg und 250 kg
- **Variospeicher**
- regelbare Haspelantriebe für Warengeschwindigkeiten: je nach Artikel bis 500 m/min
- **Smart dose system** – vollautomatisches Dosieren von Farbstoffen und Hilfsmitteln nach einstellbaren Parametern über eine Bypasszirkulation
- intelligente Kesseldruckregelung verringert den Druckluftbedarf
- vollelektronische Füllstandsmessung
- Wasseruhr
- automatisch reinigendes Filtersystem
- Easy-Handling-Einführsystem – Beladen der Ware ohne Vorläufer möglich
- **Vario-Plaiter** verbesserte Ablage durch Veränderung des Plaiter–Ablageverhaltens
- Flottenverhältnis ab 1:3,7
- CCR – Kühlen und Spülen in einem Arbeitsgang
- Warenspeicher mit Teflon-Auskleidung

Technical details:

- **internal winch** with individual drive
- frequency-controlled pump motor
- Rope circulation control
- Seam detector
- electro-pneumatic-operated valves
- 8.4"-TFT-touch-screen controller
- Operating temperature up to 140 °C
- Nominal chamber capacities 100 kg, 200 kg and 250 kg
- **Adjustable chamber**
- Variable winch drive for fabric speeds up to 500 m/min, depending on fabric properties
- **Smart dose system** – programmable, automated dosing of dyes and chemicals using readily adjustable parameters and bypass circulation
- Reduced consumption of compressed air by intelligent kier-pressure management
- Electronic measurement of liquor level
- Water meter
- Self-cleaning filter
- Easy-Fabric-Loading without a lead cloth
- **Vario-Plaiter** Improved fabric plaiting using enhanced plaiter movement
- Liquor ratio starting at 1:3,7
- CCR – cooling and rinsing in one step
- Teflon-lined fabric chamber

Detalles técnicos:

- **Aspa interna** con accionamiento individual
- Motor de bomba con regulador de frecuencia
- Control de circulación de la cuerda
- Detector de costuras
- Órganos de cierre en ejecución electro-neumática
- Programador con pantalla táctil 8,4" TFT
- Temperaturas de operación hasta 140 °C
- Capacidad nominal por acumulador: 100 kg, 200 kg y 250 kg
- **Acumulador variable**
- Aspa de transporte con accionamiento regulable para velocidades de circulación de hasta 500 m/min, según las características del tejido
- **Smart dose system** – dosificación completamente automática de los colorantes y auxiliares de acuerdo con parámetros ajustables, pasando por una circulación bypass
- Regulación inteligente de la presión en la autoclave de tintura que reduce la demanda de aire comprimido
- Medición electrónica del nivel del baño
- Medidor de agua
- Filtro autolimpiante
- Carga fácil sin necesidad de introducir una guía
- **Plegador variable** – mejor acomodo del tejido gracias a mayores posibilidades de ajuste en la carrera del plegador
- Relación de baño a partir de 1:3,7
- CCR – enfriamiento y enjuague en un solo paso
- Acumulador de tela revestido en teflón


Plaiter
Plaiter
Plegador
Variospeicher
Vario chamber
Acumulador variable
100% Ansatzgefäß
100% stock tank
Rec. de preparación 100%

Go green with Thies

Technische Details:

- **Batchparameter**
  Vereinfachung der Färbeprogramme durch Verwendung von Variablen
- **Synchronlauf** – optimierter Warenlauf durch automatische Synchronisation von Haspelgeschwindigkeit und Düsendruck
  - immer passender Düsendruck
  - kein Warenschlupf
  - reproduzierbare Einstellungen
- **RINSEtronic** – komplexes und optimiertes Nachbehandlungs- und Spülverfahren für die Reaktivfärbung.
  Nur ein Programmschritt für den gesamten Spülprozess
- **Salzlösefunktion**
- 100 % Ansatzgefäß – automatisiertes, dem max. Füllniveau der Anlage angepasstes Ansatzgefäß für die Vorbereitung von kompletten Behandlungsbädern.

Technical details:

- **Batch parameter**
  Simplification of dyeing programs by use of variables
- **Synchronised dyeing** – optimised fabric circulation by automatically synchronising winch speed and nozzle pressure
  - Appropriate nozzle pressure in every stage of the program
  - Positive winch transport
  - Reproducible adjustments
- **RINSEtronic** – complex after-treatment/rinsing method for reactive dyeing. Complete rinse process in a single program step
- **Salt dissolving**
- 100 % Stock tank – automated stock tank for preparation of the complete process baths. Tank volume equates to max. filling volume of the machine.

Detalles técnicos:

- **Batch parameter**
  Simplificación de los programas de tintura mediante el uso de variables
- **Tintura sincronizada** – circulación optimizada de la cuerda mediante la sincronización automática de la velocidad del aspa y la presión de tobera
  - Presión de tobera apropiada en cada fase del proceso
  - Transporte del tejido sin patinajes
  - Ajustes reproducibles
- **RINSEtronic** – proceso complejo de tratamiento posterior y de enjuague para tinturas reactivas. Un solo paso de programa para el proceso completo de enjuague.
- **Disolución de sal**
- Recipiente de preparación 100% – recipiente automatizado para la preparación de baños completos con un volumen equivalente al volumen de llenado máximo de la máquina.

Zusatzausstattung:

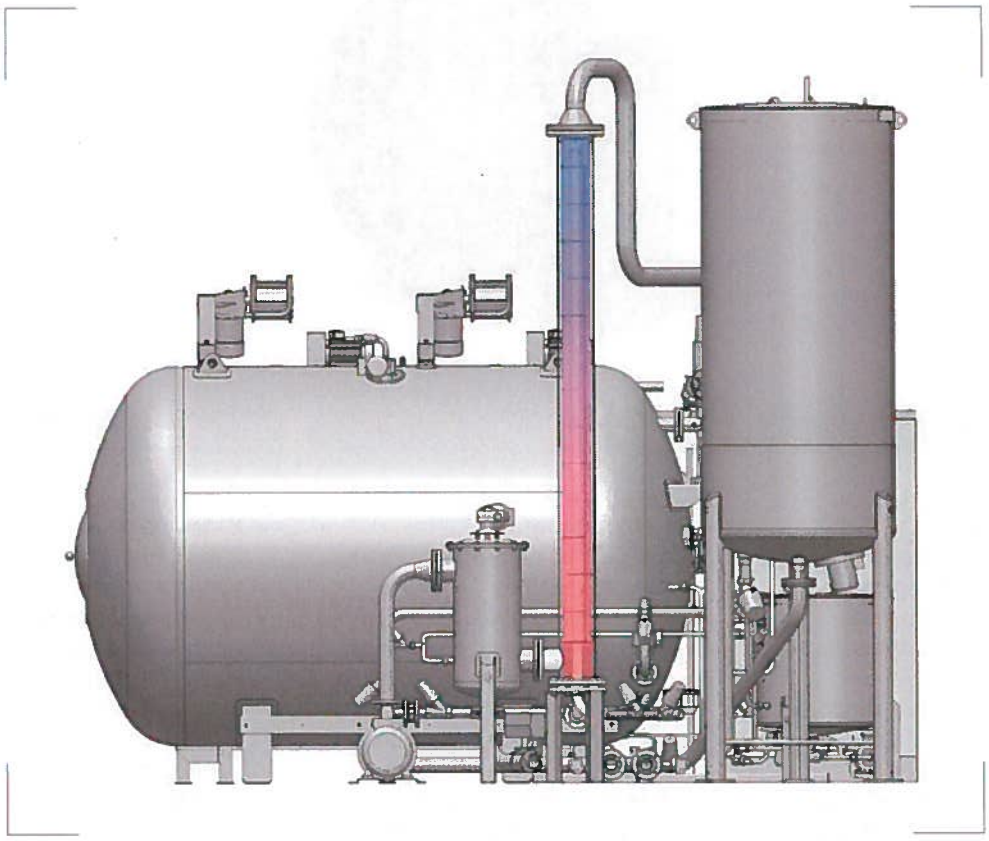
- HT-Ablassen
- Funktion 400 – Bleichflottenrecycling, Energieeinsparung und Prozesszeitverkürzung durch Einsatz von 3 Ansatzbehältern
- interne Verrohrung

Additional features:

- HT-Draining
- Function 400 – recycling of bleaching liquor. Energy saving and reduction of process time by use of three addition tanks
- Connecting pipework to a common point

Equipo adicional:

- Drenaje a alta temperatura
- Función 400 – reciclaje de baños de blanqueo. Economía de energía, así como reducción de los tiempos de proceso, por el empleo de 3 recipientes de adición
- Tubería interna alineada hasta un punto central de conexión



Sonstiges:

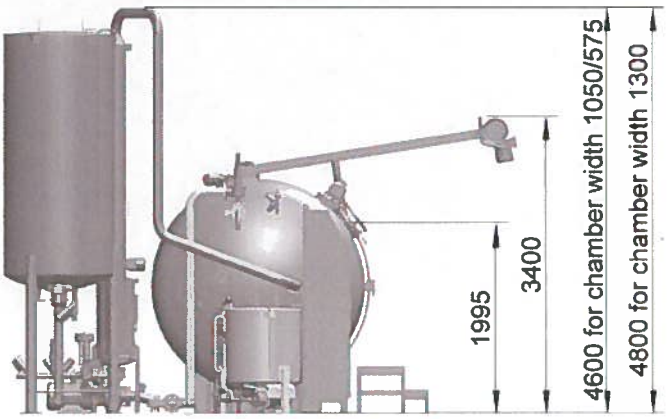
- Flottenkontaktfreies Färben – Ware kommt nicht mit der Flottenoberfläche in Berührung
- Ablassen < 92 °C
- Aufheizen der Flotten bereits bei den Füllvorgängen möglich
- Quickstop – Stillstand innerhalb von 1 s, aktive Vermeidung von Schleifstellen
- Strang ABS
- verringerte Zugspannung im Warenstrang durch innenliegende Haspel und verringerte Abzugshöhe
- kein Kanteneinrollen
- schonende Warenbehandlung
- iJBox – optimaler Warenpakettransport

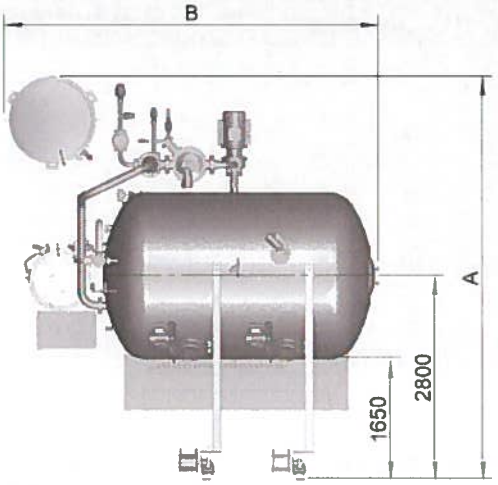
Special features:

- Contact-free dyeing – fabric sits above the liquor level
- Draining < 92 °C
- Possibility of heating the liquor during the filling process
- Quick stop – Machine stops within 1 s, avoiding tangling and slippage
- Rope ABS
- Reduced tension on the fabric rope by use of an internal transport winch and reduced lifting height
- Minimised selvedge curling
- Smooth fabric handling
- iJBox – optimised fabric transport

Características especiales:

- Tinturas sin contacto con el baño – el material textil circula por encima de la superficie del baño
- Desagüe < 92 °C
- Posibilidad de calentar el baño durante los procesos de llenado
- Quick stop – paro de la máquina en 1 segundo, evitando así la formación de brillos y roces
- Sistema antibloqueo ABS
- Tensión reducida en la cuerda textil gracias a la baja altura con respecto al aspa de transporte interna
- Mínimo acigarramiento de los orillos
- Trato muy suave del material textil
- iJBox – transporte optimizado del tejido





Speicherbreite Chamber width Ancho de acumulador	Einsatzgewicht nominal Nominal capacity Capacidad nominal	Anzahl der Speicher Number of chambers Número de acumuladores									
			1	2	3	4	5	6	7	8	
575 mm	100 kg		100	200	300	400	500	600	700	800	kg
		A	5200	5200	5700	5700	5800	5800	6400	6400	mm
		B	3350	3600	4500	4900	5650	6250	7000	7600	mm
1050 mm	200 kg		200	400	600	800	1000	1200	1400	1600	kg
		A	5200	5700	5800	6100	6400	6500	6900	6900	mm
		B	3600	4900	6250	7750	8850	10000	11550	12600	mm
1300 mm	250 kg		250	500	750	1000	1250	1500	1750	2000	kg
		A	5400	5700	6000	6300	6500	6600	7500	7500	mm
		B	4050	5350	6900	8450	10050	11550	13400	14700	mm

* Maßabweichungen durch konstruktive Änderungen vorbehalten.
* These dimensions are subject to design changes.
* Con reserva de diferencias de medida por causa de modificaciones de construcción.

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Appendix D
Lekos Dye and Finishing
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive
Proposed Project: Replacement of Two Older Dyeing Machines

	Gallons Used Per Working Day (gpd)	Million Gallons Used Per Year (Mgal/yr)	Hundred Cubic Feet Used Per Year (HCF/yr)	Hundred Cubic Feet Used Per Month (HCF/mth)	Estimated Annual Water and Wastewater Costs: California Water Service Company Quantity Rates (1) $2.866 Per HCF	Estimated Annual Water and Wastewater Costs: Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges (2) $746 per Mgal/yr	Net Annual Water and Wasterwater Costs, and Potential Savings
Average Annual Water Usage	507,800	152.34	203,663	16,972	583,739	113,646	$ 697,384
Estimated Water Savings (3)	68,000	20.40	27,273	2,273	78,169	15,218	**$ 93,387**

(1) Quantity Rates of $2.8662 per HCF is effective April 1, 2011. Quantity Rates do not include base rate or surcharges authorized by the California Public Utilities Corporation

(2) 2010 - 2011 LACSD Wastewater Treatment Surcharges:
- a. Total Flow Volume Per Year (Mgal/yr) x $746.00
- b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $131.90
- c. Total Suspended Solids Per Year (1000 of lbs) x $372.70

For this preliminary estimate, surcharges b and c are assumed to be constant and are omitted from the Wastewater Treatment Surcharges Calculation

(3) Savings Based on the following:
- a. Dyeing process accounts for 82% of total water use.
- b. New machines would reduce water use per pound by 35 to 50 percent.
- c. Facility-wide water use reduction would be 10 to 14 percent. Calculations are based on 14 percent reduction.

Total Work Days Per Year
300 days

Potential Program Cash Incentives		
Million Gallons Saved Per Year	**20.40 Mgal/yr**	
Potential Water Reduction Incentive	Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period.	**$ 61,200**

Potential Annual Cost Savings	
Net Annual Water and Wastewater Cost Savings	$ 93,387
Potential Program Cash Incentives	$ 61,200
Potential Annual Cost Reduction to Lekos	**$ 154,587**

Appendix E
Lekos Dye and Finishing
Recirc & $ave Program
Program Contact Information

Name	Affiliation	Phone	Email
Elise Goldman	West Basin Municipal Water District	(310) 660-6253	EliseG@westbasin.org
Tricia Butler	RMC Water and Environment	(949) 587-1700	TButler@rmcwater.com
Miluska Propersi	RMC Water and Environment	(310) 566-6460	MPropersi@rmcwater.com
Water Service	City of Inglewood	(310) 412-5320	www.cityofinglewood.org
South Bay Environmental Services Center	Southern California Edison	(310) 371-7222	www.sbesc.com
South Bay Environmental Services Center	Southern California Gas Company	(310) 371-7222	www.sbesc.com
Elise Goldman	So Cal Water Smart	(310) 660-6253	socalwatersmart.com
Elise Goldman	Save Water - Save A Buck	(310) 660-6253	www.mwdsaveabuck.com

17140 South Avalon Boulevard, Suite 210, Carson, CA 90746-1296, 310.217.2411, www.westbasin.org

INDUSTRIAL PROCESS WATER AND COOLING TOWER WATER REDUCTION PROGRAM

EQUIPMENT SURVEY REPORT

Prepared for:

Custom Foods Products, LLC

20704 South Fordyce Avenue
Carson, California

Prepared by:

URS Corporation
2020 East First St., Suite 400
Santa Ana, CA 92705

URS

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APPENDICES

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1.0 REPORT SUMMARY

1.1 RETROFITS AND UPGRADES

Custom Food Products (CFP) of Carson, California is considering upgrades to their industrial microwave to reduce potable water usage. The proposed modifications include the installation of a plate heat exchanger and a cooling tower to recirculate potable water for cooling the industrial microwave.

1.2 CHANGES TO OPERATIONAL PRACTICES

Operation of a recirculating system will require regular monitoring, maintenance, and water treatment.

1.3 POTENTIAL WATER AND SEWER COST SAVINGS

After installation of the proposed recirculating system, the total estimated water and sewer cost savings for CFP will be approximately $28,787 per year. Estimated water savings will be approximately 6.5 million gallons per year based on the current potable water usage of 8.1 million gallons per year in the operation of the industrial microwave.

1.4 POTENTIAL PROGRAM INCENTIVE

Based on retrofit water savings monitored for up to a one-year period and the West Basin Municipal Water District's "RECIRC & $AVE" Program financial incentives available (i.e., $3.00 per 1,000 gallons of actual water saved for a one-year period), the potential Program incentive for CFP is approximately $29,388. However, program incentive cannot exceed the total project costs.

2.0 INTRODUCTION

The West Basin Municipal Water District (West Basin), in cooperation with the Metropolitan Water District of Southern California (MET), has developed the "RECIRC & $AVE" Program (Program) for large users of water in industrial process operations and cooling towers. The Program provides funding to West Basin customers for installing equipment that captures, treats, saves and reuses water that is normally discharged to the sanitary sewer system. The Program is made possible through funding from the California Department of Water Resources, the U.S. Department of the Interior Bureau of Reclamation and the local water agency. West Basin is assisted in conducting this Program by URS, Maureen Erbeznik & Associates and RMC.

Qualifications for participating in the Program include:

- Must be a customer of West Basin or one of its water retailers;
- Must have enrolled in the Program before water savings improvements have been made at the facility;
- Install and operate the water savings equipment; and
- Obtain a measured water savings over a monitored period.

Based on a Field Survey conducted on February 23, 2012, URS identified Custom Food Products (CFP) as a potential candidate for this Program. In order for CFP to qualify for monetary incentives, an Equipment Survey of CFP's facility was conducted on May 31, 2012 to obtain additional operational information. This Equipment Survey Report provides a summary of the site investigation and the application of CFP to the Program.

The intent of this Equipment Survey Report is to estimate water and cost savings associated with recommended upgrades to water-using equipment and processes at the surveyed industrial site. The information and recommendations included in this report are provided to help participating companies make decisions about implementing water-use efficiency measures at their facility. It is important to recognize, however, that this report is not an engineering design document. The report describes recommended upgrades in general terms only, and it provides limited information about equipment application, savings estimates, and the feasibility of implementation at the site. Additional engineering and design services will be required to implement the upgrades evaluated in this report. The Program does not endorse any specific

vendor, company, or technology. Each Program participant is responsible for selecting a vendor and technology to meet their objectives for this Program.

2.1 Facility Description

Custom Food Products (CFP) is located in Carson, California and is a major manufacturer of processed beef, pork, and poultry products. It produces meat products in a variety of forms, which are used by several consumer product companies and national food service providers. The CFP facility includes administrative offices, manufacturing, and distribution. A site vicinity map is provided as Figure 1.

2.2 Description of Equipment Using Significant Water Volume

The following operations performed at CFP use significant amounts of potable water:

- Evaporative Condensers;
- Industrial Microwave;
- Steam Houses;
- Boilers;
- Sanitization;
- Product Preparation; and
- Administration (includes facility restrooms and site irrigation).

2.3 Potable Water Use and Sewer Discharge Rate

The California Water Service Company (Cal Water) is the local water purveyor for CFP. Cal Water provided potable water supply data over a 24-month period from March 2010 to February 2012. Potable water supplied to the CFP facility is measured by three separate meters, but the majority of water used in their manufacturing operations is measured by Meter No. 7372844293.

A table and a graph of the facility's potable water use data for Meter No. 7372844293 is provided in Appendix B. CFP operates 24 hours per day, five days per week from Monday through Friday. Thus, CFP operates approximately 260 days per year (52 weeks x 5 workdays per week).

A review of the data indicates that CFP used an average of 47.5 million gallons per year (MGY) of potable water, or approximately 182,772 gallons per work day (gpd).

CFP currently treats the facility's wastewater through a settling unit prior to discharging into the industrial sewer system of the Los Angeles County Sanitation District (LACSD). The facility currently does not measure the amount of wastewater discharged to the LACSD.

3.0 PROPOSED WATER EFFICIENCY TECHNOLOGY

3.1 DESCRIPTION OF POTENTIAL WATER SAVINGS TECHNOLOGIES

CFP has proposed to reduce its potable water use by introducing water recycling into its production lines. The following water efficiency technology is proposed for the manufacturing equipment at CFP:

- Installation of a system to recirculate the cooling water for the industrial microwave.

CFP also considered installation of a filtration system to recycle the condensate and rinse water generated in the steam houses. Meat products at CFP are packaged in sealed pouches and stacked in racks in the steam houses. Steam is applied to cook the meat products. After the steaming, potable water from overhead sprayers is sprayed on the products to cool and stop the cooking process. Due to the cooling water's contact with the packaged meat products, any recycled water must be treated to meet the requirements of the United State Department of Agriculture (USDA) and other governing food administrations. The additional treatment, testing and potential health risk liabilities associated with recycling the steam house cooling water is not considered viable.

3.2 PROPOSED INSTALLATION OF WATER SAVINGS TECHNOLOGIES

CFP currently provides cooling for their industrial microwave by using a once-through arrangement that discharges spent cooling water to a wastewater treatment system prior to discharge to the industrial sewer system. CFP has proposed to install a plate heat exchanger and a cooling tower to regulate the transfer of heat from the microwave and recirculate the cooling water. As a result, potable water usage would be reduced.

The proposed recirculating system would consist of two separate cooling circuits; a closed circuit cooling system between the industrial microwave and a plate heat exchanger; and a second open cooling circuit system between the plate heat exchanger and the cooling tower. Since the cooling tower operates on the principle of evaporative cooling, the cooling water will require treatment to prevent scaling and reduce environmental contamination. In the closed circuit cooling system, the cooling water will recirculate through the plate heat exchanger and is not exposed to the environment; therefore, water treatment is not necessary. An overview of the proposed industrial microwave recirculating cooling system is provided as Figure 2.

URS contacted a vendor, Refrigeration Supplies Distribution (RSD), to provide initial application information on the availability of small-scale industrial cooling towers. The CFP industrial microwave currently operates with three 50 kilowatt (kW) transmitters. The average

water temperature entering the industrial microwave is 65° Fahrenheit (F). The outlet water temperature is approximately 75° F. The average flow rate of the cooling system is 46 gallons per minute (gpm). Based on the location of the CFP facility, the wet bulb temperature is estimated to be 72° F. The system heat load is estimated to be approximately 230,000 British thermal unit per hour (BTU/hr) which converts to approximately 17 tons. Based on RSD cooling tower capacity curves for a 46 gpm cooling water flow rate and a heat load of 17 tons, there are commercial cooling towers available to meet these requirements. The RSD cooling tower capacity curves and the cooling tower product information are provided in Appendix C.

4.0 ESTIMATES ON WATER REDUCTION, COST SAVINGS AND PROGRAM FUNDING

4.1 ESTIMATED WATER REDUCTION

The industrial operations at CFP used an average of 47.5 MGY of potable water over a two-year period from March 2010 to February 2012. The estimated breakdown of industrial water usage is as follows:

- Evaporative Condensers: 9.5 MGY (20 %)
- Industrial Microwave: 8.1 MGY (17 %)
- Steam Houses: 9.5 MGY (20 %)
- Boilers: 7.1 MGY (15%)
- Sanitation: 11.9 MGY (25%)
- Product Preparation: 1.4 MGY (3%)

The total estimated water usage for cooling the industrial microwave is approximately 8.1 MGY. Installation of a system to recirculate the cooling water for the industrial microwave is estimated to reduce potable water consumption by approximately 80% based on study of installations at similar facilities. This would result in an estimated savings of approximately 6.5 MGY of potable water.

4.2 ESTIMATED COST SAVINGS

Appendix D provides the estimated savings in potable water supply costs and wastewater disposal charges. If approximately 6.5 MGY of cooling water was recycled, this would result in a potable water supply cost savings of approximately $23,966 per year and a sewer cost savings of approximately $4,821 for a total of $28,787 per year.

The water usage savings rate is based on the Cal Water's 2011 Quantity Rates of $2.7738 per hundred cubic feet of potable water. The rates do not include various surcharges authorized by the California Public Utilities Commission. Sewer disposal charges are based on the LACSD's 2010-2011 Wastewater Treatment Surcharge Statement. For this estimate, surcharges for Chemical Oxygen Demand, Suspended Solids and Average Peak Flow Rate are assumed to be constant and are omitted from the total estimated wastewater treatment surcharge cost savings.

4.3 Estimated Gas and Electricity Savings

Installation of a plate heat exchanger and a cooling tower is not expected to result in additional gas and electricity savings.

The installation of a cooling tower will results in the usage of chemicals for water treatment. In addition, the recirculation system will increase the electrical usage at the facility due to installation of additional electrical equipment, such as pumps and controls.

4.4 Estimated Program Funding

Based on retrofit and water savings over a monitored period, qualified participants in the Program may receive the following three payments:

- Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period.
- Reimbursement of the equipment cost of up to $5,000 maximum based on the $3.00 per 1,000 gallons saving rate over a one-year period.
- Reimbursement of the equipment installation of up to $5,000 maximum based on actual installation costs.

The estimated Program funding for CFP is shown in Appendix E. Based on a water savings of approximately 6.5 MGY after installation and monitoring, the estimated Program incentive payment would be $19,388 based on a reimbursement rate of $3.00 per 1,000 gallons saved. Reimbursements for the equipment cost and the equipment installation would be the maximum allowable reimbursement of $5,000 each. Thus, the net potential Program incentive for CFP is approximately $29,388. However, the total program incentive cannot exceed the total project costs.

