UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

November 30, 2009

In Reply Refer To: WTR-7

Eddie Rocha, Director of Operations
South Bay Circuits
6409 West Commonwealth Avenue
Chandler, Arizona 85226

Re: August 11, 2009 Clean Water Act Inspection

Dear Mr. Rocha:

Enclosed is the November 30, 2009 report for our August 11, 2009 inspection of South Bay Circuits. Please submit a short response to the findings in Sections 2 through 5, to EPA, Chandler, and ADEQ, by **January 30, 2010**. The main findings are summarized below:

1 South Bay Circuits qualifies as a new source metal finisher under 40 CFR 433.

2 On-site treatment for the Main Bldg 6409 is equivalent to the models used in setting the Federal standards. Operational controls which improve performance are also employed, most notably the well-controlled handling of high-strength spents, segregated treatment, and reaction end-point metering for treatment process control. Sampling has demonstrated consistent compliance with Federal standards and local limits, with one exception. The cause should be determined for the single sample with violations from Bldg 99.

3 The self-monitoring is representative over the sampling day but not the reporting period because the single infrequent samples do not account for the intermittent contributions of batch treated spents. Nickel, copper, and pH should be self-monitored more frequently.

4 The Federal cyanide standards are appropriately applied to internal sampling points.

I appreciate your helpfulness extended to me during this inspection. I remain available to the City of Chandler, and to you to assist in any way. Please do not hesitate to call me at (415) 972-3504 or e-mail at arthur.greg@epa.gov.

Sincerely,

Original signed by:

Greg V. Arthur
CWA Compliance Office

Enclosure

cc: Luis Provencio, Senior Inspector, City of Chandler
Moses Olade, Environmental Hydrologist, ADEQ

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION 9

CLEAN WATER ACT COMPLIANCE OFFICE

NPDES COMPLIANCE EVALUATION INSPECTION REPORT

Industrial User:	South Bay Circuits 6409 West Commonwealth Avenue, Chandler, Arizona 85226 New Source Metal Finishing (40 CFR 433)
Treatment Works:	City of Chandler Lone Butte Wastewater Treatment Plant No NPDES Permit – No Arizona Aquifer Protection Permit Reuse Under Contract with the Gila River Indian Community
Pretreatment Program:	City of Chandler
Date of Inspection:	August 11, 2009

Inspection Participants:

US EPA:	Greg V. Arthur, Region 9, CWA Compliance Office, (415) 972-3504
Arizona DEQ:	Moses Olade, Environmental Hydrologist, (602) 771-4552
City of Chandler:	Ray Figueroa, Pretreatment Supervisor, (480) 782-3734 Luis Provencio, Senior Industrial Waste Inspector, (480) 782-3732 Lande Adams, Industrial Waste Inspector, (480) 782-3733
South Bay Circuits:	Eddie Routha, Director of Operations, (480) 940-3125 Troy McWhirt, Environmental Manager, (602) 796-3869

Report Prepared By:	Greg V. Arthur, Environmental Engineer November 30, 2009

1.0 Scope and Purpose

On August 11, 2009, EPA and the City of Chandler conducted a compliance evaluation inspection of South Bay Cirucits in Chandler, Arizona. The purpose was to ensure compliance with the Federal regulations covering the discharge of non-domestic wastewaters into the sewers. In particular, it was to ensure:

- Classification in the proper Federal categories;
- Application of the correct standards at the correct sampling points;
- Consistent compliance with the standards; and
- Fulfillment of Federal self-monitoring requirements.

South Bay Circuits is a significant industrial user ("SIU") within sewer service areas administered by the City of Chandler whose compliance was assessed as part of an on-going EPA evaluation of industrial users in EPA Region 9 by sector. The inspection participants are listed on the title page. Arthur conducted the inspection.

1.1 Process Description

South Bay Circuits is job-shop full service printed circuit board manufacturer of multilayer, non-flexible boards. The manufacturing work occurs at 6409 West Commonwealth Avenue (Bldg 6409), while the shipping, receiving, and final inspection work occurs across the street at 99 North McKinley (Bldg 99). South Bay Circuits began operations in 1994.