5.0 POTENTIAL IMPACTS

5.1 IMPACT OF PRODUCTION CHANGES ON ESTIMATED WATER SAVINGS

The nature of CFP's business is the production of processed meat products that includes beef, pork, and poultry into a variety of shape and size. The fluctuation in production may affect the volume of water used at the facility and also may mask any potential water savings if business increases. Therefore, the amount of water used by the industrial microwave is recommended as an appropriate benchmark to assess future water savings.

In order to establish a baseline for current potable water usage, operational data on the elapsed time or "hour" meter for the industrial microwave over a 3-month period will be needed to determine the average number of gallons required.

After the installation of the recommended improvements and a period of monitoring, the hours of operation for the microwave will be tabulated and compared to the water usage rates recorded by the new water meters. The water savings will be calculated as the difference between the total gallons of potable water recorded and the operational time of the industrial microwave multiplied by the average number of gallons required. This factor will adjust the water savings accordingly if there is an increase or decline in production at the CFP facility.

5.2 IMPACT OF PROCESS CHANGE ON SEWER DISCHARGE

CFP discharges industrial wastewater through a Permit with the LACSD. All wastewater will continue to be treated by the existing wastewater treatment system prior to disposal to the industrial sewer. The proposed recirculating system will continue to discharge wastewater to the industrial sewer as part of the blow-down to maintain water quality of the cooling water.

5.3 IMPACT OF PROCESS CHANGE ON PRODUCT QUALITY

Installation of a system to recirculate the cooling water for the industrial microwave is not expected to impact product quality unless insufficient cooling is provided and the microwave equipment does not function effectively.

6.0 PROGRAM APPLICATION AND IMPLEMENTATION

Based on a review of the proposed modifications, CFP is considered as a viable candidate to apply for incentive funding under this Program.

The next step is for CFP to contact West Basin to initiate their application into the Program. The responsible Program contact at West Basin is Elise Goldman, Water Efficiency Program Specialist (eliseg@westbasin.org).

Prior to installation and operation of the recirculating system, monitoring of the current water usage in the industrial microwave will be required to develop a baseline value and further refine the potential potable water savings and Program incentives. Currently, a flow meter/totalizer has been installed in the discharge line of the industrial microwave that could be used to confirm cooling system flow rates and water usage.

Following acceptance and inclusion to the Program, CFP may receive 50% of the estimated Program incentive. CFP may utilize this Program funding to install the recommended equipment and notify West Basin when the proposed modifications are fully operational.

Following installation of the equipment, a formal monitoring period will begin. CFP will collect potable water use data for the industrial microwave cooling system on a monthly basis. Upon confirmation of the anticipated potable water savings, CFP may receive up to the remaining balance of the Program incentive as justified by the recorded data.

7.0 ADDITIONAL UTILITY INCENTIVE PROGRAMS

In addition to the Program under West Basin, other utility incentive programs are also available for industrial customers.

The Southern California Gas Company and Southern California Edison (SCE) are offering potential cash incentives to qualifying industrial users for reduction in gas and electricity usage. The South Bay Environmental Services Center (SBESC) serves as a regional clearing house for information about programs offered by the Southern California Gas Company and Southern California Edison.

The MET's Save Water, Save-A-Buck Program also provides rebates to industrial customers for commonly used plumbing fixtures, such as toilets and urinals.

For more information on these associated programs, please contact the following:

- South Bay Environmental Services Center (www.sbesc.com) (310) 371-7222
- Save Water/Save-A-Buck Program (www.mwdsaveabuck.com) (310) 660-6253

APPENDIX A

FIGURES

N

Not To Scale

Custom Food Products, LLC.
20704 S. Fordyce Avenue
Carson, Ca. 90810

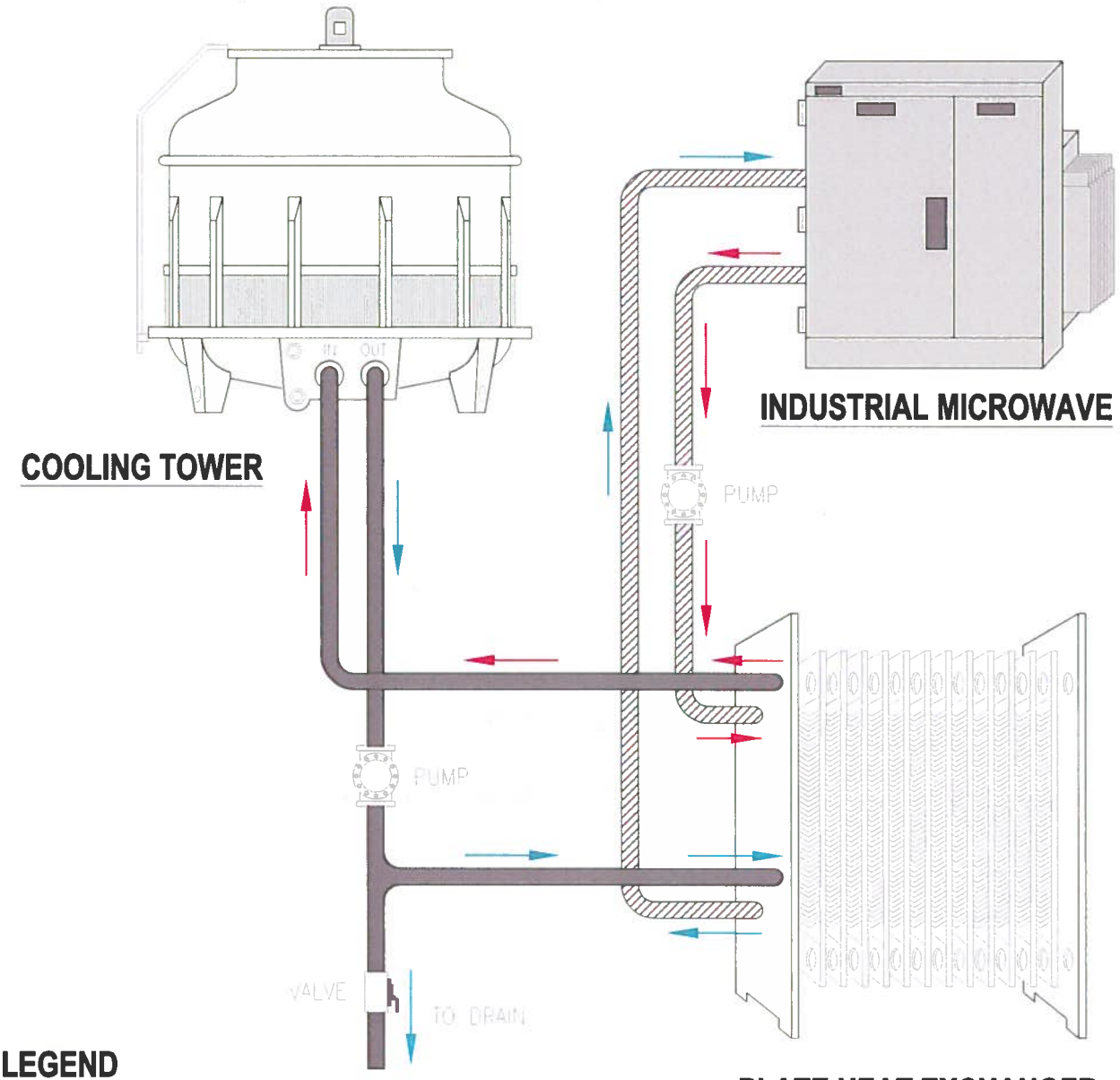
Reference: Google Map

Custom Food Products, LLC Equipment Survey Report

URS

FIGURE 1
SITE VICINITY MAP

Proj No: 29880043		Date: JUNE 2012	
Project: West Basin Municipal Water District Recirc & Save Program		Customer: Custom Food Products	
Drawn by: AC	Checked by: SK	Figure: 1	



LEGEND

FLOW DIRECTION

CLOSED CIRCUIT SYSTEM

OPEN CIRCUIT SYSTEM

RECIRC & SAVE

Custom Food Products, LLC
Equipment Survey Report

URS

FIGURE 2
INDUSTRIAL MICROWAVE
RECIRCULATING SYSTEM LAYOUT

Proj. No.: 29880043		Date: JUNE 2012	
Project: West Basin Municipal Water District Recirc & Save Program		Customer: Custom Food Products	
Drawn by: AC	Checked by: SK	Figure: 1	

APPENDIX B

PORTABLE WATER USAGE DATA

Appendix B
Custom Food Products
Recirc & $ave Program

Potable Water Use Data

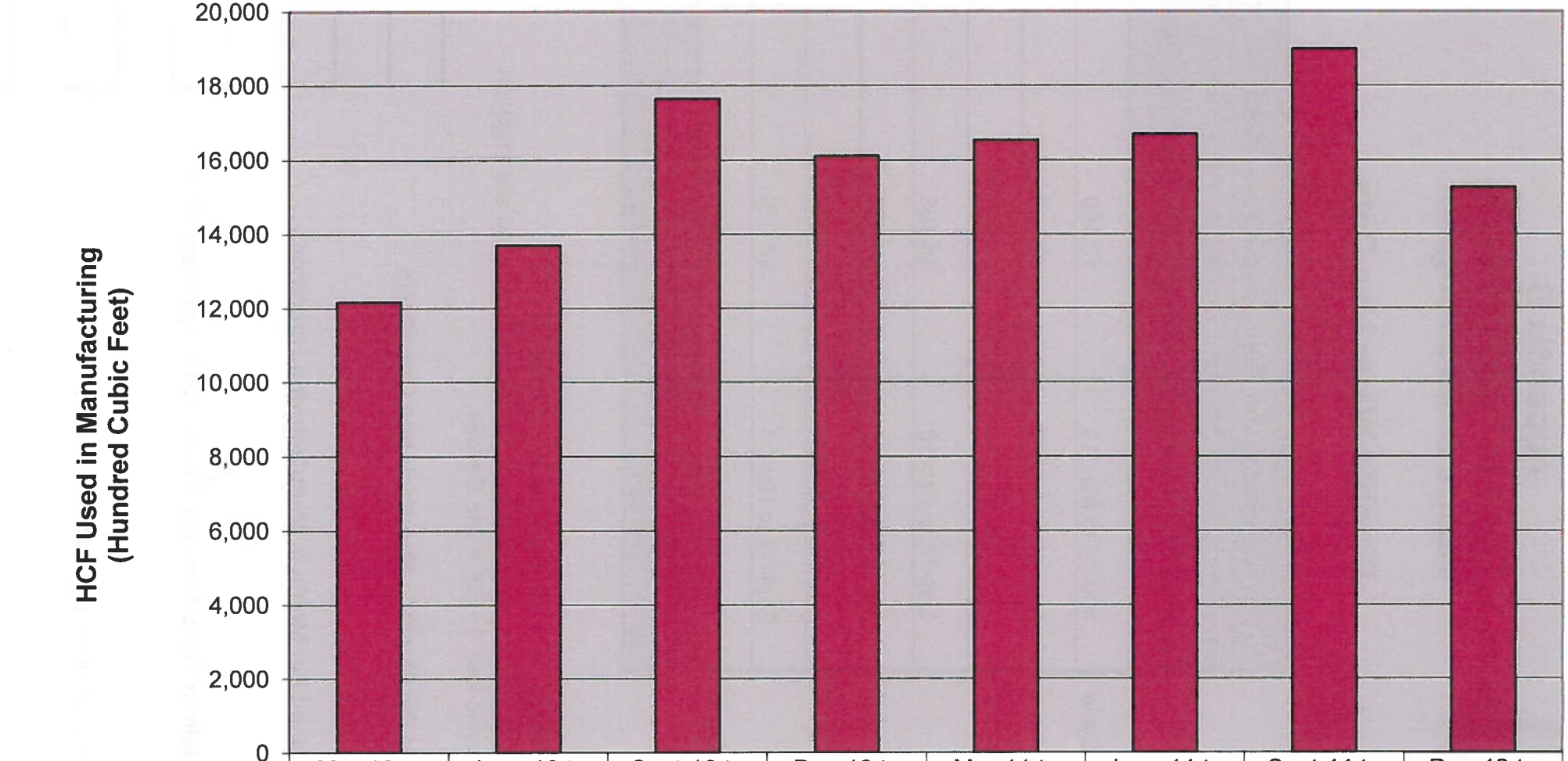
	California Water Service Company Meter No. 7372844293		
	Months of Cycle Read	**Total HCF Used**	**Total Gallons Used**
Start of Read Cycle	Mar-10 to May-10	12,169	9,102,412
	June-10 to Aug-10	13,700	10,247,600
	Sept-10 to Nov-10	17,639	13,193,972
	Dec-10 to Feb-10	16,106	12,047,288
	Mar-11 to May-11	16,528	12,362,944
	June-11 to Aug-11	16,683	12,478,884
	Sept-11 to Nov-11	18,979	14,196,292
End of Read Cycle	Dec-12 to Feb-12	15,257	11,412,236
	Net Total	127,061	95,041,628

Notes:
- Meter No. 7834512663 is for the fire protection system.
- Meter No. 9966171038 is for administration, facility restrooms and site irrigation.
- HCF = hundred cubic feet, 1 HCF = 748 Gallons.

Average HCF Used Per Month in Manufacturing Operations	5,294
Average Gallons Used Per Month in Manufacturing Operations	3,960,068
Average Million Gallons Used Per Year (March 2010 - Feburary 2012)	47.5
Working Days Per Year (Monday through Friday)	260
Average Gallons Per Working Day	182,772

Appendix B
Custom Food Products
Recirc & $ave Program

Potable Water Use Data



	Mar-10 to May-10	June-10 to Aug-10	Sept-10 to Nov-10	Dec-10 to Feb-10	Mar-11 to May-11	June-11 to Aug-11	Sept-11 to Nov-11	Dec-12 to Feb-12
Meter No. 7372844293	12,169	13,700	17,639	16,106	16,528	16,683	18,979	15,257

Months of Cycle Read

APPENDIX C

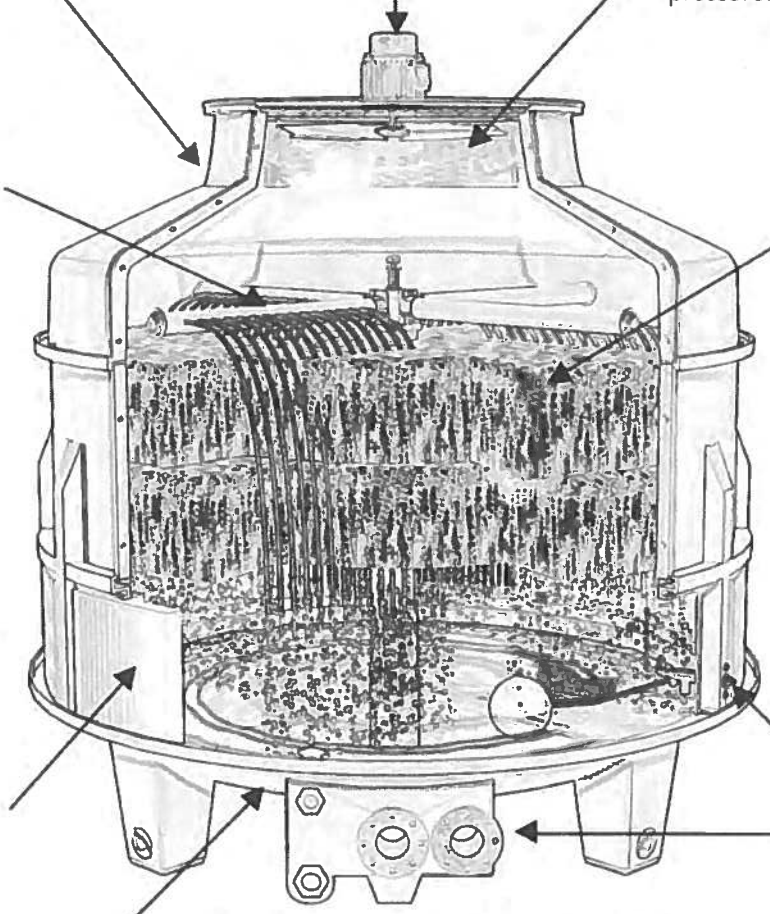
PRODUCT INFORMATION

RSD FIBERGLASS COOLING TOWERS...

MOTORS
All motors are UL Recognized, TEFC or TEAO construction. Due to superior tower design, motor H.P. and energy consumption are significantly less than that of traditional tower designs.

TOWER SHELL
The tower shell is constructed of F.R.P. (Fiberglass Reinforced Polyester), making it extremely lightweight, durable and non-corrosive.

FAN BLADES
Our axial flow fan blades have been specifically designed for cooling tower application, providing a large volume of stable air at constant pressure.



WATER DISTRIBUTION SYSTEM
The water distribution system is constructed of 100% non-corrosive materials. The rotating sprinkler assembly ensures low velocity waterflow and excellent distribution over the fill deck. The assembly is field adjustable to compensate for your specific system flow requirements.

TOWER FILL
Our honeycombed PVC fill is designed to promote turbulent waterflow for maximum heat transfer. The heat embossed construction will prevent loss of shape due to the high inlet water temperature.

FASTENERS
100% Stainless Steel fasteners ensure trouble free maintenance.

INLET LOUVERS
Non-corrosive PVC louvers prevent debris from entering the tower basin. All towers RSD 040 and above come standard with our premium louvers that eliminate splash from the tower basin.

FLUID CONNECTIONS
All fluid connections are located on a common bulkhead for easy access. All fittings are American standard for easy installation. Our unique makeup valve assembly is designed to meet all plumbing code requirements.

10 YEAR LIMITED WARRANTY

WATER BASIN
Our tapered basin design ensures a steady flow of water to the system pump, even at low water levels. With 360 degree access, routine cleaning is a breeze.

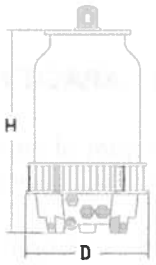
STAINLESS STEEL OPTIONS
For added corrosion protection, most steel and aluminum components are available in stainless steel. (Excluded: fan blades, motors and gear reducers)

FAN DRIVES
All towers RSD 003 through RSD 175 feature maintenance free, direct drive fans. All towers RSD 200 and above are equipped with a one step gear reducer. The gear reducers are designed specifically for cooling tower application, and require virtually no maintenance.

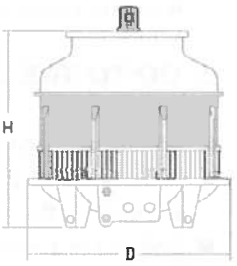
LADDERS
All towers RSD 100 and above are equipped with an OSHA standard ladder for safety and convenience.

AGENCY APPROVALS
City of Los Angeles Mechanical Testing Laboratory Approved.
Fan motors are UL recognized TEFC or TEAO construction.

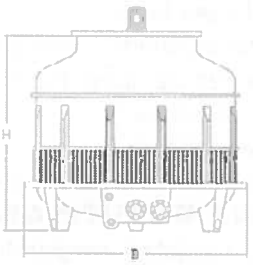
QUALITY THAT IS OUT OF THIS WORLD



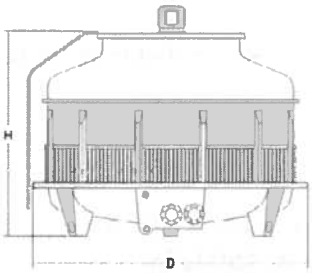
RSD 003-030



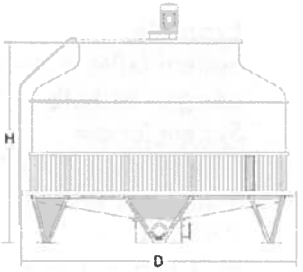
RSD 040-060



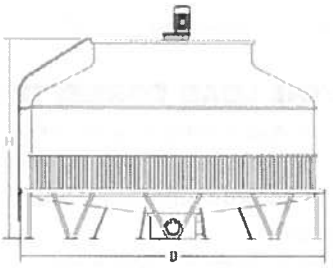
RSD 070-080



RSD 100-300



RSD 400-500



RSD 600-1000

MODEL	DIMENSIONS HT	DIA	FLUID CONNECTIONS* IN	OUT	MAKE UP	OVER FLOW	DRAIN	MOTOR H.R	FAN CFM	NOM. WATER FLOW† IN GPM	FEET PUMP HEAD	WEIGHTS DRY	OPERATING
RSD 003	48″	27″	1″	1″	3/4″	1″	3/4″	1/6	953	9	3.9	57	143
RSD 005	50″	35″	1.5″	1.5″	3/4″	1″	3/4″	1/6	2,120	15	3.9	77	221
RSD 008	57″	33″	1.5″	1.5″	3/4″	1″	3/4″	1/6	2,650	24	3.9	88	304
RSD 010	55″	43″	1.5″	1.5″	3/4″	1″	1″	1/4	3,530	30	4.3	106	392
RSD 015	60″	43″	2″	2″	3/4″	1″	1″	1/2	4,950	45	4.6	148	573
RSD 020	62″	47″	2″	2′	3/4″	1″	1″	1/2	6,350	60	4.9	172	728
RSD 025	67″	55″	2.5″	2.5″	3/4″	1″	1″	3/4	7,060	75	5.2	209	926
RSD 030	70″	64″	2.5″	2.5″	3/4″	1″	1″	3/4	7,950	90	5.9	243	1,103
RSD 040	70″	71″	3″	3″	3/4″	1″	1.5″	1	9,890	120	5.9	353	1,213
RSD 050	72″	78″	3″	3″	3/4″	1″	1.5″	1	11,650	165	6.2	461	1,544
RSD 060	78″	78″	3″	3″	3/4″	1″	1.5″	1.5	14,830	180	6.2	474	1,654
RSD 070	76″	87″	4″	4″	3/4″	1″	1.5″	1.5	18,010	210	6.6	562	2,117
RSD 080	80″	87″	4″	4″	3/4″	1″	1.5″	1.5	19,420	255	6.6	573	2,293
RSD 100	85″	110″	4″	4″	1″	1″	1.5″	2	24,720	330	9.8	882	2,778
RSD 125	89″	122″	5″	5″	1″	1″	1.5″	3	29,310	375	9.8	948	3,572
RSD 150	102″	138″	5″	5″	1″	1″	1.5″	3	33,550	480	10.5	1,433	5,998
RSD 175	106″	138″	6″	6″	1″	1″	1.5″	3	40,600	540	10.5	1,499	6,395
RSD 200	114″	154″	6″	6″	1.5″	2″	2″	7.5	44,140	640	11.5	1,720	7,343
RSD 225	114″	154″	6″	6″	1.5″	2″	2″	7.5	61,790	690	11.5	1,742	7.497
RSD 250	118″	154″	8″	8″	1.5″	2″	2″	7.5	65,320	800	13.1	1,786	7,718
RSD 300	120″	184″	8″	8″	1.5″	3″	2″	10	77,690	975	13.1	2,205	8,820
RSD 350	124″	184″	8″	8″	1.5″	3″	2″	10	81,210	1,125	13.1	2,426	9,592
RSD 400	159″	211″	8″	8″	2″	3″	2″	15	91,810	1,350	16.4	5,072	15,656
RSD 500	167″	211″	10″	10″	2″	3″	2″	15	97,100	1,650	16.4	5,292	16,890
RSD 600	175″	260″	10″	10″	2″	3″	2″	20	132,410	2,000	18.0	7,497	21,874
RSD 700	183″	260″	10″	10″	2″	3″	2″	20	137,710	2,300	18.0	8,379	25,688
RSD 800	205″	291″	12″	12″	2″	4″	2.5″	25	176,550	2,650	19.7	9,923	26,460
RSD 1000	211″	291″	12″	12″	2″	4″	2.5″	30	183,610	3,000	19.7	10,584	27,122

***2.5″ AND BELOW FPT, 3″ MPT, 4″ AND ABOVE FLANGE CONNECTION †NOMINAL WATER FLOW BASED ON 95° IN 85° OUT 75° WET BULB**

HOW TO SELECT A COOLING TOWER

1. OBTAIN THE FOLLOWING INFORMATION

- System flow in gallons per minute;
  Or
- System load in BTU's per hour
- Desired inlet water temperature; *(water returning to the tower)*
- Desired outlet water temperature; *(water leaving the tower)*
- Design wet bulb temperature
- System temperature range; *(inlet temp – outlet temp)*
- System approach temperature; *(outlet temp – wet bulb temp)*

HOW TO CALCULATE SYSTEM GPM:

- System load in BTU's /(system temperature range x 500)

HOW TO CALCULATE SYSTEM LOAD IN BTU'S/HR:

- *System flow in GPM x (system range x 500)*

2. DETERMINE THE LOAD CORRECTION FACTOR

- Find the chart corresponding to your design wet bulb.
- Find the column showing your system temperature range.
- Move down the column until you intersect the system approach temperature.
- Make note of the load correction factor.
- Determine the corrected load;
  (system load in BTU's/hr x correction factor)
- Determine the corrected load in tons;
  (corrected load in BTU's/hr / 15,000)

3. GO TO THE COOLING TOWER CAPACITY CURVES

- Locate the system GPM along the bottom of the curve.
- Move up the curve until you intersect the corrected tons for your system.
- Select the tower curve that falls above and to the left of the intersect.

Example:

System GPM = 450, inlet temp = 95, outlet temp = 85, design wet bulb = 71

System load=

450 x ((95 – 85) x 500) = 2,925,000 BTU's/hr

System correct load=

2,925,000 x .71 = 2,076,750/15,000 = 138.4 tons

RSD 175 = 139 corrected tons at 450 GPM

66°F Wet Bulb

Range ▶ ▼Approach	8	10	12	14	16	18	20	22
8	1.35	1.20	1.09	1.08	.095	0.87	0.82	0.78
10	1.13	1.05	.094	0.86	0.82	0.75	0.71	0.67
12	0.97	.087	0.81	0.73	0.72	0.67	0.63	0.60
14	0.84	.077	0.71	0.66	0.63	0.59	0.56	0.53
16	0.74	0.70	0.64	0.60	0.56	0.53	0.49	0.46
18	0.67	0.63	0.59	0.54	0.51	0.48	0.45	0.44
19	0.64	0.61	0.56	0.52	0.49	0.46	0.44	0.43
20	0.62	0.58	0.54	0.51	0.48	0.45	0.43	0.42

68°F Wet Bulb

Range ▶ ▼Approach	8	10	12	14	16	18	20	22
8	1.31	1.19	1.08	0.97	0.89	0.83	0.77	0.72
10	1.09	1.00	0.90	0.84	0.76	0.72	0.67	0.64
12	0.98	0.85	0.79	0.73	067	0.62	0.55	0.52
14	0.82	0.75	0.69	0.64	0.59	0.55	0.49	0.48
16	0.72	0.66	0.63	0.56	0.54	0.49	0.46	0.44
17	0.68	0.64	0.59	0.55	0.52	0.48	0.44	0.43
18	0.65	0.61	0.56	0.53	0.49	0.46	0.43	0.42
20	0.60	0.56	0.53	0.49	0.46	0.43	0.41	0.40

70°F Wet Bulb

Range ▶ ▼Approach	8	10	12	14	16	18	20	22
8	1.26	1.14	1.04	0.95	0.87	0.82	0.77	0.73
10	1.05	0.95	0.88	0.82	0.75	0.72	0.67	0.63
12	0.88	0.83	0.77	0.72	0.66	0.63	0.60	0.56
14	0.77	0.72	0.68	0.63	0.58	0.55	0.53	0.49
15	0.72	0.68	0.63	0.60	0.55	0.520	0.49	0.46
16	0.68	0.64	0.60	0.56	0.53	0.49	0.46	0.45
18	0.63	0.58	0.55	0.52	0.48	0.45	0.43	0.43
20	0.57	0.54	0.52	0.48	0.45	0.43	0.40	0.37

71°F Wet Bulb

Range ▶ ▼Approach	8	10	12	14	16	18	20	22
6	1.51	1.35	1.23	1.13	1.03	0.95	0.90	0.83
8	1.20	1.10	1.00	0.93	0.85	0.79	0.75	0.70
10	1.02	0.94	0.86	0.80	0.74	0.69	0.65	0.62
12	0.87	0.80	0.75	0.70	0.64	0.60	0.57	0.55
14	0.75	0.71	0.66	0.62	0.57	0.54	0.50	0.47
16	0.67	0.63	0.59	0.55	0.52	0.48	0.46	0.43
18	0.61	0.58	0.54	0.51	0.47	0.44	0.42	0.40
20	0.56	0.54	0.50	0.47	0.44	0.42	0.38	0.37

72°F Wet Bulb

Range ▶ ▼Approach	8	10	12	14	16	18	20	22
8	1.18	1.08	0.96	0.90	0.84	0.77	0.73	0.68
10	0.98	0.90	0.83	0.77	0.73	0.67	0.64	0.60
12	0.85	0.78	0.73	0.67	0.63	0.58	0.56	0.53
13	0.78	0.74	0.67	0.63	0.58	0.55	0.53	0.49
16	0.66	0.63	0.57	0.54	0.50	0.47	0.45	0.42
18	0.62	0.57	0.53	0.50	0.46	0.43	0.41	0.39
20	0.56	0.53	0.48	0.46	0.43	0.40	0.39	0.36
22	0.52	0.49	0.46	0.43	0.41	0.38	0.36	0.34

73°F Wet Bulb

Range ▶ ▼Approach	8	10	12	14	16	18	20	22
6	1.47	1.31	1.17	1.06	0.98	0.91	0.84	0.80
8	1.18	1.06	0.95	0.88	0.82	0.76	0.72	0.67
10	0.98	0.90	0.82	0.76	0.71	0.67	0.63	0.59
12	0.84	0.77	0.72	0.66	0.62	0.57	0.55	0.52
14	0.73	0.68	0.63	0.59	0.55	0.52	0.49	0.46
16	0.65	0.61	0.57	0.53	0.50	0.46	0.44	0.41
18	0.60	0.56	0.53	0.49	0.46	0.43	0.41	0.38
20	0.55	0.52	0.48	0.46	0.43	0.40	0.38	0.37

74°F Wet Bulb

Range ▶ ▼Approach	8	10	12	14	16	18	20	22
6	1.40	1.26	1.15	1.04	0.95	0.89	0.82	0.77
8	1.10	1.03	0.94	0.86	0.80	0.74	0.70	0.65
10	0.95	0.87	0.80	0.74	0.69	0.65	0.60	0.57
11	0.86	0.80	0.75	0.69	0.65	0.60	0.57	0.54
14	0.71	0.66	0.62	0.57	0.54	0.50	0.47	0.45
16	0.63	0.60	0.56	0.53	0.49	0.45	0.43	0.41
18	0.58	0.55	0.53	0.48	0.45	0.43	0.40	0.38
20	0.54	0.51	0.47	0.45	0.42	0.39	0.37	0.35

75°F Wet Bulb

Range ▶ ▼Approach	8	10	12	14	16	18	20	22
6	1.40	1.25	1.14	1.00	0.95	0.88	0.82	0.78
8	1.10	1.00	0.93	0.85	0.80	0.75	0.70	0.65
10	0.95	0.85	0.80	0.78	0.70	0.65	0.60	0.57
12	0.80	0.75	0.68	0.68	0.60	0.55	0.53	0.50
14	0.70	0.65	0.60	0.56	0.53	0.50	0.47	0.45
16	0.63	0.58	0.55	0.52	0.48	0.45	0.43	0.40
18	0.58	0.54	0.50	0.48	0.44	0.41	0.39	0.38
20	0.53	0.50	0.47	0.44	0.40	0.39	0.37	0.36

76°F Wet Bulb

Range ▶ ▼Approach	8	10	12	14	16	18	20	22
6	1.35	1.20	1.10	1.00	0.93	0.85	0.80	0.75
8	1.09	1.00	0.90	0.84	0.77	0.73	0.68	0.65
9	1.00	0.90	0.84	0.77	0.72	0.67	0.63	0.60
12	0.77	0.73	0.67	0.62	0.58	0.54	0.51	0.48
14	0.68	0.64	0.60	0.55	0.52	0.48	0.45	0.43
16	0.62	0.58	0.54	0.50	0.47	0.43	0.41	0.39
18	0.57	0.53	0.50	0.46	0.44	0.41	0.39	0.36
20	0.53	0.49	0.46	0.44	0.40	0.38	0.36	0.32

78°F Wet Bulb

Range ▶ ▼Approach	8	10	12	14	16	18	20	22
6	1.28	1.14	1.04	0.95	0.88	0.80	0.76	0.72
7	1.13	1.02	0.94	0.85	0.80	0.74	0.70	0.65
10	0.85	0.80	0.73	0.68	0.64	0.60	0.56	0.53
12	0.74	0.68	0.64	0.59	0.55	0.52	0.48	0.46
14	0.65	0.61	0.57	0.53	0.49	0.46	0.44	0.42
16	0.60	0.56	0.52	0.48	0.45	0.41	0.39	0.38
18	0.55	0.52	0.48	0.45	0.41	0.39	0.36	0.34
20	0.52	0.48	0.45	0.41	0.39	0.36	0.32	0.31

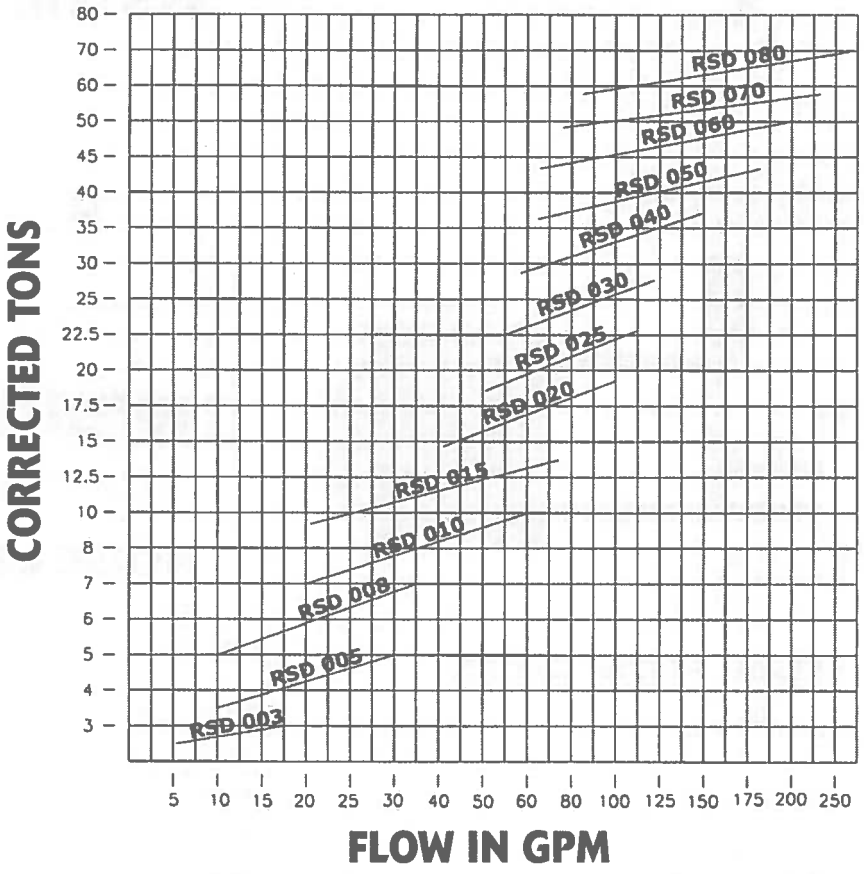
80°F Wet Bulb

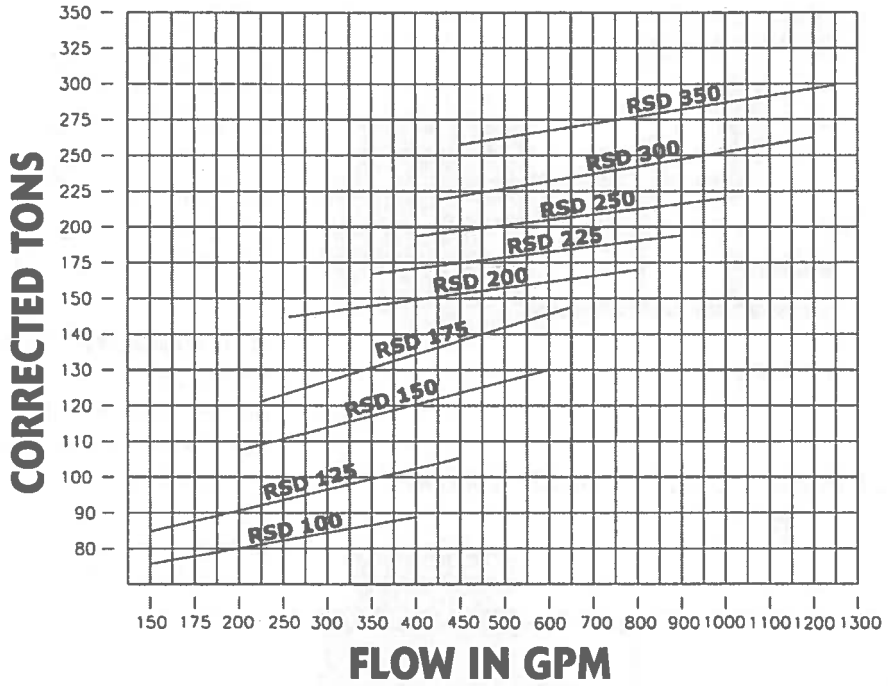
Range ▶ ▼Approach	8	10	12	14	16	18	20	22
6	1.20	1.10	0.97	0.90	0.84	0.76	0.72	0.68
8	0.98	0.90	0.80	0.75	0.70	0.65	0.60	0.57
10	0.83	0.75	0.70	0.65	0.60	0.55	0.53	0.50
12	0.70	0.63	0.60	0.56	0.53	0.48	0.46	0.44
14	0.63	0.58	0.55	0.52	0.47	0.44	0.42	0.40
16	0.57	0.54	0.50	0.46	0.44	0.40	0.38	0.37
18	0.53	0.50	0.46	0.43	0.40	0.38	0.36	0.35
20	0.48	0.45	0.43	0.41	0.38	0.36	0.34	0.33

82°F Wet Bulb

Range ▶ ▼Approach	8	10	12	14	16	18	20	22
6	1.15	1.04	0.94	0.86	0.80	0.74	0.70	0.64
8	0.94	0.85	0.78	0.72	0.66	0.62	0.58	0.56
10	0.79	0.72	0.66	0.61	0.57	0.53	0.50	0.47
12	0.68	0.63	0.57	0.54	0.50	0.48	0.45	0.42
14	0.61	0.57	0.53	0.49	0.46	0.43	0.41	0.40
16	0.56	0.52	0.49	0.46	0.42	0.40	0.38	0.37
18	0.51	0.47	0.45	0.42	0.40	0.38	0.36	0.35
20	0.47	0.44	0.42	0.40	0.38	0.36	0.34	0.33

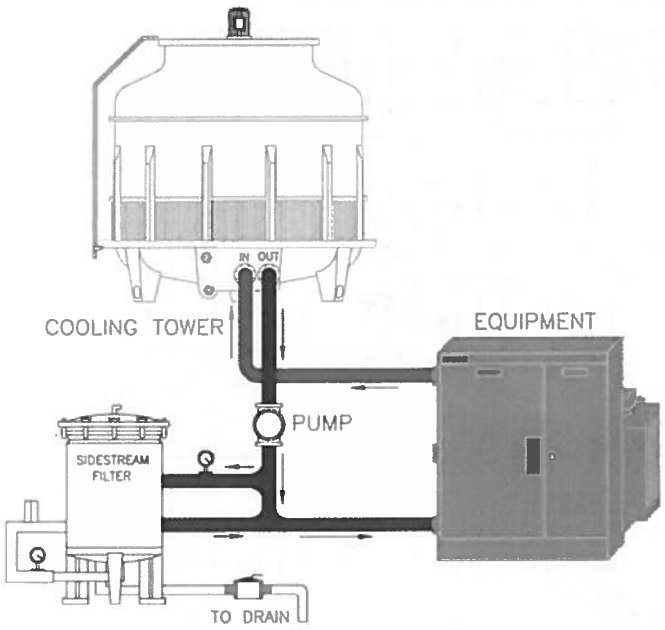
CAPACITY CURVES



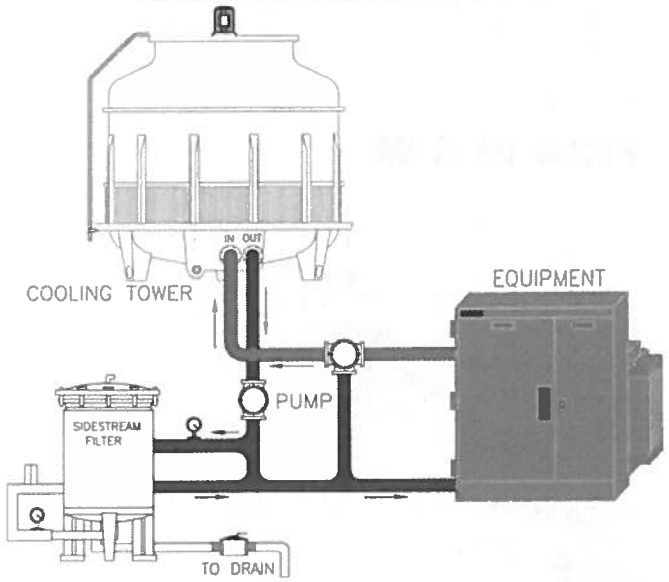


ST/CITY		DESIGN W.B.
AK	ANCHORAGE	60.0
AK	FAIRBANKS	64.0
AL	AUBURN	79.0
AL	BIRMINGHAM	78.0
AL	MOBILE AP	80.0
AR	FAYETTEVILLE	77.0
AR	JONESBORO	81.0
AR	LITTLE ROCK	80.0
AZ	FLAGSTAFF	61.0
AZ	PHOENIX	76.0
AZ	TUCSON	72.0
AZ	YUMA	79.0
CA	EL CENTRO	81.0
CA	FRESNO	72.0
CA	LOS ANGELES	70.0
CA	MONTEREY	64.0
CA	PALM SPRINGS	76.0
CA	POMONA	74.0
CA	SACRAMENTO	72.0
CA	SAN FRANCISCO	65.0
CA	SAN JOSE	68.0
CA	BURBANK	71.0
CT	HARTFORD	77.0
CO	COLORADO SPG	63.0
CO	DENVER AP	64.0
DC	WASHINGTON	78.0
DE	DOVER	79.0
FL	MIAMI BEACH	79.0
FL	ORLANDO	79.0
FL	PANAMA CITY	81.0
FL	PENSACOLA	80.0
FL	TAMPA	79.0
FL	CAPE KENNEDY	80.0
GA	ATHENS	78.0
GA	ATLANTA	77.0
GA	AUGUSTA	80.0
GA	MACON	79.0
HI	HILO	75.0
HI	HONOLULU	76.0
IA	DUBUQUE	77.0
IA	IOWA CITY	80.0
IA	DES MOINES	78.0
ID	POCATELLO	64.0
ID	BOISE	68.0
IL	CHICAGO	79.0
IL	DANVILLE	78.0
IL	ROCKFORD	77.0
IL	CARBONDALE	80.0
IN	INDIANAPOLIS	78.0
IN	MUNCIE	76.0
IN	TERRE HAUTE	79.0
IN	FORT WAYNE	77.0
KS	ATCHISON	81.0
KS	DODGE CITY	74.0
KS	HUTCHINSON	77.0
KS	RUSSELL	78.0
KS	WICHITA	77.0
KY	BOWLING GREEN	79.0
KY	LEXINGTON	77.0
LA	BATON ROUGE	80.0
LA	NEW ORLEANS	81.0
LA	SHREVEPORT	79.0
MA	GREENFIELD	74.0
MA	WORCESTER	73.0
MA	BOSTON	75.0
MD	BALTIMORE	80.0
MD	HAGERSTOWN	77.0
MD	SALISBURY	79.0
ME	BANGOR	73.0
ME	PORTLAND	74.0
MI	LANSING	75.0
MI	SAGINAW	76.0
MI	TRAVERSE CITY	75.0
MI	DETROIT	76.0
MN	DULUTH	72.0
MN	INTL FALLS	71.0
MN	MINNEAPOLIS	77.0
MO	HANNIBAL	80.0
MO	KANSAS CITY	78.0
MO	POPLAR BLUFF	81.0
MO	ST LOUIS	78.0
MS	BILOXI	82.0
MS	HATTIESBURG	81.0
MS	JACKSON	79.0
MS	TUPELO	80.0
MT	BUTTE	60.0
MT	MISSOULA	65.0
MT	BILLINGS	67.0
NC	CHARLOTTE	77.0
NC	FAYETTEVILLE	79.0
NC	JACKSONVILLE	80.0
NC	RALEIGH/DURHAM	78.0
NC	WILMINGTON	81.0
NC	WINSTON-SALEM	76.0
ND	BISMARCK	73.0
ND	DICKINSON	71.0
ND	FARGO	76.0
NE	LINCOLN	78.0
NE	NORTH PLATTE	74.0
NE	GRAND ISLAND	75.0
NH	BERLIN	73.0
NH	CONCORD	74.0
NJ	ATLANTIC CITY	78.0
NJ	NEW BRUNSWICK	77.0
NJ	TRENTON	78.0
NM	ALBUQUERQUE	66.0
NM	CARLSBAD	72.0
NM	LAS CRUCES	69.0
NM	SANTA FE	63.0
NV	LAS VEGAS	71.0
NV	RENO	64.0
NY	ALBANY	75.0
NY	ITHACA	74.0
NY	NYC-KENNEDY	75.0
NY	ROCHESTER	75.0
NY	SYRACUSE	75.0
OH	CINCINNATI	77.0
OH	CLEVELAND	76.0
OH	TOLEDO	76.0
OH	YOUNGSTOWN	74.0
OH	AKRON-CANTON	75.0
OK	OKLAHOMA CITY	78.0
OK	TULSA	79.0
OK	ALTUS	77.0
OR	BEND	64.0
OR	EUGENE	69.0
OR	GRANTS PASS	71.0
OR	PENDLETON	66.0
OR	PORTLAND	69.0
OR	ALBANY	69.0
PA	ERIE	75.0
PA	PHILADELPHIA	77.0
PA	PITTSBURGH	74.0
PA	READING	76.0
RI	NEWPORT	76.0
RI	PROVIDENCE	75.0
SC	CHARLESTON	81.0
SC	COLUMBIA	79.0
SC	FLORENCE	80.0
SC	SPARTANBURG	77.0
SD	ABERDEEN	77.0
SD	RAPID CITY	71.0
TN	CHATTANOOGA	78.0
TN	DYERSBURG	81.0
TN	KNOXVILLE	77.0
TN	NASHVILLE	78.0
TX	AMARILLO	71.0
TX	AUSTIN	78.0
TX	DALLAS	78.0
TX	EL PASO	69.0
TX	GALVESTON	81.0
TX	HOUSTON	80.0
TX	LUBBOCK	73.0
TX	SAN ANTONIO	77.0
UT	SALT LAKE CITY	66.0
UT	ST. GEORGE	70.0
UT	CEDAR CITY	65.0
VT	BURLINGTON	74.0
VA	FREDERICKSBURG	78.0
VA	NORFOLK	79.0
VA	RICHMOND	79.0
VA	WINCHESTER	77.0
WA	OLYMPIA	67.0
WA	SEATTLE-TACOMA	66.0
WA	SPOKANE	65.0
WA	EVERETT	67.0
WI	GREEN BAY	76.0
WI	MADISON	77.0
WI	MILWAUKEE	76.0
WI	ASHLAND	72.0
WV	CHARLESTON	76.0
WV	HUNTINGTON	78.0
WV	WHEELING	74.0
WY	CHEYENNE	63.0
WY	CASPER	63.0

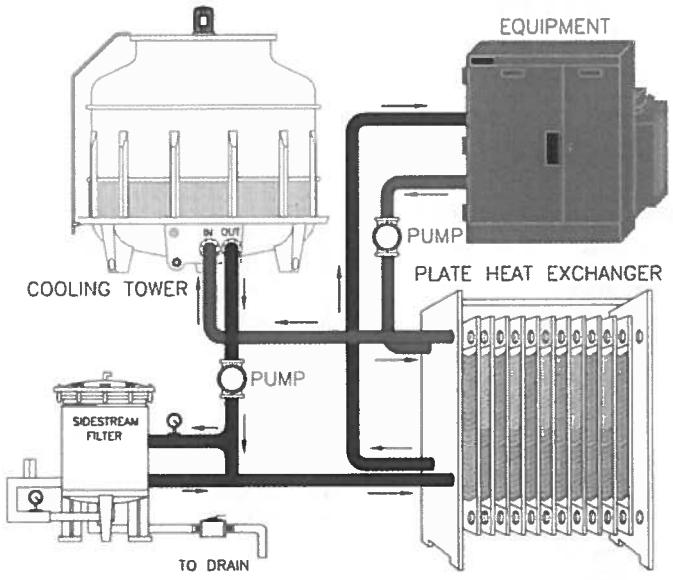
BASIC SYSTEM LAYOUT



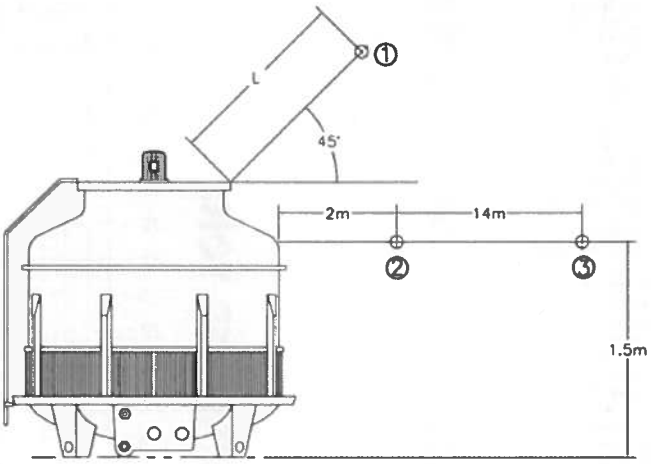
BYPASS SYSTEM LAYOUT



TYPICAL FLUID COOLER LAYOUT



SYSTEM LAYOUTS



NOISE LEVEL DATA $(dB)_A$

Tower Model	Position		
	1	2	3
RSD 003	59	57	46
RSD 005	59	57	46
RSD 008	60	58	46
RSD 010	66	61	50
RSD 015	66	61	50
RSD 020	67	62	51
RSD 025	72	66	58
RSD 030	73	67	58
RSD 040	77	74	63
RSD 050	77	74	63
RSD 060	79	75	65

Tower Model	Position		
	1	2	3
RSD 070	75	72	61
RSD 080	75	72	61
RSD 100	81	76	65
RSD 125	83	76	66
RSD 150	81	75	64
RSD 175	75	70	61
RSD 200	77	72	63
RSD 225	77	72	63
RSD 250	79	74	64
RSD 300	78	73	64
RSD 350	78	73	64

RSD COOLING TOWER WARRANTY

RSD warrants this product to be free of defects in materials and/or workmanship to the extent, but only the extent set forth below, and is limited to product that is properly applied and installed:

(A) FRP components for ten (10) years* from the date of installation. To be replaced or repaired as needed.
*Starting with serial #99000

(B) PVC fill material for two (2) years from date of installation. To be replaced as needed.

(C) All electrical, mechanical and non-FRP structural components for one (1) year from date of installation. To be repaired or replaced as needed.