- Board Scrubbing – pumice abrasive scrubbing.
- Photo Resist – dry film applied, caustic developer (Na_2CO_3), resist strip (monoethanolamine).
- Imaging – film development (Ag fixant).
- Etching –ammonia etching (NH_4Cl/NH_3).
- Inner Layer Bonding – vacuum lamination.
- Hole Drilling/Plating – CNC drilling, resin swell (butyl "carbitol"), desmear ($NaMnO_4/NaOH$), acid neutralizer, acid activation, microetch, palladium catalyst, electroless copper plate, rack strip (H_2SO_4/H_2O_2), anti-tarnish (methanol).
- Plating – acid clean, microetch, acid activation, acid-copper plating, acid pre-dip, tin plating, electroless nickel plating, nitrate silver plating, cyanide gold plating.
- Soldering – solder preparation, solder flux (H_4B), reflow, solder mask (K_2CO_3), hot air leveling, tin/solder strip (HNO_3).
- Bldg 99 Finishing – cut to final product, final water cleaning.

See Appendix 1 on page 15 for a schematic of the configuration and layout of wastewater handling. Also ***see*** Table 1 in Appendix 2 on page 16 for a process tank inventory. Photo documentation of this inspection follows in Section 1.7 on pages 4 and 5.

1.2 Facility SIC Code

South Bay Circuits is assigned the SIC code for printed circuit boards (SIC 3472).

1.3 Facility Wastewater Sources

The printed circuit board manufacturing lines generate spents, rinses, wash waters, spills, and residuals. Rinses and wash waters are hard-piped to either a metal-bearing or a non-metal-bearing collection system, for separate handling and treatment. Spents are either off-hauled for reclaim or drummed for on-site batch treatment. ***See*** Tables 2, 3, and 4 in Appendix 2 on page 17 for lists of generated spents, rinses, wash waters, and residuals, and the methods of their on-site handling. Also ***see*** the photo documentation in Section 1.7 on pages 4 and 5.

Spent Solutions – The imparted contamination from the processing of printed circuit boards and the progressive drop in solution strength results in the generation of spents. The generation rates depend on bath usage, effectiveness of bath contamination control, and the amount of drag-out lost into the rinses or to the floor. Most spents are handled on-site through batch treatment. The palladium catalyst bath and the acid copper, tin, cyanide gold, and nitrate silver plating baths are regenerated strictly through additions and thus do not generate spents. Losses from these "adds-only" baths therefore must be through the drag-out of solution into the rinses, since baths without outlets would foul through contamination or fail through use.

Rinses – South Bay Circuits primarily employs first-stage on-demand overflow rinsing but also follows certain processing steps with first-stage drag-outs or multiple-stage rinses. Most rinses and wash waters undergo on-site treatment. Certain non-metals bearing rinses are separately handled for untreated discharge.

Residuals – South Bay Circuits generates spent carbon, filter cartridges, board drilling dust, and industrial wastewater treatment sludges for off-site disposal as hazardous. South Bay Circuits also generates spent etchant, solder flux, and silver canisters for off-site reclaim.

1.4 Facility Process Wastewater Handling

Composition - The process-related wastewaters listed in section 1.3 above would be expected to contain copper, lead, nickel, silver, zinc, acidity, chelating agents, solvents, surfactants, pollutants cleaned off of parts, and the minerals entrained in the water supply.

Delivery – Spents are drummed and hauled to a drum storage pad. Spent etchants and solder flux are hauled off-site for reclaim. Other spents are drummed for on-site batch treatment. Rinses and wash waters in the main building are hard plumbed to two transfer tanks for overhead delivery to on-site flow-through treatment sited away from the building. ***See*** Photos #1, #2, and #3 in Section 1.7 of this report on pages 4 and 5. ***Also*** see Section 3.2 on page 9.

Treatment – Most low-strength rinses, wash waters, and batch treated high-strength spents from the Main Bldg 6409 discharge to the sewers after treatment for metals through equalization, hydroxide metals precipitation, alum coagulation, polymer flocculation, flash mixing, and plate coalescing clarification. Spents are batch treated, 12 accumulated barrels at a time, through pH adjustment, polymer flocculation, and in-barrel tests for copper, with the tail waters metered into flow-through treatment. Certain non-metals bearing rinses discharge untreated with the treated wastewaters to the sewers. Imaging and pumice scrub wastewaters

first are pretreated through silver cementation canisters and bag filters, respectively. The wash waters from Bldg 99 discharge to the sewers after bag filtration. ***See*** Appendix 1 on page 15 of this report. ***Also*** see Sections 3.2 and 3.3 of this report on pages 9 and 10, as well as Photos #4, #5, and #6 in Section 1.7 of this report on page 5.