The foregoing expressed warranty is in lieu of all other warranties, expressed, implied, or statutory (including, but not limited to, warranties of merchantability and fitness for a particular purpose.) RSD shall in no event be liable for any consequential, incidental or special damages and/or expenses.

TYPICAL COOLING TOWER APPLICATIONS

Type of Equipment	BTU	GPM	Cooling Range
Air Conditioning or Refrigeration	Per ton	Per ton	
Hermetic/Semi-Hermetic compressor	15,000/hr	1.5-3	10-20
Open drive compressor (external motor)	12,000/hr	3-3.6	10-12
Steam turbine driven compressor	30,000/hr	2-3	20-30
Absorption chiller	30,000/hr	3-4	15-20
Diesel Engine; jacket water & lube oil			
Four-cycle supercharged	2,600/hr	0.26	20
Four-cycle non supercharged	3,000/hr	0.30	20
Natural Gas Engine; jacket water & lube oil	per/bhp	per/bhp	
Four-cycle engine	4,500/hr	0.45	20
Two-cycle engine	4,500/hr	0.40	20
Electric Motor Driven Air Compressor	per/bhp	per/bhp	
Single stage	380/hr	0.076	10
Single stage, with aftercooler	2,545/hr	0.51	10
Two stage, with intercooler	1,530/hr	0.31	10
Plastic Injection Machines	Refer to the Hydraulic load demand		
Hydraulic Oil Coolers	2,545/hr/bhp	.51/bhp	10
Welding Tip Coolers	84/min(avg)	1	10
Dry Cleaning Machines	500 btu/lb cap.	3 gpm/ton	10

bhp = Brakehorse power 1 ton - 15,000 btu/hr

ACCESSORIES

CONTROL PANELS

RSD can provide control panels for any application. Whether your requirement is for simple fan cycling control or full system integration, our state-of-the-art Panel Division is uniquely equipped to engineer, design and build a control panel to meet your specific system demands. All control panels are UL 508 approved. This guarantees that your system will meet all code requirements and ensure years of trouble free operation.

HEAT EXCHANGERS

RSD can offer a variety of closed loop cooling systems. Many applications require water temperatures or water quality not normally attainable from a traditional open tower system. An RSD cooling tower in conjunction with a properly sized heat exchanger is an extremely cost effective and service friendly alternative to self contained fluid cooler designs. Simply provide us the system flow and water temperature requirements and leave the designing to us.

WATER TREATMENT

RSD can choose the correct water treatment for your needs. In all open cooling systems it is essential that the water be treated for dissolved solids and potential bacterial growth. Regardless of system design, over time, minerals in the water will form scale throughout the system that can affect heat transfer, water flow and ultimately system performance. In some systems, the formation of algae can also cause system problems. Let our water treatment specialists choose the proper chemical and feed system for your specific needs.

CIRCULATION SYSTEMS

RSD can design your water circulation system. Proper water flow is essential to ensure effective system performance. Since not all systems are created equally, efficient system design can save time and money. Our trained professionals can assist you in not only selecting the correct circulating pump for your flow requirements but also help design the most efficient piping layout for your system.

WATER FILTRATION

RSD can select the proper filtration option for you. One of the biggest challenges in any open cooling system is the control of foreign material in the water. This can cause everything from valve and control damage to the slow erosion of heat exchangers and the system piping. Whether the debris is introduced from the outside atmosphere or a by-product of the system itself, we can select a filtration option that is best suited to your specific needs.

COMPANY PROFILE

Refrigeration Supplies Distributor – Total Control has been a wholesale distributor of refrigeration, air conditioning and control products since 1933. Family owned and operated, RSD-TC was founded on the basis of quality products, knowledgeable staff and the highest in customer service, both before and after the sale.

In the early 1980's RSD-TC saw a need in the marketplace for a durable and economic alternative to the traditional metal and wood cooling towers. The RSD Fiberglass Cooling Tower was designed with the customer in mind. Fiberglass construction provides the double benefits of being lightweight and virtually non-corrosive. All the mechanical components have been engineered to meet the exacting standards of today's high tech marketplace.

RSD-TC takes pride in being more than a "me too" supplier. Though it is true that our Cooling Tower is the leader in its class, the benefits of choosing RSD-TC go far beyond the tower itself. Whether your requirements are for a simple HVAC application or a complex water-cooled system, RSD-TC has the technical support, products and services you need. With the largest inventory of Equipment, Controls and Accessories in the industry, RSD-TC is the clear choice when looking for a one-stop solution.

Our friendly technical support staff is trained to take your requirements and turn them into the most effective and cost efficient solution possible. To turn your problems into solutions, simply contact us via E-mail, Phone or Fax. We look forward to serving you.

RSD Fiberglass Cooling Towers, a Division of

RSD
REFRIGERATION SUPPLIES DISTRIBUTOR

26021 Atlantic Ocean Dr, Lake Forest Ca, 92630 949-380-1000 ex 00405
website www.rsdcoolingtower.com – email towers@rsd.net

APPENDIX D

WATER REDUCTION AND COST SAVINGS ESTIMATES

Appendix D
Custom Food Products
Recirc & $ave Program

Estimated Water Reduction

	Percentage of Water Consumption of Meter No. 7372844293	Water Use per Day (Gallons per Work Day)	Annual Water Usage (Million Gallons per Year)
	(Percent)	(gal/day)	(MGY)
Evaporative Condensers	20%	36,554	9.5
Industrial Microwave	17%	31,071	8.1
Steam Houses	20%	36,554	9.5
Boilers	15%	27,416	7.1
Sanitiation	25%	45,693	11.9
Product Preparation	3%	5,483	1.4
Total Water Usage of Meter No. 7372844293		**182,772**	**47.5**

	Annual Water Usage (Million Gallons per Year)	Estimated Water Savings	Estimated Water Savings (Million Gallons per Year)
	(MGY)	(Percent)	(MGY)
Total Water Usage for Industrial Microwave	8.1	80%	**6.5**

Appendix D
Custom Food Products
Recirc & $ave Program

Potential Annual Water and Wastewater Cost Savings

	Average Annual Water Usage for Industrial Microwave (Milion Gallons per Year)	Estimated Annual Water Savings		Average Annual Water Usage After Installation of Water Efficiency Technologies (Million Gallons per Year)	Estimated Annual Water and Wastewater Savings		Net Estimated Annual Water and Wasterwater Savings
					California Water Service Company Quantity Rates[1]	Sanitation Districts of Los Angeles (LACSD) Wastewater Treatment Surcharges[2]	
	(MGY)	(MGY)	(HCF/yr)	(MGY)	($2.7738 per HCF)	($746 per Mgal)	
Total Water Usage for IndustriaL Microwave	8.1	6.5	8,640	1.6	**$ 23,966**	**$ 4,821**	**$ 28,787**

(1) Quantity Rates of $2.7738 does not include various surcharges authorized by the California Public Utilities Commission.
(2) 2010- 2011 LACSD Wastewater Treatment Surcharges:
a. Total Flow Volume Per Year (Mgal/yr) x $746.00
b. Total Chemical Oxygen Demand Per Year (1000 of lbs) x $ 131.90
c. Total Suspended Solids Per Year (1000 of lbs) x $ 372.70
d. Average Peak Flow Rate (gal/min) x $ 98.90
For this preliminary estimate, surcharges b, c and d are assumed to be constant and are omitted from the Wastewater Treatment Surcharges calculation.

APPENDIX E

ESTIMATED PROGRAM FUNDING

Appendix E
Custom Food Products
Recirc & $ave Program

Estimated Program Funding

Potential Program Cash Incentives			
Estimated Annual Potable Water Savings (Million Gallons per Year)	**6.5**		
Water Reduction Incentive	Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period.	$	19,388
Equipment Cost Incentive*	Reimbursement of the equipment cost of up to $5,000 maximum based on the $3.00 per 1,000 gallons saving rate over a one-year period.	$	5,000
Installation Cost Incentive	Reimbursement of the equipment installation of up to $5,000 maximum based on actual installation costs.	$	5,000
	Total Potential Program Cash Incentives	**$**	**29,388**

*A minimum of 1.67 Mgal/yr of water savings is necessary to obtain the Equipment Cost Incentive. Program cash incentives cannot exceed the total project costs

17140 S. Avalon Blvd., Suite 210, Carson CA 90746 310-217-2411 www.westbasin.org

WEST BASIN MUNICIPAL WATER DISTRICT
RECIRC & $AVE

INDUSTRIAL PROCESS WATER
AND
COOLING TOWER WATER REDUCTION PROGRAM

Cooling Tower Water Use Survey

Prepared for:

The Pepsi Bottling Group
19700 South Figueroa Street
Carson, California

Prepared by:

Maureen Erbeznik & Associates
4246 Michael Avenue
Los Angeles, CA 90066

Cooling Tower Water Use Survey

Your Savings Opportunity

Based upon the technical survey of the cooling towers at your business, $7,876 can be saved per year by moving to pH control for all three of your cooing towers. The estimated lifetime savings for these upgrades is between $39,380 - $78,760. In addition, West Basin is offering a one-time incentive of $9,840 if you install these water saving measures.

A financial overview of these changes is below:

$9,840	Total project cost
- $9,840	Incentives provided by *Recirc & Save Program*
$0	Out-of-pocket project cost
$7,876	Estimated annual water and sewer savings
IMMEDIATE	**Payback period in years = Start Savings Day One**

Program Overview

West Basin Municipal Water District, through the ***Recirc & Save Program***, provides local businesses with technical assistance and large scale incentives to invest in ph and conductivity controllers for your cooling towers. These measures can significantly reduce your water use. This innovative program offers:

- Up to **$5,000** for equipment upgrades
- Up to **$5,000** for equipment installation

The technical survey of your cooling towers was conducted at the following address:

The Pepsi Bottling Group
19700 S Figueroa St.
Carson, 90745

Cooling Tower Water Use Survey

Existing Condition

The Pepsi Carson property has three cooling towers on site. Below is an overview of these cooling towers:

Cooling Tower #	Cooling Tower Size	Conductivity Controller Make and Model	Cycles of Concentration	pH	M alkalinity	Conductivity	% Load	Operating Time
EC1	300 Ton	Advantage Controller Series 2EZ	2	9	316	1100	40%	24/6
EC2	300 Ton	Advantage Controller Series 2EZ	2.1	9.2	400	1500	40%	24/6
CT3	100 Ton	Advantage Controller	2	Unknown	Unknown	1200	60%	24/6

City Water

The conductivity of the city water is currently tracking at 450 to 700 parts per million.

Cooling Tower Water Use Survey

RECOMMENDATIONS

RECOMMENDATIONS FOR COOLING TOWER EC1

Potential Modification	*Recommended (yes/no)*	*Estimated Cost of Retrofit*	*Estimated Annual Water Savings*	*Estimated Water and Sewer Bill Savings*	*Estimated Incentive*	*Payback Period*
Install New Conductivity Controller	NO	$750	Minimal	Minimal	$625	6 months
Upgrade to pH Control	YES	$3,280	1,078,272 gallons	$3,332	$3,280	Immediate
Upgrade to Water Softener	NO	$15,000	1,293,926 gallons	$3,998	$10,000	1.25 years

RECOMMENDATION FOR COOLING TOWER EC2

Potential Modification	*Recommended (yes/no)*	*Estimated Cost of Retrofit*	*Estimated Annual Water Savings*	*Estimated Water and Sewer Savings*	*Estimated Incentive*	*Payback Period*
Install New Conductivity Controller	NO	$750	Minimal	Minimal	$625	6 months
Upgrade to pH Control	YES	$3,280	931,235 gallons	$2,878	$3,280	Immediate

Cooling Tower Water Use Survey

Upgrade to Water Softener	NO	$15,000	1,146,889 gallons	$3,544	$10,000	1.4 years

Cooling Tower Water Use Survey

RECOMMENDATION FOR COOLING TOWER CT3

Potential Modification	*Recommended (yes/no)*	*Estimated Cost of Retrofit*	*Estimated Annual Water Savings*	*Estimated Water and Sewer Savings*	*Estimated Incentive*	*Payback Period*
Install New Conductivity Controller	NO	$750	Minimal	Minimal	$625	6 months
Upgrade to pH Control	YES	$3,280	539,136 gallons	$1,666	$3,280	Immediate
Upgrade to Water Softener	NO	$15,000	943,488 gallons	$2,082	$10,000	4.8 years

NEXT STEPS

Contact your water treatment company or a company on the list provided in this report to obtain a quote for the new equipment and installation.

1. Complete Program Application (Save a Buck) and submit to:

RECIRC & $AVE Program
Attn: Elise Goldman
17140 South Avalon Blvd., Ste. 210
Carson, CA 90746-1296

Cooling Tower Water Use Survey

2. Receive approval for your project and allow West Basin to install a temporary flow meter onto your cooling towers (if not already present). A West Basin representative will supply and install the meter on each of the cooling towers receiving an incentive. The water savings will be monitored for one month prior to installation and two months after installation. All monitoring expenses will be covered under the Program.

3. Purchase controllers and notify Recirc & Save Program of your Purchase and send receipts to above address.

4. Receive first payment upon purchase of new equipment.

5. West Basin obtains meter readings for one month.

6. Install new controllers and notify Recirc & Save Program of installation.

7. Receive second payment upon installation of new controllers.

8. West Basin obtains meter readings for two months to confirm water savings and removes meters.

CURRENT COOLING TOWER WATER TREATMENT COMPANY

Pepsi currently contracts with the following water treatment company to maintain their cooling towers:

Water Treatment Company	**Apollo Technologies**
Address	**31441 Santa Margarita Parkway Suite A-219**
City, State and Zip	**Rancho Santa Margarita, CA 92688**
Contact	**Bob Ricks/Leo Ramos**

Cooling Tower Water Use Survey

Contact Phone	**(949) 888-0573**

Cooling Tower Water Use Survey

ADDITIONAL PROGRAM ASSISTANCE

For additional assistance, please contact the following:

Recirc & Save Representative	**Maureen Erbeznik**
Address	**4246 Michael Avenue**
City, State and Zip	**Los Angeles, CA 90066**
Contact Phone (office):	**(310) 822-3369**
Contact Phone (cell):	**(310) 621-4577**
Contact Email	**moerbeznik@ca.rr.com**

Cooling Tower Water Use Survey

APPENDIX A: COOLING TOWER AND WATER EFFICIENCY UPGRADE BACKGROUND

Cooling towers are normally part of the air conditioning system of large commercial buildings or manufacturing sites. These towers are used to remove heat from the system through evaporation.

Up to 75 to 80% of the water used by a cooling tower is evaporated to remove heat and the remainder is lost due to "blowdown". Blowdown is water intentionally removed from the cooling tower to control the buildup of dissolved solids resulting from evaporation. Blowdown is usually controlled by a conductivity meter/controller using a timer or by manual adjustment.

As water evaporates from a cooling tower, the dissolved solids concentrate in the re-circulating water creating a high amount of TDS (Total Dissolved Solids). If these solids are not removed, their concentrations will increase to levels that can cause damage to the cooling tower system. In most systems, these solids are removed by adding chemicals and discharging a portion of the re-circulating water. Make-up water is then added to replace water lost to evaporation and blowdown.

From a water efficiency standpoint, it is desirable to maximize the number of cycles of concentration, which will minimize the blowdown water quantity, and reduce make-up water demand. However, this can only be done within the constraints of the make-up water and cooling tower water chemistry. As cycles of concentration increase, the dissolved solids increase, which can cause scale and corrosion problems if they are not carefully controlled.

The relationship between quantities of make-up water and blowdown can be expressed in terms of the concentration ratio, or the cycles of concentration. The concentration ratio can be thought of as an indicator of the number of times water is used in the cooling tower before it is discharged.

Cooling towers that are older and/or lacking proper controls and devices cost much more to operate than cooling towers that take advantage of current technologies.

Cooling Tower Water Use Survey

THERE ARE THREE CATEGORIES OF UPGRADES:

1. Maximize performance through low cost measures-

   A standard conductivity controller can be used to monitor the water chemistry and reduce the amount of blowdown and make-up water. Installing a new conductivity controller and increasing the cycles of concentration to 3 to 3.5 cycles can save a significant amount of water. A standard controller costs between $400 to $800.

2. Upgrade cooling tower system with mid-level cost measures by adding a pH controller-

   A pH controller is a more sophisticated type of controller that monitors the pH of the water. The pH controller combined with acid-based chemical treatment can push the cycles of concentration to 5 to 7 cycles. This upgrade, although higher in initial costs than Category 1, typically yields much higher savings. The costs of a pH controller range from $2,400 to $4,000.

3. Upgrade cooling tower system with high level technologies – There are an array of ultra high efficiency options available today. Two of these options include:

   a) Installation of a water softening system: Under some applications, it is cost effective to install a water softening system. Softened water can be used as the makeup water and increase the cycles of concentration from 6 to 20 cycles. Due to the high corrosivity of highly cycled soft water, very specialized chemistry is required for corrosion control.

   b) Utilization of recycled water for the cooling tower: Recycled water from the local water retailer may be available if there is a recycled water infrastructure in existence. If so, this cost of this water is much less expensive than the traditional potable water supply and can readily be used for cooling tower systems. In some instances, water from other equipment within a facility can be recycled and reused for cooling tower make-up with little or no pre-treatment, including the following:

   - Air handler condensate (water that collects when warm, moist air passes over the cooling coils in air handler units)
   - Water used in a once-through cooling system
   - Pretreated effluent from other industrial processes, provided that any chemicals used are compatible with the cooling tower system

Cooling Tower Water Use Survey

APPENDIX B: COOLING TOWER WATER TREATMENT RECORDS

Cooling Tower Water Use Survey

APPENDIX C: WATER SAVINGS CALCULATION

APPENDIX D: UPGRADE QUOTATION FROM WATER TREATMENT COMPANY

17140 S. Avalon Blvd., Suite 210, Carson CA 90746 310-217-2411 www.westbasin.org

WEST BASIN MUNICIPAL WATER DISTRICT
RECIRC & $AVE

INDUSTRIAL PROCESS WATER
AND
COOLING TOWER WATER REDUCTION PROGRAM

Cooling Tower Water Use Survey

Prepared for:

Albertsons a SUPERVALU Company
1421 South Manhattan Ave.
Fullerton, California 92831

Prepared by:

Maureen Erbeznik & Associates
4246 Michael Avenue
Los Angeles, CA 90066

Cooling Tower Water Use Survey

YOUR SAVINGS OPPORTUNITY

A technical survey was conducted at Albertsons Store #6108 located at 1735 W Artesia Boulevard in Gardena, California. Data was also collected for two additional Albertsons Stores #6103 and #6127 located within West Basin's service territory.

Based upon the technical survey of the cooling towers associated with your evaporative condensers, up to $5,157 can be saved per year by moving to pH control. The estimated lifetime savings for these upgrades are $25,785 - $51,570 depending on the life of the product. In addition, West Basin is offering a one-time incentive of $7,500 if you install these water saving measures, which should cover the entire cost of the project.

A financial overview of these changes is below:

$7,500	Total project cost
- $7,500	Incentives provided by *Recirc & Save Program*
$0	Out-of-pocket project cost
$5,157	Estimated annual water and sewer savings
IMMEDIATE	**Payback period in years = Start Savings Day One**

PROGRAM OVERVIEW

West Basin Municipal Water District, through the ***Recirc & Save Program***, provides local businesses with technical assistance and cash incentives to invest in ph and conductivity controllers for your cooling towers. These measures can significantly reduce your water use. This innovative program offers:

- Up to **$5,000** for equipment upgrades (per controller)
- Up to **$5,000** for equipment installation (per controller)

Cooling Tower Water Use Survey

Existing Condition

The Cooling Towers evaluated at Albertsons Stores #6103, #6108 and #6127 include the following:

Store #	Cooling Tower Size	Conductivity Controller Make and Model	Cycles of Concentration	pH	M alkalinity	Conductivity	% Load	Operating Time
Store 6103	320 Ton	No Existing Controller – Timer with Drip System	2.5	Unknown	Unknown	Unknown	50%	24/7
Store 6108	240 Ton	No Existing Controller – Timer with Drip System	2.5	Unknown	Unknown	Unknown	50%	24/7
Store 6127	135 Ton	No Existing Controller – Timer with Drip System	2.5	Unknown	Unknown	Unknown	50%	24/7

City Water

The conductivity of the city water to the Cooling Towers is currently tracking at approximately 500 parts per million.

Cooling Tower Water Use Survey

RECOMMENDATIONS

COOLING TOWER AT ALBERTSONS STORE #6103

Potential Modification	*Recommended (yes/no)*	*Estimated Cost of Retrofit*	*Estimated Annual Water Savings*	*Estimated Water and Sewer Bill Savings*	*Estimated Additional Monthly Service Fee*	*Estimated Incentive*	*Payback Period*
Install New Conductivity Controller	NO – Savings don't justify cost	$750	Minimal	Minimal	$0	$625	6 months
Upgrade to pH Control	YES	$2,500	838,656 gallons	$2,298	$225	$2,500	Cost $402 per year
Upgrade to Water Softener	NO	$15,000	1,174,118 gallons	$3,217	Unknown	$10,000	1.5 years

It is necessary to determine if the Cooling Tower is located on the roof. If the tower is located on the roof, it will not be feasible to implement pH control, since it would require carrying containers of acid onto the roof as well as the installation of a nearby eye wash station.

Although the incentive pays for the entire costs of the recommended project, the annual cost for weekly water quality testing will increase by $225 per month. After the annual water savings are considered, the estimated out of pocket expense to Albertsons would be $402 per year.

Cooling Tower Water Use Survey

Cooling Tower at Albertsons Store #6108

Potential Modification	*Recommended (yes/no)*	*Estimated Cost of Retrofit*	*Estimated Annual Water Savings*	*Estimated Water and Sewer Bill Savings*	*Estimated Additional Monthly Service Fee*	*Estimated Incentive*	*Payback Period*
Install New Conductivity Controller	NO – Savings don't justify cost	$750	Minimal	Minimal	$0	$625	6 months
Upgrade to pH Control	NO – Location of Tower not feasible for pH treatment	$2,500	628,992 gallons	$1,723	$225	$2,500	Cost $977 per year
Upgrade to Water Softener	NO – Savings don't justify costs	$15,000	880,589 gallons	$2,413	Unknown	$10,000	2 years

The Cooling Tower at Albertsons Store #6108 is located on the roof and therefore pH control cannot be implemented at the site.

Cooling Tower Water Use Survey

COOLING TOWER AT ALBERTSONS STORE #6127

Potential Modification	*Recommended (yes/no)*	*Estimated Cost of Retrofit*	*Estimated Annual Water Savings*	*Estimated Water and Sewer Bill Savings*	*Estimated Additional Monthly Service Fee*	*Estimated Incentive*	*Payback Period*
Install New Conductivity Controller	NO – Savings don't justify cost	$750	Minimal	Minimal	$0	$625	6 months
Upgrade to pH Control	YES	$2,500	353,808 gallons	$1,136	$225	$2,500	Cost $1,564 per year
Upgrade to Water Softener	NO	$15,000	495,331 gallons	$1,590	Unknown	$10,000	3 years

It is necessary to determine if the Cooling Tower is located on the roof. If the tower is located on the roof, it will not be feasible to implement pH control, since it would require carrying containers of acid onto the roof as well as the installation of a nearby eye wash station.

Although the incentive pays for the entire costs of the recommended project, the annual cost for weekly water quality testing will increase by $225 per month. After the annual water savings are considered, the estimated out of pocket expense to Albertsons would be $1,564 per year.

Cooling Tower Water Use Survey

NEXT STEPS

Contact your water treatment company or a company on the list provided in this report to obtain a quote for the new equipment and installation.

1. Complete Program Application (Save a Buck) and submit to:

   RECIRC & $AVE Program
   Attn: Elise Goldman
   17140 South Avalon Blvd., Ste. 210
   Carson, CA 90746-1296

2. Receive approval for your project and allow West Basin to install a temporary flow meter onto your cooling towers (if not already present). A West Basin representative will supply and install the meter on each of the cooling towers receiving an incentive. The water savings will be monitored for one month prior to installation and two months after installation. All monitoring expenses will be covered under the Program.

3. Purchase controllers and notify Recirc & Save Program of your Purchase and send receipts to above address.

4. Receive first payment upon purchase of new equipment.

5. West Basin obtains meter readings for one month.

6. Install new controller(s) and notify Recirc & Save Program of installation.

7. Receive second payment upon installation of new controller(s).

8. West Basin obtains meter readings for two months to confirm water savings and removes meters.

Cooling Tower Water Use Survey

Current Cooling Tower Water Treatment Company

Albertsons currently contracts with the following water treatment company to maintain their cooling towers:

Water Treatment Company	**McMillian Water**
Address	**PO Box 1539**
City, State and Zip	**Fontana, CA 92334**
Contact	**Doug Potts**
Contact Phone	**(800) 785-3242**

Additional Program Assistance

For additional assistance, please contact the following:

Recirc & Save Representative	**Maureen Erbeznik**
Address	**4246 Michael Avenue**
City, State and Zip	**Los Angeles, CA 90066**
Contact Phone (office):	**(310) 822-3369**
Contact Phone (cell):	**(310) 621-4577**
Contact Email	**moerbeznik@ca.rr.com**

Cooling Tower Water Use Survey

APPENDIX A: COOLING TOWER AND WATER EFFICIENCY UPGRADE BACKGROUND

Cooling towers are normally part of the air conditioning system of large commercial buildings or manufacturing sites. These towers are used to remove heat from the system through evaporation.

Up to 75 to 80% of the water used by a cooling tower is evaporated to remove heat and the remainder is lost due to "blowdown". Blowdown is water intentionally removed from the cooling tower to control the buildup of dissolved solids resulting from evaporation. Blowdown is usually controlled by a conductivity meter/controller using a timer or by manual adjustment.

As water evaporates from a cooling tower, the dissolved solids concentrate in the re-circulating water creating a high amount of TDS (Total Dissolved Solids). If these solids are not removed, their concentrations will increase to levels that can cause damage to the cooling tower system. In most systems, these solids are removed by adding chemicals and discharging a portion of the re-circulating water. Make-up water is then added to replace water lost to evaporation and blowdown.

From a water efficiency standpoint, it is desirable to maximize the number of cycles of concentration, which will minimize the blowdown water quantity, and reduce make-up water demand. However, this can only be done within the constraints of the make-up water and cooling tower water chemistry. As cycles of concentration increase, the dissolved solids increase, which can cause scale and corrosion problems if they are not carefully controlled.

The relationship between quantities of make-up water and blowdown can be expressed in terms of the concentration ratio, or the cycles of concentration. The concentration ratio can be thought of as an indicator of the number of times water is used in the cooling tower before it is discharged.

Cooling towers that are older and/or lacking proper controls and devices cost much more to operate than cooling towers that take advantage of current technologies.

Cooling Tower Water Use Survey

THERE ARE THREE CATEGORIES OF UPGRADES:

1. Maximize performance through low cost measures-

   A standard conductivity controller can be used to monitor the water chemistry and reduce the amount of blowdown and make-up water. Installing a new conductivity controller and increasing the cycles of concentration to 3 to 3.5 cycles can save a significant amount of water. A standard controller costs between $400 to $800.

2. Upgrade cooling tower system with mid-level cost measures by adding a pH controller-

   A pH controller is a more sophisticated type of controller that monitors the pH of the water. The pH controller combined with acid-based chemical treatment can push the cycles of concentration to 5 to 7 cycles. This upgrade, although higher in initial costs than Category 1, typically yields much higher savings. The costs of a pH controller range from $2,400 to $4,000.

3. Upgrade cooling tower system with high level technologies – There are an array of ultra high efficiency options available today. Two of these options include:

   a) Installation of a water softening system: Under some applications, it is cost effective to install a water softening system. Softened water can be used as the makeup water and increase the cycles of concentration from 6 to 20 cycles. Due to the high corrosivity of highly cycled soft water, very specialized chemistry is required for corrosion control.

   b) Utilization of recycled water for the cooling tower: Recycled water from the local water retailer may be available if there is a recycled water infrastructure in existence. If so, this cost of this water is much less expensive than the traditional potable water supply and can readily be used for cooling tower systems. In some instances, water from other equipment within a facility can be recycled and reused for cooling tower make-up with little or no pre-treatment, including the following:

   - Air handler condensate (water that collects when warm, moist air passes over the cooling coils in air handler units)
   - Water used in a once-through cooling system
   - Pretreated effluent from other industrial processes, provided that any chemicals used are compatible with the cooling tower system

Cooling Tower Water Use Survey

APPENDIX B: COOLING TOWER WATER TREATMENT RECORDS

Cooling Tower Water Use Survey

APPENDIX C: WATER SAVINGS CALCULATION

WEST BASIN RECIRC & SAVE INDUSTRIAL WATER USE REDUCTION PROGRAM

SUMMARY OF MAJOR CUSTOMERS

Customer Name	Site Visit	Field Survey Report	Equip Survey Report	Status Notes
Raytheon	X	X		Customer considering future cooling tower replacement.
Coast Plating	X	X	X	Customer installed recommended upgrades and received half Program incentive. Customer unable to effectively run DI system to obtain estimated water savings.
Lekos Dye and Finishing	X	X	Pending	Awaiting data from Customer to complete Equipment Report.
American Apparel				Facility relocated to Orange County area. MWDOC completed Site Visit and Survey Report, but Customer did not proceed.
Nissin Foods	X	X		After submittal of Field Survey Report, Customer has no additional interest.
Boeing				Managed by Elise
Northrop Grumman				Managed by Elise
Texlon	X	X		Customer may have installed recommended upgrades outside Program.
Texollini				Customer was interested in Program, but installed new water-saving machines under Southern California Gas incentive program.
Custom Food Products	X	X	X	Customer reluctant to initiate recommended changes to microwave unit.
Alcoa Carson	X	X	X	Customer reluctant to initiate recommended changes to plating lines.
Blue Creations	X	X	X	Customer implemented recommended changes and received full Program incentive.
Enterprise	X	X		Combined Field Survey and Equipment Survey report issued. Customer considering implementation of recommended changes.
International Dye Casting	X	X		Customer had previous problems in recycling of wastewater.
Amneostat	X			No significant water reductions recommended.
Caitac	X	X	X	Recommendation to install newer machines but previously had excess capacity. Customer may purchase new machines in future as business increases.
Teledyne	X	X		After submittal of Field Survey Report, Customer not interested in recommended modifications to plating operation.
Sodexo	X	X		Customer contact left facility and recommended changes put

				on hold.
Don Lee Farms	X			No significant water reductions recommended.
Praxair				Unable to establish Customer contact by telephone.
Nalco	X			No significant water reductions recommended.
Air Products				Customer not interested in Program.
Pacific Continental	X	X		Facility engineer waiting for management approval of recommended changes. Capital investment does not seem feasible at this time.
Hollywood Riviera Car Wash	X	Pending		Field Survey Report in process.
Radiant Services				Customer already implemented on-site water reuse, so no interest in Program.
Maxima Enterprises				Customer moved to Gardena outside West Basin service area.
OSI	X	Pending		Field Survey Report in process.

Appendix C
Albertson's Store 6103
Recirc & $ave Program
Estimated Annual Savings and Potential Program Cash Incentive for Cooling Towers

Cooling Tower		
Chiller Capacity - Nominal	320	Tons
Average Equiv. Cooling Load (All Year)	50%	
Average Equiv. Cooling Load (All Year)	160	Tons (@12,000 Btu/Ton)
Average Equiv. Cooling Load (All Year)	1,920,000	Btuh
Required Cooling Tower Capacity	200.0	C.T. Tons (15,000 Btu/Chiller Ton)

CALCULATIONS

Basis of Calculation	Operating Season	Cycles of Concentration	Cooling Tower Delta T (° F)	Evaporation (% / Deg.F)	Flow Based on Full Load (GPM)	Cooling Tower Evaporation (GPM)	Make-Up Water (GPD)	Total Annual Make-Up Water in Gallons	Estimated Annual Water Bill Savings	Estimated Annual Sewer Bill Savings	Estimated Project Costs	Estimated Customer Out-of-Pocket Expense
Current Operation	All Year	2.5	10.0	0.1%	960	4.80	11,488	4,193,280				
With pH Control	All Year	4.0	10.0	0.1%	960	4.80	9,191	3,354,624				
Water Savings								838,656				
Incentive								$3,364	$2,298	$0	$3,364	$0

Water Rate $2.74 per HCF (748 gallons)
Sewer Rate Not commodity based

Appendix C
Albertson's Store 6108
Recirc & $ave Program
Estimated Annual Savings and Potential Program Cash Incentive for Cooling Towers

Cooling Tower		
Chiller Capacity - Nominal	240	Tons
Average Equiv. Cooling Load (All Year)	50%	
Average Equiv. Cooling Load (All Year)	120	Tons (@12,000 Btu/Ton)
Average Equiv. Cooling Load (All Year)	1,440,000	Btuh
Required Cooling Tower Capacity	150.0	C.T. Tons (15,000 Btu/Chiller Ton)

CALCULATIONS

Basis of Calculation	Operating Season	Cycles of Concentration	Cooling Tower Delta T (° F)	Evaporation (% / Deg.F)	Flow Based on Full Load (GPM)	Cooling Tower Evaporation (GPM)	Make-Up Water (GPD)	Total Annual Make-Up Water in Gallons	Estimated Annual Water Bill Savings	Estimated Annual Sewer Bill Savings	Estimated Project Costs	Estimated Customer Out-of-Pocket Expense
Current Operation	All Year	2.5	10.0	0.1%	720	3.60	8,616	3,144,960				
With pH Control	All Year	4.0	10.0	0.1%	720	3.60	6,893	2,515,968				
Water Savings								628,992				
Incentive								$3,364	$1,723	$0	$3,364	$0

Water Rate $2.74 per HCF (748 gallons)
Sewer Rate Not commodity based

Appendix C
Albertson's Store 6127
Recirc & $ave Program
Estimated Annual Savings and Potential Program Cash Incentive for Cooling Towers

Cooling Tower		
Chiller Capacity - Nominal	135	Tons
Average Equiv. Cooling Load (All Year)	50%	
Average Equiv. Cooling Load (All Year)	67.5	Tons (@12,000 Btu/Ton)
Average Equiv. Cooling Load (All Year)	810,000	Btuh
Required Cooling Tower Capacity	84.4	C.T. Tons (15,000 Btu/Chiller Ton)

CALCULATIONS

Basis of Calculation	Operating Season	Cycles of Concentration	Cooling Tower Delta T (° F)	Evaporation (% / Deg.F)	Flow Based on Full Load (GPM)	Cooling Tower Evaporation (GPM)	Make-Up Water (GPD)	Total Annual Make-Up Water in Gallons	Estimated Annual Water Bill Savings	Estimated Annual Sewer Bill Savings	Estimated Project Costs	Estimated Customer Out-of-Pocket Expense
Current Operation	All Year	2.5	10.0	0.1%	405	2.03	4,847	1,769,040				
With pH Control	All Year	4.0	10.0	0.1%	405	2.03	3,877	1,415,232				
Water Savings								353,808				
Incentive								$3,364	$1,136	$0	$3,364	$0

Water Rate $3.21 per HCF (748 gallons)
Sewer Rate Not commodity based

Appendix D:
Reclamation Promotional Article

Appendix D: Reclamation Promotional Article

RECLAMATION
Managing Water in the West

Lower Colorado Region

Vol. XVIII No. 37 **The Regional Report** October 5, 2012

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Reclamation funds West Basin water efficiency programs to reduce demand on Western Water System

Editor's note: The following article was submitted by Reclamation Water Conservation Specialist Deb Whitney; with Gus Meza, Senior Water Efficiency Specialist, and Elise Goldman, Water Efficiency Specialist with West Basin Municipal Water District.

To reduce indoor and outdoor water use throughout the West Basin Municipal Water District's (West Basin) service area, the Bureau of Reclamation is matching the funds from local and state sources to support West Basin's work with businesses, other public agencies, and residents in the Los Angeles coastal area.

The programs supported by Reclamation's funding include an innovative Commercial, Industrial and Institutional (CII) program that works with large industrial process water users and customers with cooling towers and the Landscape Irrigation Efficiency Program (LIEP) to reduce runoff and other water waste from inefficient sprinklers and irrigation systems.

Commercial, Industrial and Institutional

The overall goal of the CII program is to inspect large commercial and industrial sites and identify water efficiency potential to encourage customer participation.

Conductivity controllers are used for process improvement in treating and re-circulating industrial water. *Photo courtesy of West Basin Municipal Water District*

Water efficiency measures include conductivity controllers and meters to closely monitor processes, pH controllers for cooling towers and pay-for-performance incentives for process improvement that treat and re-circulate industrial water on site.

The total water savings goal for this program is 160 acre-feet or more than 50,000,000 gallons per year. Electricity savings is estimated to be more than 500,000 kWh per year.

The CII program is currently being implemented by Alcoa Fastening Systems (AFS), a manufacturer of

fasteners and installation tools for the aerospace and industrial markets. Its facility in Carson, California, just south of Los Angeles, is participating in CII as a means of implementing its "Best Practices."

AFS has installed meters on the plating process where 90-95 percent of their water use takes place. This metered monitoring program is establishing pre-installation baseline data on water use and will use post-installation data use to verify water savings.

Mike Silva, Plating Department lead, says the, ". . . meters may sense and help the Carson facility achieve company goals." *Photo courtesy of West Basin Municipal Water District*

"As a practical application, the meters make sense and help the Carson facility achieve the company's annual, international environmental goals," said Mike Silva, Plating Department Lead.

"From a business perspective, AFS looks at the costs of raw materials, including water and energy, and saving water helps achieve a better bottom line," added William J. Carrigan, Director of Operations.

AFS' practices also help position the company as an environmental leader in the industry, an ethic becoming increasingly significant to their customers around the world.

"AFS' environmental standards, as set by the Alcoa corporate office, exceed state and federal reporting requirements and are implemented at its facilities throughout the world," said Shweta Kabre, Environmental Engineer. For example, AFS' facilities in China are held to the same standards as those in California.

The decision to take part in West Basin's CII program was easy for AFS staff. They've already implemented meters on the parts washing and heat treatment processes. The CII program helps AFS and other similar businesses qualify for a $5,000 rebate on equipment and a $5,000 reimbursement for installation expenses.

Reclamation is providing $66,000 of the $1 million CII program budget. Matching funds for the difference are provided by the California Department of Water Resources, the Metropolitan Water District, West Basin and retail partners California Water Service Company (Cal Water) and Golden State Water Company.

Landscape Irrigation Efficiency Program

Reclamation is also investing in West Basin's Landscape Irrigation Efficiency Program, or LIEP, in which a landscape contractor surveys landscape sites for leaks and inefficient sprinkler nozzles and makes recommendations for improvements. This program is available to residents, businesses, and public agencies.

Through the Landscape Irrigation Efficiency Program, a landscape contractor surveys landscape sites for leaks and inefficient sprinkler nozzles and makes recommendations for improvements. *Photo courtesy of West Basin Municipal Water District*

One of West Basin's initial customers in this program is Continental Development, a property management company with 80 acres of landscape at its Manhattan Beach and El Segundo locations. Contractors run the sprinklers to look for leaks and runoff and switch out old sprinkler heads with water efficient sprinkler heads on site.

According to Lianne M. Ibarra, Director of Property Management for Continental Development Corporation, "Reducing water and energy use at our facilities helps Continental Development remain competitive in the marketplace. When our expenses are lowered, we can offer better rates to our tenants."

Continental is additionally working with Southern California Edison to secure rebates to reduce its energy use.

The goal of the LIEP is to save a projected 1,478 acre-feet of water each year or 481,000,000 gallons of water. To put that into perspective, that's enough water to sustain almost 3,000 families for one year.

Reclamation has invested $100,000 toward the LIEP program budget of $378,195. Other funding partners include West Basin, the Metropolitan Water District, Golden State Water Company, Cal Water, Los Angeles County Department of Public Works – Waterworks District #29, and the Water Replenishment District.

These programs are part of West Basin's Water Reliability 2020 program to reduce the region's dependence on imported water in half by the year 2020. Working in partnership with Reclamation and other agencies helps West Basin meet those goals while providing value to its customers by increasing the amount of services it is able to offer at less cost.

Presently, West Basin is seeking additional program participants in the CII and LIEP programs.

For more information, visit www.westbasin.org.

Appendix E:
Final Budget Information

FEDERAL FINANCIAL REPORT

(Follow form instructions)

1. Federal Agency and Organizational Element to Which Report is Submitted	2. Federal Grant or Other Identifying Number Assigned by Federal Agency (To report multiple grants, use FFR Attachment)	Page	of
United States Bureau of Reclamation	R07AP35223	1	1 pages

3. Recipient Organization (Name and complete address including Zip code)
West Basin Municipal Water District
17140 South Avalon Blvd., Ste 210
Carson, CA 90746

4a. DUNS Number	4b. EIN	5. Recipient Account Number or Identifying Number (To report multiple grants, use FFR Attachment)	6. Report Type	7. Basis of Accounting
5382940	95-6003477	n/a	☐ Quarterly ☐ Semi-Annual ☐ Annual X Final	☐ Cash X Accrual

8. Project/Grant Period From: (Month, Day, Year)	To: (Month, Day, Year)	9. Reporting Period End Date (Month, Day, Year)
6/13/2007	6/30/2014	3/30/2014

10. Transactions	Cumulative
(Use lines a-c for single or multiple grant reporting)	
Federal Cash (To report multiple grants, also use FFR Attachment):	
a. Cash Receipts	$66,000.00
b. Cash Disbursements	$66,000.00
c. Cash on Hand (line a minus b)	
(Use lines d-o for single grant reporting)	
Federal Expenditures and Unobligated Balance:	
d. Total Federal funds authorized	$66,000.00
e. Federal share of expenditures	$66,000.00
f. Federal share of unliquidated obligations	$0.00
g. Total Federal share (sum of lines e and f)	$66,000.00
h. Unobligated balance of Federal funds (line d minus g)	$0.00
Recipient Share:	
i. Total recipient share required	$807,000.00
j. Recipient share of expenditures	$395,711.00
k. Remaining recipient share to be provided (line i minus j)	$411,289.00
Program Income:	
l. Total Federal program income earned	$0.00
m. Program income expended in accordance with the deduction alternative	$0.00
n. Program income expended in accordance with the addition alternative	$0.00
o. Unexpended program income (line l minus line m or line n)	$0.00

11. Indirect Expense	a. Type	b. Rate	c. Period From	Period To	d. Base	e. Amount Charged	f. Federal Share
	n/a	n/a	n/a	n/a	n/a		0
				g. Totals:			

12. *Remarks: Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation:*

13. Certification: By signing this report, I certify that it is true, complete, and accurate to the best of my knowledge. I am aware that any false, fictitious, or fraudulent information may subject me to criminal, civil, or administrative penalities. (U.S. Code, Title 218, Section 1001)

a. Typed or Printed Name and Title of Authorized Certifying Official	c. Telephone (Area code, number and extension)
Richard Nagel, General Manager	(310) 660-6210
b. Signature of Authorized Certifying Official	d. Email address: richardn@westbasin.org
	e. Date Report Submitted (Month, Day, Year): 9/26/14
	14. Agency use only:

Standard Form 425
OMB Approval Number: 0348-0061
Expiration Date: 10/31/2011

Invoice #	Date	for period ending	Total	Task 1	Task 2	Task 3	Task 4A	Task 4B	Task 5	Task 6	Task 7
			VENDOR INVOICES:	ADMINISTRATION (WB)	CUSTOMER ID (WB and DWR)	MARKETING (DWR)	SITE INSPECTION, LETTER REPORT, EQUIP. SURVEYS, REPORTS, SUB-CONTRACTORS (DWR)		INCENTIVES (DWR, USBR, WB)	POST INSTALL SITE INSPECTIONS AND TECHNICAL ASST. (DWR)	METERING AND MONITORING (WB/USBR)
				Invoiced Amt		West Basin In Kind					
5809853	2/26/2014	12/31/2013	$5,216.46	$1,015.00				$4,201.46			
5704163	11/4/2013	11/1/2013	$9,037.50	$873.75				$8,163.75			
5673574	10/16/2013	10/4/2013	$2,728.44	$1,317.50	$130.00			$1,280.94	$10,000.00		
5642963	9/23/2013	8/30/2013	$12,305.90	$1,478.75	$1,365.00			$9,244.65			$217.50
5613454	8/15/2013	8/2/2013	$7,112.50	$2,832.50	$325.00			$3,955.00			
5517521	5/14/2013	5/3/2013	$7,756.25	$1,261.25	$610.00			$5,595.00			$290.00
				$1,261.25	$610.00	$0.00	$0.00	$5,595.00	$0.00	$0.00	$290.00
5483172	4/5/2013	3/31/2013	$9,492.71	$990.00	$5,466.70			$3,036.01			
5451853	3/8/2013	3/1/2013	$2,223.08	$1,730.70	$427.38						$65.00
5418130	2/6/2013	2/1/2013	$3,721.25	$451.25				$2,790.00	$10,000.00		$480.00
5388334	1/14/2013	12/31/2012	$12,120.43	$590.00				$10,290.43			$1,240.00
5350645	12/3/2012	11/30/2012	$5,947.14	$1,373.75		$210.00		$4,038.39			$325.00
5314211	11/8/2012	11/2/2012	$2,055.00	$2,055.00							
5280269	10/11/2012	10/5/2012	$9,737.67	$2,260.00				$7,312.67			$165.00
5210443	9/28/2012	8/3/2012	$11,782.41	$1,602.50	$660.00			$4,242.50	$10,836.00	$3,145.17	$2,132.24
5180583	7/13/2012	6/29/2012	$11,328.90	$521.36				$6,011.35		$2,459.60	$2,330.00
5139290	6/20/2012	6/1/2012	$10,512.46	$738.86				$9,773.60			
5100614	5/10/2012	4/27/2012	$4,516.25	$705.00				$3,811.25			
5060383	4/12/2012	3/30/2012	$10,141.88	$1,480.00	$1,196.90			$7,448.73		$16.25	
5021459	3/15/2012	2/24/2012	$9,480.70	$1,277.50	$2,675.70			$5,527.50			
4988318	2/8/2012	1/27/2012	$16,584.81	$1,245.00				$15,339.81			
4945485	1/9/2012	12/30/2011	$8,799.91	$1,732.50	$440.00			$4,309.16		$2,318.25	
4880253	11/9/2011	10/28/2011	$2,360.65	$1,130.00	$220.00			$913.15		$97.50	
4848799	10/6/2011	9/30/2011	$10,247.56	$907.50	$4,070.00			$5,270.06			
4812955	9/14/2011	8/26/2011	$5,275.00	$1,325.00	$2,310.00	$422.38		$1,640.00			
4784006	8/5/2011	7/29/2011	$3,616.10	$1,276.25	$1,540.00	$950.34		$799.85	$12,803.00		
4752253	7/8/2011	7/1/2011	$11,207.31	$1,277.50	$2,970.00	$876.88	$6,959.81				
4712561	6/6/2011	5/27/2011	$4,987.29	$1,258.40	$2,090.00		$591.25				$1,047.64
4680284	5/4/2011	4/29/2011	$2,985.14	$2,985.14							$438.44

4646905	4/8/2011	4/1/2011	$3,658.01	$1,842.50			$720.30	$881.25				$934.26
4615882	3/18/2011	2/25/2011	$2,645.00	$1,195.00				$870.00		Coast Plating		$580.00
4590833	2/24/2011	1/28/2011	$872.50	$872.50			$480.20					
					WB In-Kind							
4557120	1/7/2011	12/31/2010	$2,537.36	$1,979.05	$334.04							$558.31
4526003	12/6/2010	11/26/2010	$1,606.25	$600.00	$668.08			$266.25				$740.00
4498999	11/10/2010	10/29/2010	$3,742.50	$1,277.50	$1,002.12							$2,465.00
4471300	10/29/2010	10/1/2010	$1,894.91	$1,875.00								$19.91
4431687	9/10/2010	8/27/2010	$2,277.50	$1,537.50	$829.89			$100.00				$640.00
4403759	8/11/2010	7/30/2010	$2,177.50	$2,150.00	$829.89							$27.50
4371613	7/9/2010	7/2/2010	$5,711.25	$1,305.00	$970.86			$2,360.00				$2,046.25
4340634	6/7/2010	5/28/2010	$7,306.28	$2,246.25	$970.86							$5,060.03
4310462	5/4/2010	4/30/2010	$4,678.75	$971.25				$3,707.50				
4278520	4/6/2010	4/2/2010	$4,687.15	$1,472.50				$3,214.65				
4245031	3/2/2010	2/26/2010	$1,639.75	$842.50	$1,544.96		$110.00	$741.25				
4217630	2/9/2010	1/29/2010	$4,807.50	$3,707.50	$1,315.32		$1,100.00					
4186239	1/6/2010	1/1/2010	$3,675.50	$520.00	$0.00			$3,155.50				
4153587	12/3/2009	11/27/2009	$2,866.25	$536.25	$1,146.60			$2,330.00				
4120247	11/16/2009	10/30/2009	$12,459.98	$615.00	$764.40			$1,852.50		$9,992.48		
4083958	10/14/2009	10/2/2009	$7,156.25	$1,051.25	$1,337.70			$6,105.00				
4041689	9/4/2009	8/28/2009	$3,693.50	$890.00	$0.00		$38.50	$2,700.00			$65.00	
4009162	8/20/2009	7/31/2009	$8,091.25	$1,196.25	$764.40			$6,895.00				
3970868	7/15/2009	7/3/2009	$3,961.05	$890.00	$382.20			$1,177.00				$1,894.05
3929462	6/11/2009	5/29/2009	$3,158.75	$1,051.25	$1,719.90			$2,107.50				
3895480	5/14/2009	5/1/2009	$9,746.75	$1,068.75	$0.00		$16.50	$8,661.50				
3851134	4/9/2009	4/3/2009	$13,596.31	$1,026.56	$1,337.70			$12,569.75				
3804262	3/5/2009	2/27/2009	$16,665.00	$585.00	$382.20		$1,760.00	$14,320.00				
3763898	2/11/2009	1/30/2009	$5,503.71	$1,328.93	$764.40		$330.00	$3,844.78				
3717520	1/14/2009	1/2/2009	$33,911.28	$4,632.30	$2,675.40	$1,337.70	$12,748.52	$16,530.46				
3593632	10/1/2008	9/26/2008	$5,674.85	$4,466.35	$191.10	$1,719.90	$1,208.50					
3554071	9/4/2008	8/22/2008	$3,899.00	$1,825.00	$1,242.15		$2,074.00					
3523612	8/25/2008	7/25/2008	$3,739.30	$1,600.30	$0.00		$1,269.00	$870.00				
3477080	7/10/2008	6/27/2008	$3,615.00	$1,045.00	$0.00		$2,570.00					
				$98,289.62		$30,164.28	$26,885.12	$102,810.95	$130,590.26	$53,631.48	$8,101.77	$23,986.13
				$87,155.45	$21,174.17							
								DWR Only	West Basin, USBR, Local Partners			

Total Amount Invoiced by URS	$404,936.64

Program Name **CII Incentive Program**
DWR Agreement #: **4600007858**
USBR Agreement #: **R07AP35223**
Vendor Contract # **W1959**

Appendix F:
Marketing Materials

Save water! Save money!

Be a West Basin Industrial Water Saver!

Find out if you qualify for a *FREE TECHNICAL SURVEY, WATER USE REPORT & CASH INCENTIVES!*

CALL: 310.660.6253

EMAIL: eliseg@westbasin.org

WOULD YOU LIKE TO:

LOWER O&M COSTS IN THIS DIFFICULT ECONOMY?

BE MORE "GREEN" FOR THE ENVIRONMENT?

HAVE A MORE RELIABLE SUPPLY OF WATER?

RECEIVE AN INCENTIVE TO DO SO?