Discharge – Non-domestic wastewaters discharge to the City of Chandler domestic sewers through two connections designated in this report by permit number as IWD-26-1 and 26-3. Domestic sewage discharges through separate connections downstream of the industrial connections. The July 1, 2009 City of Chandler permit identifies IWD-26-1 as the secured sampling facility outside of Main Bldg 6409 and IWD-26-3 as a batch discharge tank in Bldg 99. The permit lists the average discharge to the sewers as 99,000 gpd for IWD-26-1 and 50 gpd for IWD-26-3. ***See*** Appendix 1 on page 15 for a schematic of the configuration and lay-out of the wastewater handling. ***See*** Photo #8 in Section 1.7 of this report on page 5.

1.5 Sampling Record

South Bay Circuit self-monitors semi-annually as required by the City of Chandler permit. The City of Chandler also collects its own samples semi-annually.

1.6 POTW Legal Authorities

The City of Chandler has enacted an ordinance to implement a pretreatment program in the areas serviced by the Lone Butte Water Reclamation Plant, which operates under contract with the Gila River Indian Community for wastewater reuse. Under this authority, the City issued City permit No.26 authorizing discharge of non-domestic wastewater to the sewers.

1.7 Photo Documentation

Eight of the 11 photographs taken during this inspection are depicted below and saved as *southbaycirc-01.jpg through -11.jpg.*

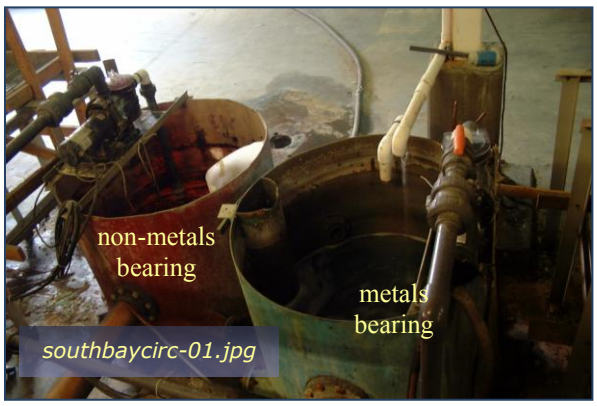


Photo #1: Main Bldg 6409 Transfer Holding Tanks
Taken By: Greg V. Arthur
Date: 08/11/09

Photo #2: Drummed Spents Accumulation Area
Taken By: Greg V. Arthur
Date: 08/11/09

Photo #3: Overhead Piped Delivery to the IWTP
Taken By: Greg V. Arthur
Date: 08/11/09

Photo #4: IWTP Incoming Equalization Tanks
Taken By: Greg V. Arthur
Date: 08/11/09

Photo #5: IWTP ORP and pH Metering
Taken By: Greg V. Arthur
Date: 08/11/09

Photo #6: IWTP Lamella Clarifier
Taken By: Greg V. Arthur
Date: 08/11/09

Photo #7: Secondary Containment Pans/Trenches
Taken By: Greg V. Arthur
Date: 08/11/09

Photo #8: IWD-26-1 Main Bldg Discharge Point
Taken By: Greg V. Arthur
Date: 08/11/09

2.0 Sewer Discharge Standards and Limits

Federal categorical pretreatment standards (where they exist), national prohibitions, State groundwater, and the local limits (where they exist) must be applied to the sewered discharges from industrial users. (40 CFR 403.5 and 403.6).

Summary

The Federal standards in 40 CFR 433 for new source printed circuit board manufactures apply to all process wastewater discharges from South Bay Circuits through compliance sample points IWD-26-1 and IWD-26-3. The Federal cyanide standards apply to just the cyanide bearing wastewaters without adjustment at their internal sources through compliance sample points IWD26-2 and IWD-26-4. The Chandler permit correctly advances standards reflecting the application of Federal standards for new sources applied to both the overall discharge points and the internal cyanide sampling points. The permit also correctly advances local limits. The application of Federal standards, national prohibitions, and local limits was determined through visual inspection. ***See*** Tables 5 and 6 in Appendix 2 on page 18 of this report for the permit limits.

Requirements

- None.

Recommendations

- None.

2.1 Classification by Federal Point Source Category

South Bay Circuits qualifies as a printed circuit board manufacturer subject to the Federal metal finishing standards for new sources in 40 CFR 433.

New or Existing Sources – Under the definitions in 40 CFR 403.3(k), a metal finishing process constructed after August 31, 1982 is a new source (1) if it entirely replaces a process which caused a discharge from an existing source or (2) if it is substantially independent of the existing sources on-site. This means that after the 1982 deadline, the new source standards apply to the original installation of metal finishing lines, rebuilt or moved lines, or existing lines converted to do new operations. The preamble to the final 1988 Federal rule states that the new source standards apply when "an existing source undertakes major construction that legitimately provides it with the opportunity to install the best and most efficient production process and wastewater treatment technologies" (*Fed Register, Vol.53, No.200, October 17, 1988, p.40601*).