Customers must be in the West Basin service area. Incentives based on water savings. Incentives paid over two payments based on amount of water saved. For more information visit *www.westbasin.org*.

*Receive up to **$6 for every 1,000 gallons** of water saved per year.*

***20 Million Gallons** of water per year saved equals up to **$120,000** in incentives!*

This program is made possible with funding from the following partners:

California Water Service Co. · Golden State Water Company · WRD Water Replenishment District of Southern California · The Metropolitan Water District of Southern California · Department of Water Resources State of California · RECLAMATION Managing Water in the West

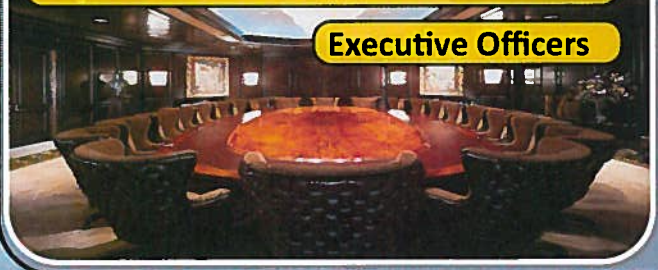
Engaging the Industrial Customer

Focus from the Board Room...
...to the Boiler Room

IMPLEMENTING WATER EFFICIENCY PROJECTS

1) Those who make the decisions

Executive Officers



What do they care about?

- Partnership Opportunities
- Positive Attention/Media
- Sustainability Initiatives
- Return on Investment
- Staff Commitment
- Product Integrity

2) Those who pay for the decisions

Financial Officers

What do they care about?

- Capital versus Operating Costs
- Maintaining Operating Costs
- Return on Investment

3) Those who make the projects work

Operators & Engineers

What do they care about?

- Water Quality
- Product Integrity
- Proven Technology
- Management Support
- Regulatory Compliance

Successful Industrial Customer Engagement

Company Name	Annual Savings Projected	Type of Project
ALCOA FASTENING SYSTEMS	6 ACRE FEET (AF)	Conductivity Control
BLUE CREATIONS	17AF	Ozone Treatment System
COAST PLATING	14 AF	Deionization Treatment System
CUSTOM FOOD PRODUCTS	20 AF	Once-through Cooling Conversion
LEKOS DYE & FINISHING	129 AF	Dye Wash Treatment & Recycling System

ELISE M. GOLDMAN | COMMERCIAL, INDUSTRIAL, INSTITUTIONAL WATER EFFICIENCY SPECIALIST eliseg@westbasin.org | 310.660.6253

SAVE WATER!

RECIRC & $AVE

SAVE MONEY!

JOIN OUR "RECIRC AND $AVE" PROGRAM
SAVE HUGE AMOUNTS OF MONEY!

- Estimated annual water savings up to 40 million gallons*
- Estimated annual water and sewer savings up to $165,000
- Receive incentives up to $130,000

* Potential saving based on recent audits

Call Now – First Come, First Served!

Contact Steve Kummerfeldt at

714-433-7774

steve_kummerfeldt@urscorp.com

for more information.

You can also go to our website at *www.westbasin.org.*

The program is brought to you by West Basin Municipal Water District and the Metropolitan Water District of Southern California, and made possible through grant funding from the California Department of Water Resources, the U.S. Department of the Interior Bureau of Reclamation, and your local water agency.

WEST BASIN MUNICIPAL WATER DISTRICT

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION

DEPARTMENT OF WATER RESOURCES STATE OF CALIFORNIA

WEST BASIN
MUNICIPAL WATER DISTRICT

"RECIRC AND $AVE"

WATER USE REDUCTION PROGRAMS

Would you like to:

- Reduce your operating cost in this difficult economy?
- Lower your water and sewer bills?
- Be more "green" for the environment?

INDUSTRIAL PROCESS WATER USE REDUCTION PROGRAM

The "RECIRC AND $AVE" Program provides technical assistance and large cash incentives to local businesses that invest in water saving process improvements. Annual water savings can be up to $165,000 (based on recent audits). Free technical surveys of your industrial water operations, including process change recommendations, are available to qualified participants.

What are the Minimum Qualifying Criteria?

- Must be a customer in the West Basin Municipal Water District,
- Must be enrolled in the Program before any improvements are made, and
- Water savings must be monitored for a one-year period to measure actual water savings.

How Much Funding is Available?

- Up to $10,000 for equipment installation *plus* a no-cap incentive of $3 per every 1,000 gallons saved. If your process improvement saves 40 million gallons of water per year, the incentive could be as much as $120,000!

How are the Incentives Paid?

- First payment upon equipment installation.
- Second payment 30 days after verification of equipment and start-up.
- Third payment after one year of monitoring.

COOLING TOWER WATER USE REDUCTION PROGRAM

The "RECIRC AND $AVE" Program provides technical assistance and large cash incentives to local businesses that invest in pH and conductivity controllers for their cooling towers. Significant water savings can be achieved with a new cooling tower conductivity controller. Estimated savings can be $4,000 in water and sewage costs per tower. Free technical surveys of your cooling towers are available to qualified participants.

What are the Minimum Qualifying Criteria?

- Must be a customer in the West Basin Municipal Water District,
- Water savings must be monitored for a 90-day period to measure actual water savings.

How Much Funding is Available?

- Up to $10,000 for equipment and installation.

How are the Incentives Paid?

- First payment upon purchase of equipment.
- Second payment 30 days after equipment installation.

West Basin Municipal Water District
Recirc & $ave Workshop
Edward C. Little Water Recycling Facility

September 30, 2008

URS

WATER 3 ENGINEERING, INC.

Maureen Erbeznick and Assoc.

1

Recirc & $ave Program

- West Basin Commercial, Industrial, Institutional (CII) Enhanced Incentive Program
- Provides funding to West Basin Customers for installing equipment that captures, treats, and reuses water that is normally discharged to the sewer
- Focused on large users of water in industrial processes and cooling towers
- Other incentive programs available for water savings from irrigation and sanitary uses (toilets and showers)

2

Who Qualifies for the Recirc & $ave Program?

- Must be a customer of West Basin Municipal Water District or one of its water retailers
- Enroll in the Program before water savings improvements have been made at your facility
- Participate in free Technical Surveys
- Install and operate the water savings equipment
- Obtain a measured water savings over a one-year monitored period

3

Recirc & $ave Program Targeted Industries

- Major Manufacturing
- Metal Finishing
- Food Processing
- Textiles and Commercial Laundry
- Electronics and Plating
- Facilities with Large Cooling Towers

4

Recirc & $ave Program Consists of Two Parts

- Industrial Process Water Use Reduction Program
- Cooling Tower Water Use Reduction Program

Industrial Process Water Use Reduction Program

- Focus on reduction in water use for major industrial processes including
  - Equipment upgrade or replacement with higher water use efficiency
  - Recycling and treatment of wastewater
  - Process modifications

How much Funding is Available for Industrial Process Customers?

- Up to $10,000 per water savings equipment installation

AND

- A no-cap incentive of $3.00 per every 1,000 gallons saved over a one-year period

7

How are the Incentives Paid for Industrial Process Customers?

- First payment upon water savings equipment installation
- Second payment 30 days after verification of equipment installation and start-up
- Third payment after one year of monitoring to determine actual water savings

8

Example of Water Use Reduction Electronics Manufacturing Company

- Manufacturer of rigid multilayer printed circuit boards
- Operates 23 separate plating lines
- Small production runs with very rapid delivery
- Wastewater discharge rate of 98 acre-feet per year

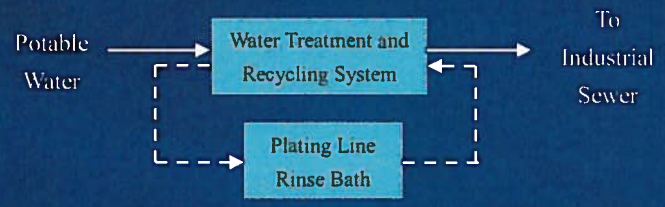
9

Equipment using Significant Water Volume Electronics Manufacturing Company

- Facility operates a total of 84 plating line rinse tanks
- Rinse tanks contain potable or deionized water
- Continuous flow of water with automatic control valve and fog sprayers
- Estimated annual potable water use in rinse tanks of 36.7 million gallons per year

10

Proposed Water Use Reduction Technology
Electronics Manufacturing Company



- Installed Water Treatment and Recycling System
- Treating and recycling plating bath rinse water
- Replaced existing plating line with more water-efficient equipment
- Estimated reduction in potable water usage by 50%

11

Potential Savings and Program Incentive
Electronics Manufacturing Company

- Estimated annual water savings of 18.8 million gallons per year
- Annual savings of $36,000 in water supply costs
- Annual savings of $21,000 in sewer disposal costs
- Total estimated annual savings of $57,000
- Estimated Program Incentive of $82,000

12

Cooling Tower Water Use Reduction Program

- Focus on reduction in water use for cooling towers including
  - Installation of new pH and conductivity controllers
  - Reduction in blow-down rates

13

How much Funding is Available for Cooling Tower Customers?

- Up to $5,000 for purchasing new pH and conductivity controllers

AND

- Up to $5,000 for installing new pH and conductivity controllers

14

How are the Incentives Paid for Cooling Tower Customers?

- First payment upon purchase of new pH and conductivity controllers
- Second payment 30 days after installation of new pH and conductivity controllers

15

How do I get Started?

- Contact the West Basin Municipal Water District Recirc & $ave Program
- Sign up and arrange to have a free Technical Survey conducted at your facility
- Survey will identify your qualifications, and potential water savings and incentives in the Program

16

Appendix G:
Sample Agreements

RECIRC AND SAVE: WATER SAVINGS PERFORMANCE PROGRAM
AGREEMENT No. 2A

THIS AGREEMENT (Agreement) is made and entered into as of November 2, 2010 between West Basin Municipal Water District (West Basin) and **Coast Plating**. West Basin and Company may be collectively referred to as "Parties" and individually as "Party."

Recitals

A. West Basin will provide a financial incentive to businesses that make capital improvements resulting in improved water use efficiency and water savings.

B. **Golden State Water Company** supports West Basin's Program and Company's water-use efficiency Project.

C. Company, an industrial customer within the service area of West Basin, submitted a proposal and received approval from West Basin to receive financial incentives for installation of capital equipment to improve water-use efficiency while maintaining existing production levels routinely established for their business operation.

D. This Agreement provides the terms for Company's participation in the Program.

NOW, THEREFORE, in consideration of the promises and covenants hereinafter set forth, the Parties do agree as follows:

Section 1: Responsibilities and Ownership

1.1 Company elects to participate in West Basin's Recirc and Save Program and will make water-use efficiency improvements (Project) at their facility as described in Exhibit A. Water savings for this Project is projected to be about **4.12 million gallons per year** when fully operational.

Company shall be responsible for the design, implementation, personnel, equipment and supplies, and all capital and operating costs related to and incurred by Project. All materials and equipment necessary to implement Project are the exclusive property of Company. West Basin shall have no ownership, right, title, security interest, or other interest in any Project facilities, materials, or equipment, nor any rights, duties, or responsibilities for operation or maintenance thereof.

1.3 Company shall ensure that the Project complies with all Federal, State and local laws, ordinances and regulations and is solely responsible for any such obligations, including, without limitation, compliance with the California Environmental Quality Act.

1.4 The Company agrees that it is responsible for its own actions under this Agreement and agrees to indemnify and hold West Basin and the ~~California Water Service~~ Golden State Water Company, and their officers and agents harmless, and agrees to defend West Basin against any claim or asserted liability arising out of its actions, either willful or negligent, in implementing the Project. Such indemnity will include any losses relating to any claim made, whether or not a court action is filed, and will include attorney fees and administrative and overhead costs related to or arising out of such claim or asserted liability.

1.5 Company shall purchase or acquire, install, operate, maintain and read metering devices and/or data acquisition systems required for the purpose of measuring and documenting Project water savings, unless otherwise designated by the Parties. Company shall provide West Basin with water billing records from Customer Agency, Retail Agency or Utility responsible for existing water meters and sewer discharge meters for each of the twelve months preceding Project startup to establish historical usage (Historical Usage). Company shall furnish **Monitoring and Water Savings Documentation** as outlined in Section 5.

1.6 Company shall allow access to Project facilities shown in Exhibit B and metering equipment to West Basin or its designee for the purposes of measuring and/or verifying actual water savings. West Basin representatives will comply with all Company safety and security requirements while on site.

1.7 Company agrees to pay the entire cost of the Project. Company shall perform all retrofit work and testing of the Project. Company shall provide West Basin a completed W-9 Form (Request for Taxpayer Identification Number and Certification) and written notification that the Project is fully operational, which will serve as the Date of Commissioning.

1.8 Within 60 days after the Date of Commissioning, Company shall provide West Basin with records of actual Project costs, including invoices, receipts, and other documentation of Project capital costs, and actual annual costs for water service for each of the twelve months preceding Project Date of Commissioning.

1.9 Company shall, at all times during the term of this Agreement, exercise its best efforts to operate the Project to achieve the anticipated water savings outlined in Section 1.1. West Basin shall not be responsible for Company's failure to achieve the anticipated water savings.

Section 2: Agreement Term

The Term shall be for 18 months commencing with the effective date of this Agreement or three months following conclusion of Monitoring Period as outlined in Section 5.1, whichever comes first. The Term may be extended at the sole discretion of West Basin, as necessary to provide Company with twelve months of accrued water savings. Obligations in Section 7 shall prevail and survive termination of this agreement.

Section 3: Agreement Administrators

3.1 Ms. Elise Goldman is appointed Agreement Administrator for West Basin for the purpose of administering this Agreement. Section 3.2 identifies Company appointed Agreement Administrator for the purpose of administering this Agreement.

3.2 The designated Agreement Administrators may be changed by providing written notice to the other Party. Any communication required to administer this Agreement shall be in writing and will be deemed received upon personal delivery or 48 hours after deposit in any United States mail depository, first class postage prepaid, and addressed to the Party for whom intended, as follows:

If to Metropolitan:

West Basin Municipal Water District
17140 South Avalon Blvd., Suite 210
Carson, CA 90746
Attention: Ms. Elise Goldman

If to Company:

Company Name: Coast Plating
Address: 417 West 164th Street
City: Carson , CA Zip: 90248
Agreement Administrator: Tim Mickal
Title: CEO

Any Party may change such address by giving notice to the other Party as provided herein.

Section 4: West Basin's Financial Incentive Payment

4.1 In accordance with Program guidelines, West Basin's financial incentive for the Project is calculated as the lesser of:

Method A – $3.00 per 1,000 gallons of water saved by the Project for one year during the Monitoring Period plus $5,000 for installation plus retail agency contribution (if any); or

Method B – one hundred percent of the total Project capital cost as provided in Section 1.8.

4.2 Based on information supplied by Company in its proposal, West Basin shall pay Company a First Payment of **$ 16,180** upon verification by West Basin or its designee of equipment installation, Project operation and submittal of Water Savings Documentation (as outlined in Section 5.1) for the first month of water savings when accompanied by an invoice from Company for First Payment. Company may be required to return a portion or all payments to West Basin based on actual Project costs and measured water savings following the procedure outlined in Section 4.4.

4.3 Alternatively, West Basin or its designee will establish water consumption to production unit ratio prior to retrofit. In the event that production numbers increase or decrease significantly impacting the water savings projection, this alternative comparison may be needed to confirm that savings are being achieved as projected.

4.4 Within 60 days of receiving/collecting complete water savings data from Company for the 6-month Monitoring Period outlined in Section 5.1, West Basin shall calculate the total financial incentive payment based on the lesser of Method A or Method B minus West Basin's First Payment of **$ 16,180**. West Basin's total payment under this agreement shall not exceed **$ 32,360** . West Basin shall compute adjustments for over- or under-payment of the final financial incentive. If there is an underpayment, West Basin shall notify Company and issue a check to Company upon Company's submittal of Final Payment invoice to West Basin. If there is an overpayment, Company shall issue a check to West Basin upon notification of overpayment. Any overpayment or underpayment shall be made within 60 days of West Basin's notification to Company of the final financial incentive payment calculation.

Section 5: Monitoring and Water Savings Documentation

5.1 The pre-installation Monitoring Period shall begin 30 full days prior to installation of any water saving devices or systems to establish a baseline water usage to compare against for water savings that will be realized as a result of the pending installation(s). Daily reads from the meter shall be recorded.

5.2 The post-installation Monitoring Period will begin with the first full month of Project operation and conclude when West Basin has received/collected 6 consecutive months of Water Savings Documentation, unless otherwise approved by West Basin in writing.

5.3 Company shall provide Water Savings Documentation/provide access to meters to obtain Water Savings Documentation, outlined in Exhibit C, on a monthly (or bi-monthly) basis, as necessary.

5.4 West Basin shall calculate accrued Project water savings during the Monitoring Period using completed Water Savings Documentation.

Section 6: Audit and Funding Reconciliation

6.1 Company shall be responsible for maintaining all supporting documentation of Project implementation costs for a period of three years following completion of Agreement Term. West Basin will have the right to audit Company's implementation expense receipts and all supporting documentation of Project costs related to this Agreement. Upon 30 days advance notice from West Basin, Company will fully cooperate with any audit of its expenses and will permit access to its books, records, and accounts related to Project as may be necessary to conduct such audit. Company shall, within one year of determination, reimburse West Basin for any financial incentive to which it was not entitled based on the results of the independent audit.

6.2 West Basin may, at its own expense and in its sole discretion, provide follow-up analysis and verification of actual water savings achieved through Project implementation. Company agrees that it will provide access to its facilities, water consumption records, production records, and personnel as necessary to complete such analysis and verification for a period of three years following completion of Agreement Term.

Section 7: Other Terms

7.1 This Agreement may be amended by written mutual agreement executed by both Parties. Any alteration or variation of the terms of this Agreement will not be valid unless made in writing and signed by both Parties. This Agreement constitutes the entire agreement between the Parties.

7.2 This Agreement will inure to the benefit of and be binding upon West Basin and Company and their respective successors. This Agreement is not assignable by either Party in whole or in part.

7.3 The partial or total invalidity of one or more parts of this Agreement will not affect the intent or validity of this Agreement.

7.4 This Agreement will be deemed a contract under the laws of the State of California, and for all purposes will be interpreted in accordance with such laws. West Basin and Company hereby agree and consent to the exclusive jurisdiction of the courts of the State of California, and that the venue of any action brought hereunder will be in Los Angeles County, California.

Attachments incorporated in this Agreement include:

Exhibit A – Project Description
Exhibit B – Project Diagram
Exhibit C – Water Savings Documentation

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement.

APPROVED AS TO FORM:

By: _____
Lemieux and Oneill
District Counsel

Date: _____

APPROVED AS TO FORM:

By: _____
Name:

Title: _____

Date: _____

// In Duplicate

WEST BASIN MUNICIPAL WATER DISTRICT

By: _____
Rich Nagel
General Manager

Date: _____

COMPANY

By: _____
Name: Tim Mickael

Title: CEO

Date: 11-8-2010

Industrial
Commercial
WATERINNOVATIONS

October 26, 2010

EXHIBITS A & B

John Merritt
Coast Plating, Incorporated
128 West 154th Street
Gardena, CA 90248

Subject: Water Conservation and Anodizing Bath Purification Systems

John,

Water Innovations Inc. (WI) is pleased to submit to Coast Plating (Coast) this proposal for the following systems. The combination of our KDI Elite 13541ff, DI Water Supply System, and Rinsewater Conductivity Controller will reduce rinsewater consumption by as much as 90% by replenishing rinse tanks with deionized (DI) water to maintain specific water quality instead of continually flowing high-TDs city water as currently done. Our proposed Cation Ion Exchange (Cat-IX) systems for purification of the chromic acid and tartaric acid anodizing baths, to selectively remove aluminum, iron, trivalent chrome and other metal contaminants, will eliminate the need for periodic off-site disposal of these baths. And our proposed ultraviolet disinfection unit, if used on either process baths or rinsewater tanks, will prevent the formation and growth of algae which is a known problem with certain of your acid baths. Our proposed equipment includes the following:

1. One (1) **KDI Elite 1354ff** 15 gallon-per-minute (gpm) capacity deionized (DI) water system for potable water purification for bath bake-up and rinsewater supply
2. Two (2) **Cation Ion Exchange (Cat-IX) Systems** to purify the existing Chromic Acid Anodizing and new Tartaric Acid Anodizing Baths by removing metallic impurities
3. One (1) **Ultraviolet (UV) Purification Units** to prevent algae growth in the Tartaric Anodizing Bath and following DI water rinse
4. One (1) **Rinsewater Conductivity Controller** to monitor rinsewater quality and supply deionized water as required for the six process rinse tanks
5. One (1) **DI Water Supply System** with storage of water produced by the KDI and supply for bath make-up and rinse tanks as controlled by the Rinsewater Conductivity Controller
6. One (1) **Automated Batch Treatment System** for Cat-IX and KDI regeneration waste and other concentrated or metal-bearing wastewater, including two (2) Waste Holding Tanks for separate storage of regeneration waste from the two CAT-IX systems

It is our understanding that these subsystems would be installed by WI on a turn-key basis, and our provided individual costs account for their integration with a central PLC-based System Controller with a 10" color Touch Screen Operator Interface Panel.

KDI Elite 1354ff Feed-Forward Deionizer

Operating Profile

The deionizer shall remove ions from tap water through a two-stage, separate bed ion exchange process. A water quality greater than 1,000,000 ohm/cm (1 umhos conductivity) will be achieved when the equipment is operated within parameters as listed. The deionizer shall provide a near continuous flow of deionized water through the use of a duplex (two tank) configuration. This duplex configuration shall operate with 50% of the resin in reserve or in regeneration. System regenerations shall be initiated by outlet resistivity measurement. Regeneration outlet quality shall be adjustable.

Regeneration Valve

One regeneration valve shall be used with each set of cation tanks and one with each set of anion tanks. These regeneration valves shall be top mounted (top of media tank), and manufactured from non-corrosive materials. Each valve shall not weigh more than four pounds. Each valve shall provide service and regeneration control for two media tanks. Inlet and outlet ports shall accept a 3/4" quick connect double o-ring sealed adapter. The adapter shall be made of PVC and provide a 3/4" connection. Interconnection between the tanks shall be made through the regeneration valve with a 3/4" quick connect adapter. The valve shall operate using a minimum inlet pressure of 60 psi. Pressure shall be used to drive all valve functions. No electric hook-up shall be required for the control valve. Control valve shall incorporate three cycles for the regeneration process of the cation vessel including; acid draw, slow rinse, and fast rinse. The acid draw cycle shall flow opposite the service flow, providing a countercurrent regeneration. The control valve shall incorporate four cycles for the regeneration process of the anion vessel including; stand-by tank purge, caustic draw, slow rinse, and fast rinse. The caustic draw cycle shall flow opposite the service flow, providing a countercurrent regeneration. The valve shall contain a fixed orifice eductor nozzle and self-adjusting backwash flow control. The control will prevent the bypass of tap water to service during the regeneration cycle.

Media Tanks

The tanks shall measure 13" in diameter and 54" tall. A total of two cation tanks will be used, with one tank in service at all times. A total of two anion tanks will be used, with one tank in service at all times. The tanks will be designed for a maximum working pressure of 125 psi and hydrostatically tested at 300 psi. Tanks shall be made of fiberglass reinforced polyester with a 2.5" threaded top opening. Each tank shall be NSF approved. The upper and lower distribution system shall be of a slot design. They will provide even distribution of regeneration water and the collection of processed water.

Deionization Media

Each cation vessel shall include 3.0 cubic feet of high-capacity, strong acid cation resin, with an exchange capacity of 20,000 grains per cubic foot when regenerated with 6 pounds of hydrochloric acid per cubic foot of resin for a total cation removal capacity between regenerations of 60,000 grains. Each anion vessel shall also include 3.0 cubic feet of high-capacity, strong base anion resin, with an exchange capacity of 18,000 grains per cubic foot when regenerated with 6 pounds of sodium hydroxide per cubic

foot of resin, for a total anion removal capacity between regenerations of 54,000 grains. Inert polypropylene beads shall be used to tightly pack the resin tanks, while still allowing the resin space for expansion and contraction.

System Pump

The system shall use a multi-stage centrifugal pump to pressurize water to the proper operating pressures and flow for the deionizer. The pump is designed to draw water from an atmospheric source. A return loop is used to provide a continuous flow of water pass the pump during operation, preventing low flow conditions. Pump construction shall be 316 stainless steel and suitable for handling of water of deionized quality.

System Controls

The system shall use a programmable logic controller (PLC) to control the start of resin regeneration. The PLC shall monitor inlet quality of the feed water and the flow rate being processed by the system. Using these factors, a loading is calculated, and regenerations are performed based on this inlet loading. Regenerations are initiated once the accumulative incoming load exceeds the preset capacity of the resin tank. During normal operation, the PLC will divert off-spec water by opening the system's off-spec valve and closing the process outlet valve. Water above the set point will be directed to the process outlet of the system. System operations and alarms can be set at the system's Operator Interface Panel. The OIP shall provide a touch screen interface for the control of the system. Touch Screen shall provide access to the system's operating history while all system set points can be modified through a password-protected section of the touch screen.

Chemical Draw System

The control valve will draw regeneration chemicals from a standard 55 gallon chemical drum. The system will provide for an adjustable throttling valving, allowing the flow of chemical to be regulated from 0-10 pounds per cubic foot. The chemical draw assembly will be compatible with the corrosive chemicals being educted. Each chemical drum shall be equipped with a level sensor with input to the system controller to both alarm at low level and prevent the system from regenerating.

System Skid

The KDI Elite 1252ff shall be skid mounted and prewired. Installation hook-ups shall be limited to plumbing and electrical connections. Skid construction shall be from 316 grade stainless steel. Finish shall include chemical passivation. Skid dimensions shall not exceed 31.5" (width) x 69.5" (height) x 41.5" depth). Skid design shall include anchoring feet for securing skid to foundation and grounding lugs for ground anchoring and shall be properly grounded with all skid mounted electrical components.

System Specifications

The following table provides details on the system.

Table 1 – KDI Elite 1354ff Deionizer Specifications

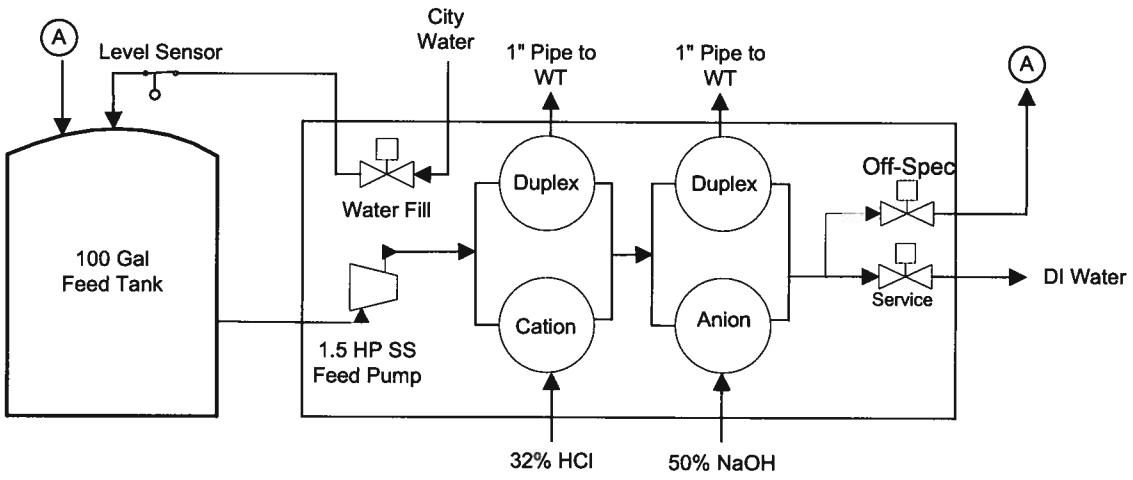
System Components	
Vessel Size	13" x 54"
Tank Volume	3.68 ft3
Regeneration Valve	Kinetico Control Valve Module
Cation Resin Type	Strong Acid, Monosphere, Gel
Cation Resin per Tank	3.0 ft3
Total Cation Resin	6.0 ft3
Anion Resin Type	Strong Base, Monosphere, Gel Type II
Anion Resin per Tank	3.0 ft3
Total Anion Resin	6.0 ft3
Inlet Pump	316 SS multistage with 1.5 HP TEFC
Inlet Pre-filter	20" Big Blue with 5 micron bag filter
Flow Meter	Signet 2537 with 4-20 mA output to PLC
Shut-off Control	N.O Contact (High tank float included)
Acid Eduction Assembly	Dual check valves viton seals
Caustic Eduction Assembly	Dual check valves EPDM seals
System Inlet Conductivity Sensor	Signet 2850-52-41 output to PLC
System Outlet Conductivity Sensor	Signet 2850-52-40 output to PLC
Chemical Level Indicator	N.O Contacts (Drum sensors included)
System Operator Controller	Allen Bradley ML1400
Operator Control Interface	C-More 10" STN Color Touch Screen
Connections	
Electrical Power (60 Hz)	208-240/460
Full Load Amps	8.5/4.5
Inlet Connection	1.5" PVC Union
Process Outlet	1.5" PVC Union
Off-Spec Diversion	1" PVC Union
Acid Inlet	0.5" polypropylene tubing
Caustic Inlet	0.5" polypropylene tubing
Regeneration Waste Outlet	1" PVC Union
Operational Specifications	
Inlet Flow Rate (Min/Max)	1-15 gpm
Regeneration Type	Counter-current
Regeneration Flow	1-7 gpm
Regeneration Time per Vessel	75 minutes
Cation Regeneration Set Point	60,000 grains
32% HCl per cation regeneration	3.5 gallons
Cation Regeneration Waste Volume	86 gallons
Acid Dosage at 1.025 SpG	4 lbs HCL/ft3 of resin
Anion Regeneration Set Point	54,000 grains
50% NaOH per anion regeneration	3.5 gallons
Anion Regeneration Waste Volume	95 gallons
Causirc Dosage at 1.045 SpG	6 lbs NaOH/ft3 of resin

Table 1 – KDI Elite 1354ff Deionizer Specifications Cont.

Feed Water	
Pressure	From atmospheric tank
Temperature	40 - 110 ° F
pH	4-10 S.U.
Chlorine (Free)	2 mg/l
Total Dissolved Solids (Max)	550 mg/l
Physical Specifications	
Width	31.5"
Depth	42.5"
Height	75"
Operating/Shipping Weight	1000/950 lbs

Providing 20% greater resin capacity than our standard KDI Elite 1252ff, our proposed KDI system as detailed is equipped with 13" x 54" resin vessels each containing 3 cubic feet of ion exchange resin instead of the 2.5 cubic feet as is standard, thereby reducing the frequency of regeneration.

Figure 1 – KDI Elite 1252ff Deionizer



As depicted above, all system components are located on an integrated skid except for the system feed tank which would receive incoming potable water as controlled by in-tank level controls to supply the KDI unit.

Our proposed equipment includes the KDI skid and Feed Tank only. Integration with the DI Water Supply System or directly to process rinse tanks is accounted for elsewhere or would be provided by Coast.

Cationic Ion Exchange (Cat-IX) Purification System

Technology Applicability

The proposed Cation Ion Exchange (Cat-IX) system was engineered by Kinetico Incorporated and is built by Water Innovations under a licensing agreement. The technology employed by the Cat-IX has been widely utilized for purification of chromic acid anodizing baths it has been marketed as the *Pure Chrome VI Bath Purification System* as with our previously-submitted proposal. Through collaborative research with Kinetico's design engineer, Water Innovations verified that the Cat-IX system is equally applicable for the Tartaric/sulfuric acid. Accordingly, we are proposing two (2) Cat-IX systems which we understand would be separately utilized for purification of Coasts existing chromic anodizing bath and for the newly-installed tartaric/ sulfuric anodizing bath. As was requested, we have increased the resin capacity from three (3) to nine (9) cubic feet which wil enable longer operating cycles between systems regeneration in consideration of the relatively large process tank volumes.

Basis of Design

The proposed Cat-IX purification system is designed to remove cationic contaminants from the anodizing baths while preserving the bath's acidity. The bath remains in operation with solution drawn from the tank by diaphragm pump, processed through the Cat-IX, and returned to the source tank. Using this on-line purification method, there are a number of distinct advantages including 100% process up-time, consistent bath composition, and significantly-reduced chromic acid additions. The system operates semi-automatically, requiring little operator interface.

Cation exchange resin removes metal contaminants such as trivalent iron and chromium as well as divalent cations like nickel, copper, and zinc provided that there is capacity left on the resin. Each cycle of the system can remove up to 13.5 pounds of cationic contaminants with a somewhat greater amount processed through each cycle to assure that all of the system's capacity is used. Each regeneration cycle requires less than three hours, during which the Cat-IX unit is taken off-line.

The Cat-IX keeps contamination levels in the bath within specified tolerances by removing them as built up in the bath. After a programmable number of processed gallons, the resin tank is placed in the regeneration mode with acid "washing" of the resin to remove contaminants which are directed to wastewater treatment. Because the system purifies the bath while it is in operation, the bath is maintained at equilibrium. This differs from batch-type treatments, where the bath builds up to objectionable levels of contaminants before it is treated or replaced. By maintaining this equilibrium, there is a consistent quality produced from the bath.

Regenerations

The regeneration sequence is either pushbutton initiated or fully automatic and based upon volume processed. Either hydrochloric or sulfuric acid is used as the regeneration chemical. The waste from this regeneration must be treated since it will contain the heavy metal contaminants which were present in the plating bath, and also a small amount of chromic acid. Regeneration should take less than three hours, consuming 15 gallons of acid and creating about 750 gallons of waste. A rinse conductivity

monitor is included to assure that sulfates or chlorides are thoroughly rinsed from the resin before the next purification cycle.

Regenerations have three or four steps. The first step is to backflush the resin to remove the chromic or tartaric/sulfuric acid in the resin tank; this flow is directed back to the feed tank, so that this chromic acid is not sent to waste. This flow also dilutes new waste so that full strength plating bath is not sent through the resin. (Full strength plating bath at ≥100°F can damage the resin and reduce its useful life.) Next, in Step 2, acid is sent through the resin to remove the cationic impurities. This flow is directed to wastewater treatment. Step 3 is a water rinse that is also directed to wastewater treatment. This is a timed rinse. If, at the end of this rinse, the conductivity of the water is above the set point, (indicating that there is still acid in the rinse water), an alarm will be activated, and the operator must initiate an extra rinse cycle at the operator interface panel. Step 4 is the optional, extra rinse. After rinsing, the system is ready to process another batch.

Maintenance

The system would need to be checked each day to see that flow meters and pressure gauges are showing read-outs that are within normal running ranges. When the pressure drop across the filter becomes high, the filter cartridges will have to be changed. Also, a daily check of chemical supply and periodic checking of the acid specific gravity are required. Other than these tasks, the system will run on its own without operator interface.

Figure 2 – Cat-IX Purification System

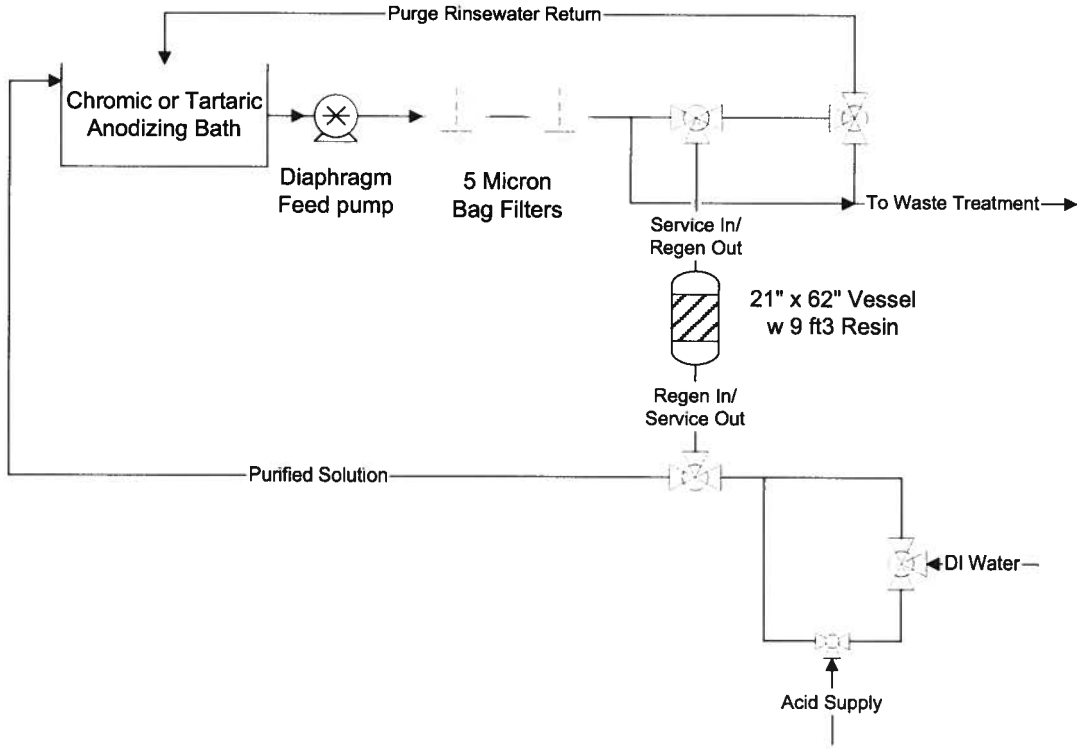


Table 2 –Cat-IX Purification System Specifications

Facility Specifications	
Room Temperatures Maximum/Minimum	105/60°F
Floor Space	See Drawing
Electrical Specifications	120 Volt, 1 Phase, 60 Hertz
Installation Access Required	5' x 10'
Installation Clear Height Required	10'
Compressed Air	≤15 SCFM @ ≥30 psi
DI Water	≥2 gpm @ ≥40 psi
Chemical Requirements	40% H_2SO_4 or 30% HCl
System Controls	
System Operator Controller	Allen Bradley ML1400
Operator Control Interface	C-More 10" STN Color Touch Screen
Equipment Specifications	
Maximum Inlet Flow Rate, gpm	12
Maximum Outlet Flow Rate, gpm	12
Minimum Outlet Flow Rate, gpm	3
Regeneration Flow Rate, gpm	3-9
Maximum Static Pressure, psi	100
Minimum Dynamic Pressure, psi	15
Influent Specifications	
pH, High, Low	NA
Temperature	<105°F
Total Dissolved Solids, Maximum, mg/L	NA
Total Suspended Solids, Maximum, mg/L	<2
TOC Maximum, mg/L	1
Solvent, Maximum, µg/L	50
Oils and Grease, Maximum	0.5 mg/L
Total Cationic Metals*, Maximum/Average	5,000 / <750 mg/l
Effluent Specifications	
pH, High, Low	NA
Temperature	<105°F
Total Dissolved Solids, Maximum, mg/L	NA
Total Suspended Solids, Maximum, mg/L	<1
Regeneration Specifications*	
Regeneration Chemical Type	32% HCl or 40% H2SO4
Chemical Volume Per Regeneration	15
Regeneration Frequency, gallons	2160
Regeneration Solution Produced, gallons	750
Total Metals Removed/Cycle (as Fe^{+++})	≤13.5 lbs.

* At 12 gpm flow and 750 mg/L contaminants; different concentrations will affect batch volume and regenerations proportionately.

Ultraviolet (UV) Unit for Algae Retardation

Our proposed Series 380-8 Reactor UV system is suitable for algae retardation for either the tartaric bath or its rinse assuming use of separate units. Its innovative design is fundamentally different from traditional UV units employing a single lamp within a quartz sleeve around which solution flows.

Our proposed system would be skid-mounted and include a self-priming stainless steel feed pump to draw and pressurize solution from either the tartaric/sulfuric anodizing bath or its following rinse. There would be single point of connections for the system inlet and outlet with 1.5" PVC Unions. Unit control would be through the Central System Controller OIP with a manual On/Off switch. All wetted materials are either PVC of AFP which are perfectly suitable for the acid solution to be processed.

In its innovative design, water flows within the reactor though two proprietary Activated Fluropolymer (AFP) plastic tubes configured in series and mounted horizontally with one tube positioned above the other. Separate banks of four (4) UV lamps surround each tube such that UV energy is projected toward the water from all sides. UV-reflecting alloys form the outer casing of the UV unit housing to reflect the light back into the wastewater, creating an extremely efficient in the utilization of UV energy. The design of the reactor, and the characteristics of the AFP tube material, makes them self-cleaning with no need for additional cleaning tanks or chemicals to remove scale as in submerged quartz sleeve systems. The naturally turbulent flow through the AFP tubes serves to scour the inside of the tubes, while providing the additional benefit of ensuring complete exposure of all the flow to the intense UV.

Figure 3 – UV Unit Schematic

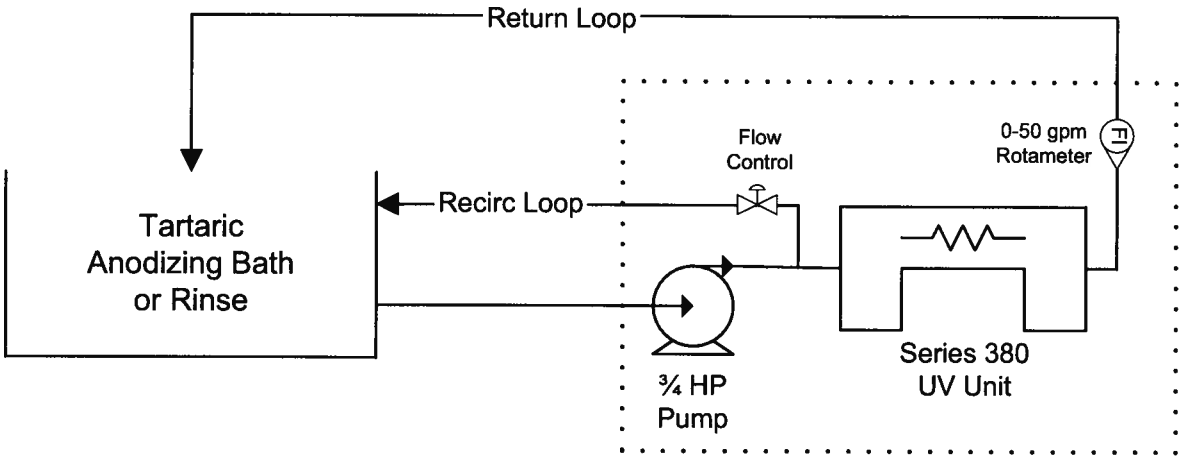


Table 3 –UV Unit Specifications

Operating Profile	
Flow Rate	35 gpm
UV Transmission	> 80%
Total Suspended Solids	> 5 mg/l
Controls	Integrated with Central System Controller
Power Supply	208-230/460 VAC
Operating Pressure	40 psi maximum
Tube Maintenance	Self-cleaning with turbulent flow
System Control	Central Controller PLC
Operator Interface	Central OIP
System Components	
Feed Pump	AMT 429K28 Self-priming
Exposure Tudes	Activated Fluropolymer (AFP) 840
Quantity of Tubes	Two
Low Pressue High Output UV Lamps	Eight
Inlet and Outlet Conections	2-inch
Shut-off Control	Automatic with pump inactivation
Temperature Control	Automatic based upon lamps temperature
On Indicator light	LED
Operating History	Elapsed Time indication
Lamp Ballasts Design	Removable Rack
Wetted Parts	PVC or AFP
Housing	Powder-coated Aluminum

Rinsewater Conductivity Controller

The Rinsewater Conductivity Controller would replenish rinse tanks with DI water having 1 part-per-million (ppm) of dissolved solids (TDS) instead of city water which averages 580 ppm TDS, as is currently done, requiring a significantly lower volume of water to maintain rinsewater cleanliness. Additionally, rather than a continuous incoming flow, DI water would only be supplied to each individual rinse as required to maintain water quality better than adjustable set-points.

Submersible conductivity sensors outputting to the Central System Controller would monitor rinsewater conductivity and precisely maintain it within a range of 5 to 5,000 ppm TDS for each rinse tank based upon a specific set-point as selected by Coast according to its process requirements. This method of controlled water supply would replace the current system in which city water flow to each tank is continuous regardless of ongoing work or not. With the Rinsewater Conductivity Controller, DI water would be added to individual rinses only as water quality diminishes due to contaminants loading as parts are processed through the line.

The Rinsewater Conductivity Controller would accomplish this by automatically energizing in-line actuated valves to feed pressurized DI water fed from the DI Water Holding Tank. Along with the in-line actuated valve, there would be an in-line 2.5 gpm flow regulator to limit the maximum water flow to any

individual rinse tank. Rinsewater quality set-points for each rinse tank would be operator adjustable at the Central System Controller OIP with actuated valve control through the Controller PLC.

Figure 4 – DI Water Supply and Rinsewater Conductivity Controller

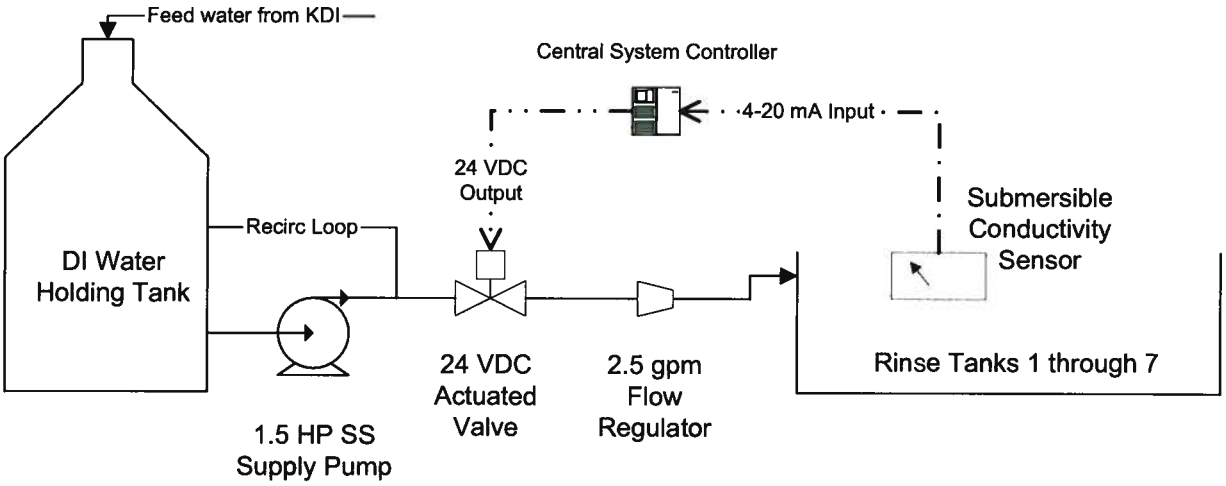


Table 4 –DI Water Supply and Rinsewater Conductivity Systems

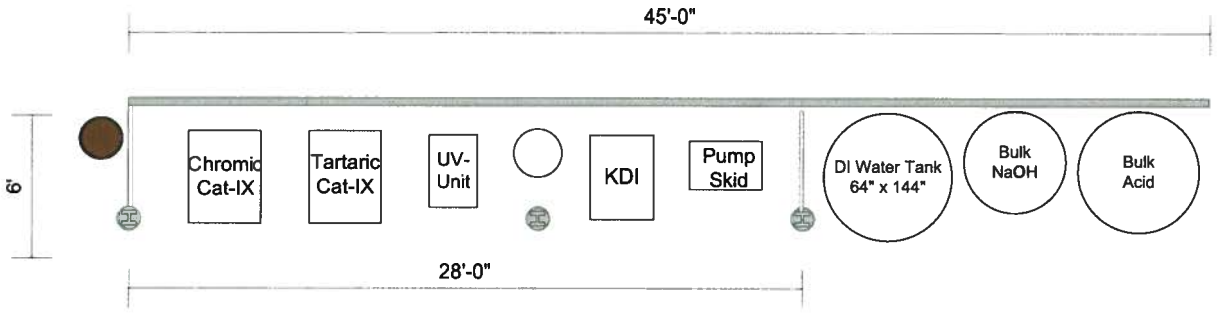
DI Water Supply System	
Holding Tank	2,000 dome top/flat bottom
Seismic/Wind Restraints	Zone 4 Compliant
Tank Material of Construction	HDLPE
Dimensions	64" Diameter x 144" Height
Level Control	N/O contact floats
Feed Pump	Stainless steel 1.5 HP TEFC
Interconnect Piping	Schedule 80 PVC
Controller	Controller PLC
Operator Interface	Controller OIP
Rinsewater Conductivity Controller	
Conductivity Sensors	Signet 2850-52-41
Actuated Control Valve	24VDC-energized 1" PVC Valve
Flow Regulator	3/4" PVC, 2.5 gpm
Conductivity control range	5 to 5,000 ppm TDS
Controller	Controller PLC
Operator Interface	Controller OIP

The below figure depicts the equipment lay-out in the location of the existing inoperable DI water system which we understand would be the location for our proposed equipment. It is our understanding that the central system controller with operator interface panel would be located inside so it has not

been included in the below lay-out. The new batch treatment system and two waste holding tanks would be located in the area of the existing wastewater treatment system.

We further understand that Coast is considering installation of an overhead structure as well as walls to protect the equipment from environmental exposure and we would strongly encourage this for the benefit of the equipment and to ensures its longest-possible service life.

Figure 5 – Equipment lay-Out



Regeneration Waste Holding Tanks

The Cat-IX systems for the chromic and tartaric acid baths require waste holding tanks which are accounted for below based upon our recent discussions. The two tanks would be located in close proximity to the newly-proposed automated batch treatment system and include the features described below.

Batch Treatment System

Based upon our discussions and agreement that your current flow-through wastewater treatment system would be unsuitable for treating the concentrated regeneration waste considering the significantly lower system flow resulting from installation of the Rinsewater Conductivity Controller, we have amended our proposal to include an automated batch treatment system.

This system would be located in close proximity to the existing wastewater treatment system and would include the features and components listed below, including the two waste holding tanks.

Its sequence of operation would be fully automatic following push button initiation, except for liquid incoming solution transfer and outgoing sludge transfer which would manually activated but controlled by in-tank level sensors.

Table 5 –DI Water Supply and Rinsewater Conductivity Systems

Metals Precipitation Batch Treatment System	
Sub-System	Chromic Acid Regeneration Waste Holding Tank
Tank	Chemtainer TC64121IA 1500 gallon dome-top flat bottom HDLPE
Seismic Restraints	Stainless Steel anchor cleat and 5 1/2" x 1/2" threaded bolt
	zinc-plated 1/4" diameter 7 x 19 braided cable and wire rope clips
Level Sensor	High level for automatic control of incoming solution flow
Kari N/O buoyancy-type	Low level for automatic control of outgoing solution flow
Transfer Pump	Wilden 1" non-metallic air-operated diaphragm pump - Shared
Pump Control	24VDC N/C actuated solenoid valve
Interconnect piping	Sch 80 PVC Fittings and Pipe
Control Valves	1" Plastomatic True Blue Union Ball Valves
Sub-System	Tartaric Acid Regeneration Waste Holding Tank
Tank	Chemtainer TC64121IA 1500 gallon dome-top flat bottom HDLPE
Seismic Restraints	Stainless Steel anchor cleat and 5 1/2" x 1/2" threaded bolt
Seismic Cables	zinc-plated 1/4" diameter 7 x 19 braided cable and wire rope clips
Level Sensor	High level for automatic control of incoming solution flow
Kari N/O buoyancy-type	Low level for automatic control of outgoing solution flow
Transfer Pump	Wilden 1" non-metallic air-operated diaphragm pump - Shared
Pump Control	24VDC N/C actuated solenoid valve
Interconnect piping	Spears Sch 80 PVC Fittings and Harvel Sch 80 PVC Pipe
Control Valves	1" Plastomatic True Union Ball Valves
Sub-System	Batch Reaction Tank - T6
Tank	2,500 gallon Fiberglass Cone Bottom Reaction Tank
Seismic Restraints	Stainless Steel anchor cleat and 5 1/2" x 1/2" threaded bolt
Level Sensor	High/High level for automatic control of incoming solution flow
	High level for automatic activation of treatment process
Kari N/O buoyancy-type	Low level for automatic control of outgoing solution flow
Mixing	Delta PG-4 1-HP Gear-drive mechanical mixer on stand
Sludge Transfer Pump	Wilden P4 non-metallic air-operated diaphragm pump
Pump Control	24VDC N/C actuated solenoid valve
Supernate Decant Lines	1" Pipe, isolation valve, 1/4" sample tap, and clear PVC viewing pipe
Interconnect piping	Spears Sch 80 PVC Fittings and Harvel Sch 80 PVC Pipe
Control Valves	2" Plastomatic True Union Ball Valves
pH Sensor	Signet 2750 and 2724 pH Sensor with 4-20 mA input to PLC
ORP Sensor	Signet 2750 and 2725 ORP Sensor with 4-20 mA input to PLC
Chemical Feed Pumps	Wilden P.025 Acid, NaOH, Precip, Floc, and Coagulant Feed Pumps

Equipment Pricing

The following pricing is consistent with our October 16th Quotation for those previously proposed systems. One of the UV Destruct unit has been eliminated as you'd requested.