The City of Chandler determined that South Bay Circuits qualifies as a new source because operations began in 1994.

2.2 Local Limits and National Prohibitions

Local limits and the national prohibitions are meant to express the limitations on non-domestic discharges necessary to protect the sewers, treatment plants and their receiving waters from adverse impacts. In particular, they prohibit discharges that can cause the pass-through of pollutants into the receiving waters or into reuse, the operational interference of the sewage treatment works, the contamination of the sewage sludge, sewer worker health and safety risks, fire or explosive risks, and corrosive damage to the sewers. The national prohibitions apply nationwide to all non-domestic sewer discharges. The City of Chandler local limits apply to non-domestic discharges in the Lone Butte WRP service area.

2.3 Federal Categorical Pretreatment Standards
New Source Metal Finishing - 40 CFR 433.17

40 CFR 433.17	Cd	Cr	Cu	Pb	Ni	Ag	Zn	CNt	Can	TTO
daily-maximum (mg/l)	0.11	2.77	3.38	0.69	3.98	0.43	2.61	1.20	0.86	2.13
month-average (mg/l)	0.07	1.71	2.07	0.43	2.38	0.24	1.48	0.65	0.32	-

Applicability - Under 40 CFR 433.10(a), the metal finishing standards apply to the process wastewaters from South Bay Circuits because the facility's operations involve printed circuit board manufacturing. The metal finishing standards "... apply to plants that perform ..." the core operations of electroplating, electroless plating, etching, anodizing, chemical coating, or printed circuit board manufacturing and they extend to other on-site operations associated with metal finishing and specifically listed in 40 CFR 433.10(a). If any of the core operations are performed, the new source metal finishing standards apply to discharges from any of the core or associated operations. As a result, the metal finishing standards apply to all process wastewater discharges from South Bay Circuits at IWD-26-1, 26-2, 26-3, and 26-4.

Basis of the Standards - The new source metal finishing standards were based on a model pretreatment unit that comprises metals precipitation, settling, sludge removal, source control of toxic organics, no discharge of cadmium-bearing wastewaters, and if necessary, cyanide destruction and chromium reduction. The best-available-technology standards were set where metal finishers with model treatment operated at a long-term average and variability that achieved a compliance rate of 99% (1 in 100 chance of violation).

Adjustments – There are three adjustments that can apply to the new source Federal standards for metal finishing at South Bay Circuits.

- First, under 40 CFR 433.12(c), the cyanide standards as applied to metal finishing wastewater discharges must be adjusted to account for dilution from non-cyanide bearing waste streams (Federally-regulated and unregulated). For South Bay Circuits, the only cyanide-bearing wastewaters are generated from the rinses following two gold plating steps. The Chandler permit appropriately applied the Federal cyanide standards without adjustment to the cyanide-bearing gold plating rinses before they commingle with any other flows at installed sample valves, identified by the permit as IWD-26-2 and IWD-26-4.

- Second, under 40 CFR 403.6(d,e), the Federal categorical pretreatment standards at IWD-26-1 and IWD-26-3 must be adjusted using the combined wastestream formula to account for any dilution from non-contact cooling waters, cooling tower bleed, and boiler blowdown. These flows, which are specifically listed as dilution waters in 40 CFR 403.6(e), were not identified during this inspection nor in the permit. As a result, the Federal standards do not need to be adjusted.

- Third, the Federal standards in 40 CFR 433.12 also allow facilities with an approved toxic organics management plan to certify instead of sample for toxic organics. South Bay Circuits self-monitors twice per year.

Compliance Deadline - New sources were required to comply on the first day of discharge.

2.4 Federal Prohibitions

The Federal standards in 40 CFR 403.6(d) and 403.17(d) prohibit dilution as a substitute for treatment, and the bypassing of any on-site treatment necessary to comply with standards, respectively. The City of Chandler permit establishes these prohibitions through incorporation of provisions against the dilution as a substitute for treatment (Permit Part II.A.8) and bypassing treatment necessary to comply (Permit Part IV.K.2-4).

2.5 Compliance Sampling and Point(s) of Compliance

The permit designates the sampling station outside the facility as the location of the compliance sampling point for Main Bldg 6409 (designated in this report as IWD-26-1), and the batch tank in the router room as the compliance sampling point in Bldg 99 (designated as IWD-26-4). The permit also designates drain valves for both gold plating rinse lines in Main Bldg 6409 as the Federal cyanide sampling points (designated as IWD-26-2 and 26-4).