We've added to our scope of services the batch treatment system, which incorporates two (2) waste holding tanks with transfer pumps for Cat-IX regeneration waste which were previously presented as separate optional line items.

The below pricing include the labor and materials for turn-key installation as well as start-up and operator training for each of the individual systems assuming their combined installation as sub-systems in the over-all equipment package detailed above.

Rinsewater Conservation Systems

• KDI Elite 1354ff		$29,353
• Rinsewater Conductivity Controller		$12,867
• DI Water Supply System		$9,230
	Sub-Total	$51,450

Bath Purification and Waste Treatment Systems

• Chromic acid Cat-IX Acid Purification		$47,638
• Tartaric acid Cat-IX Acid Purification		$47,638
• UV Purification		$13,672
• Automated Batch Treatment		$42,281
	Sub-Total	$151,229
	Project Total	$202,679

Installation, Start-up & Training

Water Innovations would take responsibility for installation of our provided equipment on a turn-key basis, providing all equipment, materials, and supplies necessary to install the equipment and interconnect piping and electrical tie-ins between the system components. This assumes that a dedicated electrical service will be readily available in the location of the equipment and that the area is readily accessible to locate and install the equipment prior to the start of installation.

All interconnect piping materials provided by Water Innovations would be Schedule 80 PVC with corrosion-resistant fiberglass or FRP anchor systems. Anchoring hardware where required would be 316 stainless steel.

Immediately following installation, system start-up and training would begin. Start-up would be considered successful and completed when all systems components are fully operational and Coast's personnel have been trained in system operation. System training would occur simultaneously with start-up services, consisting of hands-on instruction in all system operation and maintenance.

Documentation

Included with the systems would be two operator/maintenance manuals containing the following:

- System specifications
- Component literature
- Component instructions
- Maintenance instructions
- Troubleshooting instructions
- Spare parts list
- System drawings

Included for each provided system would be a drawing package consists of the following hard copy and/or AutoCAD files:

- P&ID (Process & Instrumentation Diagram) – Flow schematic for entire system
- Floor Plan – Plan view of supplied equipment layout
- Piping Interconnect – Plan view of interconnecting piping between equipment
- (Non-dimensional for flow reference only)
- Electrical Schematic – Ladder diagram with all electrical devices
- Control Panel Layout – Door mount equipment (instruments, switches, lamps)
- IWD (Interconnection Wiring Diagram) – Field devices, connections, and boxes

Service Contract

Water Innovations would offer a quarterly service contract which would include routine and as-required visits. The visits would consist of the following:

- Routine system inspection to ensure all components are in proper working condition
- Warranty repairs as required during the specified warranty period
- Non-warranty repairs (not included required components) following the specified period
- Ongoing operator training
- System trouble-shooting and optimization

The cost for this service would be subject to further discussion and would be based upon the frequency of visits and the scope of services to be provided.

Shipment Schedule

It is possible that equipment installation could occur in two stages, in an effort to accommodate Coast's project requirements without there being an impact on system pricing. Depending upon the order of individual systems being ordered, installation could occur in as little as 6 weeks. Full system installation would occur 8 to 12 weeks following receipt of a purchase order and initial payment. A ship date will be confirmed following purchase order acceptance.

Payment and Shipping Terms

Payment Terms

- 40% Due and payable with Purchase Order
- 40% Due and Payable Prior to Equipment Delivery
- 10% Due and Payable immediately upon completion of installation and start-up
- 10% Due and payable 30 Days following completion of systems start-up

Shipping Terms

Freight Collect, F.O.B. Escondido, CA

If you have any questions or would like to issue a purchase order, you can contact me at 760.271.6113 or by e-mail at steven_ward@Waterinnovations.net

Kind Regards,

Steven A. Ward

Steven A. Ward, MPH
Water Innovations, Inc.

Recirc & $ave Program

Exhibit C
COAST PLATING
417 West 16th Steet
Carson, CA 90248

Flow Meter Potable Water Supply Data
Prior to Installation of DI System

	Day of Meter Read	Day No.	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	11/25/2010	1	27	35	8
	11/27/2010	2	35	46	11
	11/29/2010	3	46	58	12
	11/30/2010	4	58	72	14
	12/1/2010	5	72	98	26
	12/2/2010	6	98	127	29
	12/2/2010	7	127	149	22
	12/3/2010	8	149	172	23
	12/4/2010	9	172	180	8
	12/6/2010	10	180	201	21
	12/7/2010	11	201	225	24
	12/8/2010	12	225	241	16
	12/9/2010	13	241	249	8
	12/10/2010	14	249	271	22
	12/11/2010	15	271	275	4
	12/13/2010	16	275	298	23
	12/14/2010	17	298	318	20
	12/15/2010	18	318	338	20
	12/16/2010	19	338	359	21
	12/17/2010	20	359	381	22
	12/18/2010	21	381	390	9
	12/20/2010	22	390	415	25
	12/21/2010	23	415	441	26
	12/22/2010	24	441	467	26
	12/23/2010	25	467	501	34
	12/24/2010	26	501	516	15
	12/27/2010	27	516	544	28
	12/28/2010	28	544	561	17
	12/29/2010	29	561	596	35
	12/30/2010	30	596	631	35
	12/31/2010	31	631	642	11
	1/3/2011	32	642	676	34
	1/4/2011	33	676	700	24
	1/5/2011	34	700	731	31
	1/6/2011	35	731	764	33
	1/7/2011	36	764	783	19
	1/10/2011	37	783	806	23
	1/11/2011	38	806	824	18
	1/12/2011	39	824	841	17
	1/13/2011	40	841	862	21
	1/14/2011	41	862	871	9
	1/15/2011	42	871	886	15
	1/17/2011	43	886	909	23
	1/18/2011	44	909	934	25
	1/19/2011	45	934	950	16
	1/20/2011	46	950	974	24
	1/21/2011	47	974	981	7
	1/22/2011	48	981	998	17
End of Read Cycle	1/24/2011	49	998	1,020	22

Total Gallons Potable Water Used	993,000
Total Number of Days Meter Records	49
Average Gallons Used per Day	20,265
Total Working Days Per Year (Monday Through Saturday)	312
Average Gallons Used Per Year	6,322,776
Number of Parts Processed	7861
Gallons Used per Part Processed	126

Recirc & $ave Program

COAST PLATING
417 West 16th Steet
Carson, CA 90248

Flow Meter Potable Water Supply Data
After Installation of DI System

	Day of Meter Read	Day No.	Meter Reading Start	Meter Reading End	Total Gallons Used (x1000)
Start of Read Cycle	3/31/11	1	2,154	2,158	4
	4/1/11	2	2,158	2,166	8
	4/2/11	3	2,166	2,175	9
	4/3/11	4	2,175	2,184	9
	4/4/11	5	2,184	2,189	5
	4/5/11	6	2,189	2,208	19
	4/6/11	7	2,208	2,228	20
	4/7/11	8	2,228	2,250	22
	4/8/11	9	2,250	2,254	4
	4/9/11	10	2,254	2,266	12
	4/11/11	11	2,266	2,278	12
	4/12/11	12	2,278	2,292	14
	4/13/11	13	2,292	2,310	18
	4/14/11	14	2,310	2,326	16
	4/16/11	15	2,326	2,339	13
	4/18/11	16	2,339	2,352	13
	4/19/11	17	2,352	2,361	9
	4/20/11	18	2,361	2,381	20
	4/21/11	19	2,381	2,401	20
	4/22/11	20	2,401	2,420	19
	4/23/11	21	2,420	2,439	19
	4/25/11	22	2,439	2,456	17
	4/26/11	23	2,456	2,497	41
	4/27/11	24	2,497	2,502	5
	4/28/11	25	2,502	2,505	3
	4/29/11	26	2,505	2,517	12
	4/30/11	27	2,517	2,528	11
	5/1/11	28	2,528	2,548	20
End of Read Cycle	5/2/11	29	2,548	2,568	20

Total Gallons Potable Water Used	414,000
Total Number of Days Meter Records	29
Average Gallons Used per Day	14,276
Total Working Days Per Year (Monday Through Saturday)	312
Average Gallons Used Per Year	**4,454,069**
Estimated Gallons Saved Per Year	**1,868,707**
Percent Water Savings	**30**
Number of Parts Processed	4560
Est Gallons Used per Production Rate	576,018
Percent Savings per Production Rate	28
Gallons Used per Part Processed	91

Coast Plating, Inc.
Recirc & $ave Program
Estimated Program Funding

Potential Program Cash Incentives								
Current Annual Water Use (Million Gallons)	**Percent Water Savings**	**65**	**60**	**50**	**40**	**35**	**30***	**20**
6.3	**Total Annual Water Savings (Million Gallons)**	4.1	3.8	3.2	2.5	2.2	1.9	1.3
19.3	**Total Annual Water Savings (Acre-Feet)**	12.6	11.6	9.7	7.7	6.8	5.7	3.9
Water Reduction Incentive	Incentive payment of $3.00 per 1,000 gallons of actual water saved over a one-year period.	$12,285	$11,340	$9,450	$7,560	$6,615	$5,606	$3,780
Equipment Cost Incentive	Reimbursement of the equipment cost of up to $5,000 maximum based on the $3.00 per 1,000 gallons saving rate over a one-year period.	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	**$0**
Installation Cost Incentive	Reimbursement of the equipment installation of up to $5,000 maximum based on actual installation costs.	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Additional Golden State Water Funding Incentive		$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
Total Potential Program Cash Incentives		**$32,285**	**$31,340**	**$29,450**	**$27,560**	**$26,615**	**$25,606**	**$18,780**

NOTE: A minimum of 1.67 Million Gallons per Year of Water Savings is necessary to obtain the Equipment Cost Incentive.

FINAL

RECIRC & SAVE:
WATER SAVINGS PERFORMANCE PROGRAM
AGREEMENT No. 2A

THIS AGREEMENT (Agreement) is made and entered into as of **April 23, 2012**
between **West Basin Municipal Water District** (West Basin) and **Blue Creations of California, Inc**. (Company)
West Basin and Company may be collectively referred to as "Parties" and individually as "Party."

Recitals

A. West Basin will provide a financial incentive to businesses that make capital improvements resulting in improved water use efficiency and water savings.

B. **California Water Service Company** supports West Basin's Program and Company's water use efficiency Project.

C. Company, an industrial customer within the service area of West Basin, submitted a proposal and received approval from West Basin to receive financial incentives for installation of capital equipment to improve water-use efficiency while maintaining existing production levels routinely established for their business operation.

D. This Agreement provides the terms for Company's participation in the Program.

NOW, THEREFORE, in consideration of the promises and covenants hereinafter set forth, the Parties do agree as follows:

Section 1: Responsibilities and Ownership

1.1 Company elects to participate in West Basin's Recirc and Save Program and will make water-use efficiency improvements (Project) at their facility as described in Exhibit A. Water savings for this Project is projected to be about **4 million gallons per year** when fully operational.

1.2 Company shall be responsible for the design, implementation, personnel, equipment and supplies, and all capital and operating costs related to and incurred by Project. All materials and equipment necessary to implement Project are the exclusive property of Company. West Basin shall have no ownership, right, title, security interest, or other interest in any Project facilities, materials, or equipment, nor any rights, duties, or responsibilities for operation or maintenance thereof.

1.3 Company shall ensure that the Project complies with all Federal, State and local laws, ordinances and regulations and is solely responsible for any such obligations, including, without limitation, compliance with the California Environmental Quality Act.

1.4 The Company agrees that it is responsible for its own actions under this Agreement and agrees to indemnify and hold West Basin and the California Water Service Company, and their officers and agents harmless, and agrees to defend West Basin against any claim or asserted liability arising out of its actions, either willful or negligent, in implementing the Project. Such indemnity will include any losses relating to any claim made, whether or not a court action is filed, and will include attorney fees and administrative and overhead costs related to or arising out of such claim or asserted liability.

1.5 Company shall purchase/acquire, install, operate, maintain and read metering devices and/or data acquisition systems required for the purpose of measuring and documenting Project water savings, unless otherwise designated by the Parties. Company shall provide West Basin with water billing records from Customer Agency, Retail Agency or Utility responsible for existing water meters and sewer discharge meters for each of the twelve months preceding Project startup to establish historical usage (Historical Usage). Company shall furnish **Monitoring and Water Savings Documentation** as outlined in **Section 5**.

1.6 Company shall allow access to Project facilities shown in **Exhibit B** and metering equipment to West Basin or its designee for the purposes of measuring and/or verifying actual water savings. West Basin representatives will comply with all Company safety and security requirements while on site.

1.7 Company agrees to pay the entire cost of the Project. Company shall perform all retrofit work and testing of the Project. Company shall provide West Basin a completed W-9 Form (Request for Taxpayer Identification Number and Certification) and written notification that the Project is fully operational, which will serve as the Date of Commissioning.

1.8 Within 60 days after the Date of Commissioning, Company shall provide West Basin with records of actual Project costs, including invoices, receipts, and other documentation of Project capital costs, and actual annual costs for water service for each of the twelve months preceding Project Date of Commissioning.

1.9 Company shall, at all times during the term of this Agreement, exercise its best efforts to operate the Project to achieve the anticipated water savings outlined in Section 1.1. West Basin shall not be responsible for Company's failure to achieve the anticipated water savings.

Section 2: Agreement Term

The Term shall be for two years commencing with the effective date of this Agreement or three months following conclusion of Monitoring Period as outlined in Section 5.1, whichever comes first. The Term may be extended at the sole discretion of West Basin, as necessary to provide Company with twelve months of accrued water savings. Obligations in Section 7 shall prevail and survive termination of this agreement.

Section 3: Agreement Administrators

3.1 Ms. Elise Goldman is appointed Agreement Administrator for West Basin for the purpose of administering this Agreement. Section 3.2 identifies Company appointed Agreement Administrator for the purpose of administering this Agreement.

3.2 The designated Agreement Administrators may be changed by providing written notice to the other Party. Any communication required to administer this Agreement shall be in writing and will be deemed received upon personal delivery or 48 hours after deposit in any United States mail depository, first class postage prepaid, and addressed to the Party for whom intended, as follows:

If to West Basin:	If to Company:
West Basin Municipal Water District 17140 South Avalon Blvd., Suite 210 Carson, CA 90746 Attention: Ms. Elise Goldman, Water Efficiency Specialist	Blue Creations of California Inc. 22632 Avalon Blvd Carson, CA 90745 Attn: Raul Cisneros, President

Any Party may change such address by giving notice to the other Party as provided herein.

Section 4: West Basin's Financial Incentive Payment

4.1 In accordance with Program guidelines, West Basin's financial incentive for the Project is calculated as the lesser of:

Method A – $5.00 per 1,000 gallons of water saved by the Project for one year during the Monitoring Period plus additional installation incentive as it applies to the savings associated with each particular project; or

Method B – one hundred percent of the total Project capital cost as provided in Section 1.8.

4.2 Based on information supplied by Company in its proposal, West Basin shall pay Company a First Payment of **$10,000** upon verification by West Basin or its designee of equipment installation, Project operation and submittal of Water Savings Documentation (as outlined in Section 5.1) for the first month (30 days) of water savings when accompanied by an invoice from Company for First Payment. Company may be required to return a portion or all payments to West Basin based on actual Project costs and measured water savings following the procedure outlined in Section 4.4.

4.3 Alternatively, West Basin or its designee will establish water consumption to production unit ratio prior to retrofit. In the event that production numbers increase or decrease significantly impacting the water savings projection, this alternative comparison may be needed to confirm that savings are being achieved as projected.

4.4 Within 60 days of receiving/collecting complete water savings data from Company for the 6-month Monitoring Period outlined in Section 5.1, West Basin shall calculate the total financial incentive payment based on the lesser of Method A or Method B minus West Basin's First Payment of **$10,000**. West Basin's total payment under this agreement shall not exceed **$20,000**. West Basin shall compute adjustments for over- or under-payment of the final financial incentive. If there is an underpayment, West Basin shall notify Company and issue a check to Company upon Company's submittal of Final Payment invoice to West Basin. If there is an overpayment, Company shall issue a check to West Basin upon notification of overpayment. Any overpayment or underpayment shall be made within 60 days of West Basin's notification to Company of the final financial incentive payment calculation.

Section 5: Monitoring and Water Savings Documentation

5.1 The pre-installation Monitoring Period shall begin 30 full days prior to installation of any water saving devices or systems to establish a baseline water usage to compare against for water savings that will be realized as a result of the pending installation(s). Weekly reads from the meter shall be recorded.

5.2 The Monitoring Period shall begin with the first full month of Project operation and conclude when West Basin has received/collected 6 consecutive months of Water Savings Documentation, unless otherwise approved by West Basin in writing.

5.3 Company shall provide Water Savings Documentation/provide access to meters to obtain Water Savings Documentation, outlined in Exhibit C, on a weekly basis, as necessary.

5.4 West Basin shall calculate accrued Project water savings during the Monitoring Period using completed Water Savings Documentation.

Section 6: Audit and Funding Reconciliation

6.1 Company shall be responsible for maintaining all supporting documentation of Project implementation costs for a period of three years following completion of Agreement Term. West Basin will have the right to audit Company's implementation expense receipts and all supporting documentation of Project costs related to this Agreement. Upon 30 days advance notice from West Basin, Company will fully cooperate with any audit of its expenses and will permit access to its books, records, and accounts related to Project as may be necessary to conduct such audit. Company shall, within one year of determination, reimburse West Basin for any financial incentive to which it was not entitled based on the results of the independent audit.

6.2 West Basin may, at its own expense and in its sole discretion, provide follow-up analysis and verification of actual water savings achieved through Project implementation. Company agrees that it will provide access to its facilities, water consumption records, production records, and personnel as necessary to complete such analysis and verification for a period of three years following completion of Agreement Term.

Section 7: Other Terms

7.1 This Agreement may be amended by written mutual agreement executed by both Parties. Any alteration or variation of the terms of this Agreement will not be valid unless made in writing and signed by both Parties. This Agreement constitutes the entire agreement between the Parties.

7.2 This Agreement will inure to the benefit of and be binding upon West Basin and Company and their respective successors. This Agreement is not assignable by either Party in whole or in part.

7.3 The partial or total invalidity of one or more parts of this Agreement will not affect the intent or validity of this Agreement.

7.4 This Agreement will be deemed a contract under the laws of the State of California, and for all purposes will be interpreted in accordance with such laws. West Basin and Company hereby agree and consent to the exclusive jurisdiction of the courts of the State of California, and that the venue of any action brought hereunder will be in Los Angeles County, California.

Attachments incorporated in this Agreement include:

Exhibit A – Project Description
Exhibit B – Project Diagram
Exhibit C – Water Savings Documentation

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement.

APPROVED AS TO FORM:			WEST BASIN MUNICIPAL WATER DISTRICT	
By:			By:	
	Lemieux and O'Neill *District Counsel*			*Rich Nagel* *General Manager*
Date:	6/19/12		Date:	6/18/12

APPROVED AS TO FORM:			BLUE CREATIONS OF CALIFORNIA	
By:			By:	RAUL QUINTERO O.
	Name:			Name: Raul ~~Cisneros~~ QUINTERO
Title:			Title:	President
Date:			Date:	6/14/2012

In Duplicate

Project Description

Blue Creations is planning to purchase and install a new ozone generator and production machine called "Dry Ozonemaster II" from GreenTech Corp. The Dry Ozonemaster II ozone generator has the capacity to produce 120 grams per hour of ozone at 8 percent ozone by weight. The Ozonemaster II machine comes with an Ozone Generator, Oxygen Generator, Ozone Analyzer, Controls, and Ambient Ozone Monitor. This machine is capable of working together with up to two 450 lbs washers, and can process up to 250 garments per hour. See the attached equipment cut-sheet for more information on Dry Ozonemaster II ozone generator.

Blue Creations produces approximately 250 different product lines. Water usage for each product line depends on the garment appearance and associated process method required. Typical garment processing steps include pre-wash with enzymes to remove all the starch and chemicals, bleaching, stonewash, sandblast, acid wash, over dyeing and rinsing the dye from the fabric, tinting, coating, and pocket whitening. Water is used for washing, rinsing, rewashing, and re-rinsing of garments to remove chemicals, dyes, sand, or stone in between the processing steps. The ozone process will eliminate steps including rinsing, chemical spraying for bleaching, dye tinting, and pocket whitening processes that use significant amount of water, chemical, and energy.

Project Diagram

Blue Creations of California, Inc. is located in Carson, California and provides garment washing and texturizing services. The Blue Creations operation takes place in two adjacent buildings at 22632 Avalon Blvd (Bldg 1) and 22624 Avalon Blvd (Bldg 2). Bldg 1 contains a small administrative office and primarily processes denim garments. In Bldg 2, Blue Creations handles dying and other washing/processing operations. There is one water meter serving Bldg 1 and one for Bldg 2, both providing water for restrooms, administrative and process purposes.

The Blue Creations facility operates 12 sample washing machines, 10 production washing machines, 14 dryers, 5 extractors, and one ozone generator and production machine. Refer to the attached **Figure 1** for the site layout of Blue Creations facility.

The Blue Creations' garment production process includes wet processes and dry processes as shown in **Table 1**.

Table 1: Blue Creations Process Method List

Wet Processes:	Dry Processes:
• Stone Wash • Vintage Wash • Enzyme Wash • Regular Wash • Acid Wash • Rinse Wash • Silicone Wash • Potassium Wash • Bleach Wash • Dirty Wash • Resin Wash	• Potassium Spray • Hand Sand • Sand Blast • Whiskers • Grinding and Tacking • Heat/Steam Press • Resin • Destruction • 3D Whiskers • Potassium Brush • Potassium Sponge • Bleach Spots • Potassium Spots • Coating • Pigment Spray

The installation of the ozone generator and production equipment will affect the operation of all washers and dryers. Although the ozone equipment will not replace any of the washers or dryers currently in operation at the facility, it will significantly reduce their usage. For example, the Bleach Wash process using ozone will eliminate the potassium and sodium washing processes and pocket whitening process, and can reduce the water usage up to 50 percent compared to the conventional washing machine process.

Monitoring and Water Savings Documentation

Monitoring and water savings documentation will be submitted by Blue Creations in accordance with Section 1.5 of the "Recir & Save Water Saving Performance Program Agreement No. 2A." The water savings documentation includes the following:

- Daily Water Usage Log
- Monthly Production Log

Blue Creations produces approximately 250 different product lines at the Carson facility. The water usage for each product line depends on the garment appearance and associated processing method required. For example, using conventional washing machines, the "Potassium Wash" processing method requires eight wash/rinse cycles while the "Rinse Wash" processing method requires one cycle. **Table 1** presents the eleven primary processing methods used by Blue Creations to produce the product lines of its customers. The range of water use listed for each process is based on water use required using the current conventional "belly" type washing machines, as determined by water records and production data provided by Blue Creations for 2011.

Using the attached Production Log form, Blue Creations will provide a record of the number of garments produced during the monitoring period. The production record will itemize the number of garments corresponding to each of the eleven processing methods. The water use data in **Table 1** will be used to estimate the water use that would have been required using the conventional washing machines and compare that to the actual water used during the monitoring period. The water savings will be the calculated difference between the estimated water use and the actual water use during the monitoring period. The water savings ratio will be used to convert the monitoring period time to an annual estimate.

Table 1: Blue Creations Water Usage by Processing Method

Processing Method	Water Usage Ranges * (gallons per unit of garment)
1. Stone Wash	15-35
2. Vintage Wash	10-25
3. Enzyme Wash	7-10
4. Regular Wash	3-15
5. Acid Wash	30-35
6. Rinse Wash	3-10
7. Silicone Wash	10-35
8. Potassium Wash	25-30
9. Bleach Wash	15-30
10. Dirty Wash	30-50
11. Resin Wash	25-30

* Water usage range based on Conventional Washing Machines.

Appendix C
Blue Creations
Recirc & $ave Program
Estimated Annual Cost Savings and Potential Program Cash Incentive Comparison
Option 2: Ozone-based Washer System, modified operation 30 to 50 percent savings

Incentive Assumptions	30 Percent Water Savings		40 Percent Water Savings		50 Percent Water Savings	
	Mgal/yr	Incentive Required	Mgal/yr	Incentive Required	Mgal/yr	Incentive Required
$3.00/1000 gallons	2.80	$ 8,402	3.73	$ 11,203	4.67	$ 14,004
$4.00/1000 gallons	2.80	$ 11,203	3.73	$ 14,937	4.67	$ 18,672
$5.00/1000 gallons	2.80	$ 14,004	3.73	$ 18,672	4.67	$ 23,340