Federal Standards - Federal categorical pretreatment standards apply end-of-process-after-treatment to all Federally-regulated discharges to the sewers. The sample points IWD-26-1, 26-2, 26-3, and 26-4 are suitable end-of-process-after-treatment sample point representative of the day-to-day discharge of Federally-regulated wastewaters from South Bay Circuits.

Local Limits - Local limits and the national prohibitions apply end-of-pipe to non-domestic flows. The sample points IWD-26-1 and 26-3 are suitable end-of-pipe sample point representtative of the day-to-day non-domestic wastewater discharges from South Bay Circuits.

Sampling Protocols – The national prohibitions are instantaneous-maximums comparable to samples of any length. Federal categorical pretreatment standards are daily-maximums comparable to 24-hour composites. The 24-hour composites can be replaced with single grabs or manually-composited grabs representative of the sampling day's discharge. The City of Chandler permit specifies these sampling protocols by parameter (Permit Part I.D). ***See*** Section 4.0 on page 12 and Tables 5 and 6 of Appendix 2 on page 18.

3.0 Compliance with Federal Categorical Standards

Industrial users must comply with the Federal categorical pretreatment standards that apply to their process wastewater discharges. 40 CFR 403.6(b).

Categorical industrial users must comply with the prohibition against dilution of the Federally-regulated waste streams as a substitute for treatment. 40 CFR 403.6(d).

Industrial users must comply with the provision restricting the bypass of treatment necessary to comply with any pretreatment standard or requirement. 40 CFR 403.17(d).

South Bay Circuits employs wastewater treatment equivalent to the models used in originally setting the Federal standards for almost all of its wastewater discharges to the sewers. Excellent built-in controls also further improve reliability and performance, most notably the well-controlled handling of high-strength spents, and the consistent use of reaction end-point metering. As a result, South Bay Circuits consistently complies with Federal standards. ***See*** Appendix 3 on pages 19 and 20 of this report for a summary of the compliance sampling.

Requirements

- None.

Recommendations

- The alkaline rinses bypassing treatment should be operated on-demand.
- Electroless nickel and electroless copper wastewaters should be separately handled, with rinses treated through dedicated ion exchange and spents off-hauled for disposal.
- The cause of the violations in the single July 2009 Bldg 99 sample should be identified.

3.1 Sampling Results

The five year 2005-2009 sample record for South Bay Circuits consists of semi-annual self-monitoring and quarterly sampling collected by the City of Chandler. Most metals samples collected from IWD-26-1 were 24-hour composites. Other metals samples including those collected from IWD-26-3 were grabs. All cyanide samples from IWD-26-2, IWD-26-3, and IWD-26-4 were grabs. ***See*** sections 3.2, 3.3 and 5.0 on pages 9, 10 and 14 of this report.

3.2 Best-Available-Technology Treatment Main Bldg 6409

Almost all process-related wastewaters generated by South Bay Circuits, an average of 95,000 gpd, discharge to the sewers from the Main Bldg 6409. South Bay Circuits is

designed and operated with best-available-technology ("BAT") model treatment for all of these discharges. As a result, the sampling results for IWD-26-1 and of the cyanide sampling points IWD-26-2 and 26-4, consistently comply with Federal standards, with average and calculated 99th% peak concentrations of 0.001 and 0.005 mg/l cadmium, 0.014 and 0.032 mg/l chromium, 0.898 and 2.559 mg/l copper, 0.046 and 0.173 mg/l lead, 0.237 and 0.969 mg/l nickel, 0.020 and 0.176 mg/l silver, 0.019 and 0.102 mg/l zinc, 0.068 and 0.577 mg/l total cyanide at IWD-26-2, 0.091 and 0.592 mg/l total cyanide at IWD-26-4, and 0.497 and 1.960 mg/l total toxic organics.

These sampling results indicate that the statistical probabilities of violating Federal standards are essentially 0% for any sampling day or any monthly-average for the Main Bldg 6409 sample points. Not only is the treatment in-place equivalent in design to the model treatment but there are operational controls which would be expected to significantly further improve performance. One minor deficiency in the design and operation was observed during this inspection. The improvements (+) and deficiencies (-) are listed below.

+ Hard-piped delivery from the sources to the wastewater treatment units.
+ Excellent chemically-aided Lamella clarifier capacity.
+ Segregated handling of alkaline soapy wastewater.
+ Excellent waste control over the generation, delivery, and handling of high-strength spent solutions, either through drumming, metered batch treatment, and off-site disposal.
+ Excellent secondary containment in PVC catch basins and pipe gallery trenches.
+ Excellent treatment process controls and reaction end-point monitoring using both ORP and pH metering.
- Electroless metals wastewaters are incompatible through hydroxide metals precipitation.

3.3 Best-Available-Technology Treatment
North McKinley Bldg 99

The board finishing washing in Bldg 99 discharges only 25 to 50 gpd of process-related wastewaters. South Bay Circuits discharges these flows through a bag filter but otherwise untreated to the sewers. The sampling results for the discharges from Bldg 99 through IWD-26-3, has, with one sample outlier, consistently complied with Federal standards, with non-outlier average and calculated 99th% peak concentrations of 0.001 and 0.004 mg/l cadmium, 0.013 and 0.038 mg/l chromium, 0.063 and 0.222 mg/l copper, 0.026 and 0.173 mg/l lead, 0.056 and 0.363 mg/l nickel, 0.002 and 0.012 mg/l silver, 0.250 and 2.314 mg/l zinc, <0.020 mg/l total cyanide, and 0.126 and 0.634 mg/l total toxic organics. The outlier sample in July 2009 had concentrations of copper, lead, and zinc well over any predicted maximum, and a pH much more acidic than any other measurements.

The statistical probability of violating the Federal standards must be determined by the estimated outlier probability because the single sample in July 2009 provided outlier values that dominate the population mean and standard deviations. As a result, a 0 to 5% frequency of the occurrence of an outlier sample is the best probability of violating the Federal standards for any sampling day or any monthly-average. Nevertheless, treatment equivalent in design to the model treatment is likely unnecessary, because final board washing would be

expected to generate minimal pollutant loadings. Instead, the outlier sample values are more likely indicative of some other unauthorized source of wastewater, through perhaps misdirected disposal or from unauthorized clean-up.

3.4 Dilution as a Substitute for Treatment

The Federal standards in 40 CFR 403.6(d) prohibit "dilution as a substitute for treatment" in order to prevent compromising BAT model treatment with dilute waste streams. In particular, this prohibition applies when sample results for a diluted waste stream are below the Federal standards and the apparent compliance is used to justify discharge without treatment. There are two conditions that need to be established in order to make a determination of non-compliance with this prohibition. First, some or all of the Federally-regulated wastewaters must discharge without undergoing BAT model treatment or its equivalent. Second, there must be some form of excess water usage within a Federally-regulated process.

There is no certain evidence of "dilution as a substitute for treatment" since South Bay Circuits does not meet both conditions of non-compliance with certainty. However, it is a possibility. The first condition is met with certainty since not all Federally-regulated waters discharge through BAT model treatment. The second condition would also be met if the alkaline rinses that bypass treatment overflow irrespective of whether there are parts in process. These bypassing rinses, if they are not operated as either on-demand or static, would dilute the discharge to the sewers with excess untreated water at the compliance sample point IWD-26-1. Therefore it is possible that there is "dilution as a substitute for treatment" from the bypassing alkaline rinses.

3.5 Bypass Provision

The Federal standards in 40 CFR 403.17 prohibit the bypassing of any on-site treatment necessary to comply with standards unless the bypass was unavoidable to prevent the loss of life, injury, or property damage, and there were no feasible alternatives. This provision explicitly prohibits bypasses that are the result of a short-sighted lack of back-up equipment for normal downtimes or preventive maintenance. It also explicitly prohibits bypasses that could be prevented through wastewater retention or the procurement of auxiliary equipment. It specifically allows bypasses that do not result in violations of the standards as long as there is prior notice and approval from the sewerage agency or State.

There is no evidence of any bypassing of treatment necessary to comply with Federal standards, with the possible exception of the lone Bldg 99 outlier sample from July 2009. Otherwise, the BAT and non-BAT treated Main Bldg 6409 discharges and the non-BAT Bldg 99 discharges consistently comply with Federal standards. South Bay Circuits has also incorporated robust methods of ensuring the hard-piped delivery of all metal-bearing rinses directly to the treatment units and the metered handling of the drummed spents. As a result, there is no need for portable pumping and hosing, and thus there is a significant reduction in the potential for an inadvertent bypass of treatment.

4.0 Compliance with Local Limits and National Prohibitions

All non-domestic wastewater discharges to the sewers must comply with local limits and the national prohibitions. 40 CFR 403.5(a,b,d).

Industrial users must comply with the provision restricting the bypass of treatment necessary to comply with any pretreatment standard or requirement. 40 CFR 403.17(d).

The sample record indicates that South Bay Circuits nearly always complies with its local limits for metals, cyanide, organics, pH, and sulfides. The only instances of violation were concurrent in samples with the few Federal standard violations. ***See*** Tables 1 and 2 of Appendix 3 on pages 19 and 20 of this report. ***Also*** see Sections 3.0 and 5.0 on pages 9 and 14 of this report.

Requirements

- None.

Recommendations

- The final discharge should be self-monitored daily for pH.

4.1 National Objectives

The general pretreatment regulations were promulgated in order to fulfill the national objectives to prevent the introduction of pollutants that:

(1) cause operational interference with sewage treatment or sludge disposal,
(2) pass-through sewage treatment into the receiving waters or sludge,
(3) are in any way incompatible with the sewerage works, or
(4) do not improve the opportunities to recycle municipal wastewaters and sludge.

This inspection did not include an evaluation of whether achievement of the national objectives in 40 CFR 403.2 have been demonstrated by the Lone Butte water reclamation plant through consistent compliance with its sludge and discharge limits.

4.2 Local Limits for Oxygen Demanding Pollutants and The National Prohibition Against Interference

High-Strength Organics - The process-related wastewaters discharged to the sewers are not expected to be high enough in organics strength to pose a risk of interference, with the organics strength significantly less than domestic sewage.

Metals and Cyanide – For the Main Bldg 6409 discharges, there was single violation of the local limit for copper and no violations for arsenic, cadmium, chromium, copper, lead,

nickel, silver, zinc, and total cyanide. For Bldg 99, there was a single sample with violations of the local limits for copper, lead, zinc, and pH. There is no evidence that these rare events resulted in any interference in the operations of the Chandler sewer system and treatment plant.

4.3 Local Limits for Toxic Metals, Cyanide, and Other Pollutants and The National Prohibition Against Pass-Through

Metals and Cyanide – For the Main Bldg 6409 discharges, there was single violation of the local limit for copper and no violations for arsenic, cadmium, chromium, copper, lead, nickel, silver, zinc, and total cyanide. For Bldg 99, there was a single sample with violations of the local limits for copper, lead, zinc, and pH. There is no evidence that these rare events resulted in a pass-through of pollutants from the Chandler wastewater treatment plant to the receiving waters.

Toxic Organics – There are no local limits for toxic organics.

Oil and Grease – There were no violations of the local limits for oil and grease and none are expected in the future.

4.4 Local Limits for pH and Sulfides, and The National Prohibitions Against Safety Hazards and Corrosive Structural Damage

Corrosion - Sewer collection system interferences related to the formation of hydrogen sulfide and the resulting acidic disintegration of the sewers are possible but not expected. The wastewaters discharged to the sewers are not high-strength in biodegradable organics. The Main Bldg 6409 final discharge through IWD-26-1 is composed of both untreated wastewaters of unknown and uncontrolled pH and pretreated wastewaters from the industrial wastewater treatment unit. For this reason, the final discharge through IWD-26-1 needs to have daily discharge monitoring for pH.

Flammability - Flammability would not be expected because sampling shows that the discharges to the sewer entrain negligible amounts of volatile organics.

5.0 Compliance with Federal Monitoring Requirements

Significant industrial users must self-monitor for all regulated parameters at least twice per year unless the sewerage agency monitors in place of self-monitoring. 40 CFR 403.12(e) & 403.12(g).

Each sample must be representative of the sampling day's operations. Sampling must be representative of the conditions occurring during the reporting period. 40 CFR 403.12(g) and 403.12(h).

Permit Requirements – South Bay Circuits has successfully fulfilled the self-monitoring requirements set forth in the city permit. Over the past five years, the sample record shows that South Bay Circuits (1) submitted monthly sample results for all permit listed parameters, (2) collected all samples from the designated compliance sampling points, and (3) correctly obtained 24-hour composites for metals and grabs for the other pollutants. It was not determined in this inspection whether appropriate chain-of-custody procedures were followed.

Representativeness – The sample record for IWD-26-1 appears to be representative of the discharge to the sewers over the sampling day but not the six-month reporting period. In particular, the sampling as required by the permit is not frequent enough to capture the intermittent release of batch treated high-strength wastewaters. Some pollutants present at concentrations well below the Federal standards and local limits can continue to be self-monitored at the Federal minimum level set forth in the permit. However, self-monitoring at IWD-26-1 for (1) nickel and copper should be increased to account for intermittent releases, and (2) pH should be daily given the variable and uncontrolled nature of the combined treated and untreated discharge. The Bldg 99 sample point, IWD-26-3, and the Federal cyanide sampling points, IWD-26-2 and IWD-26-4, are appropriately sited and their sample records all appear to be representative over the sampling day and six-month reporting period.

Requirements

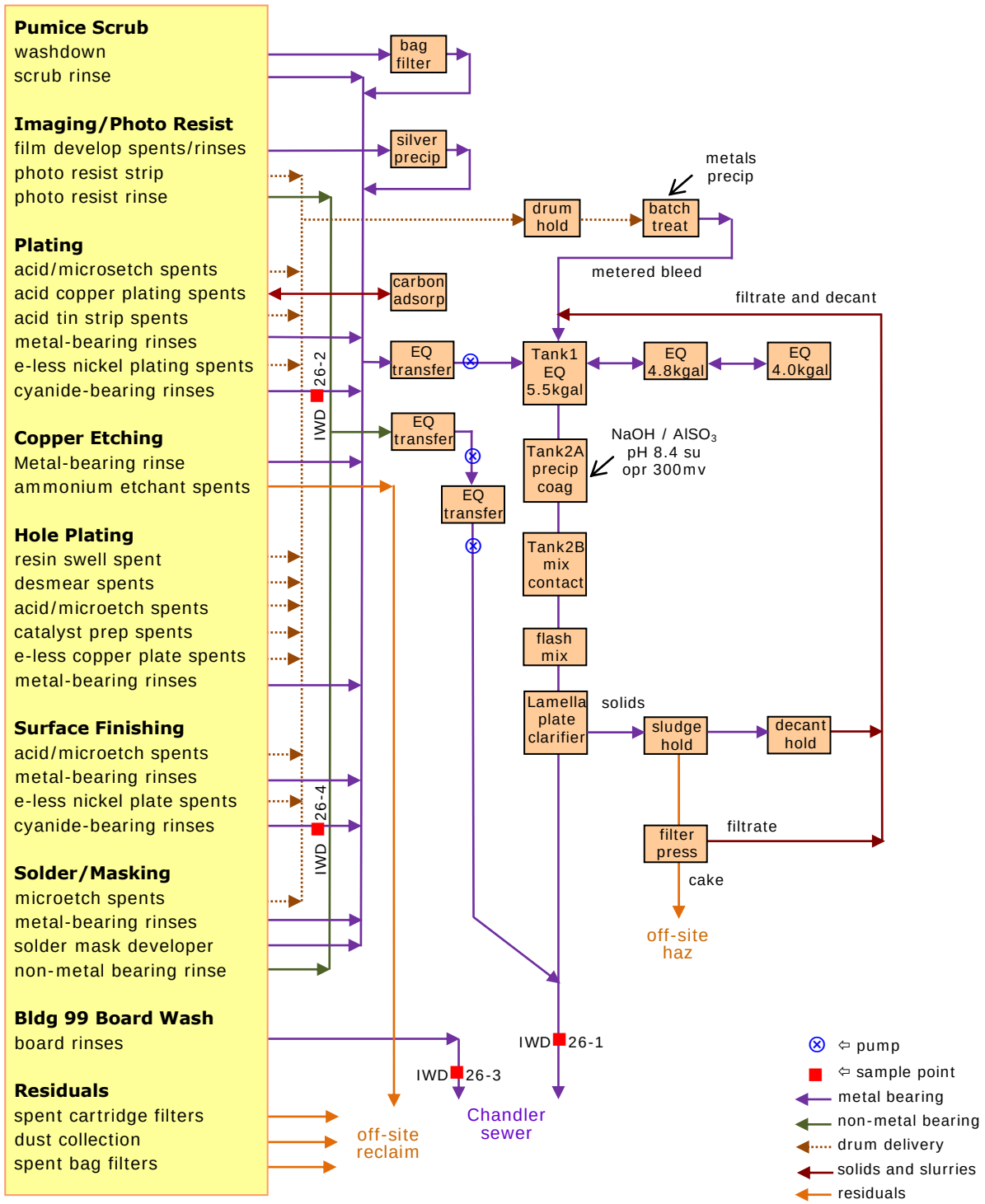
- ***See*** Table 5 of Appendix 2 for the self-monitoring and city monitoring requirements for that would be considered to be representative of the discharges.

Recommendations

- Self-certification statements should include copies of the hazardous waste manifests documenting the off-hauling of spents, and residuals.

- ***See*** Sections 4.0 and 4.4 on pages 12 and 13 of this report for findings regarding self-monitoring for pH.

Appendix 1
South Bay Circuits - Configuration and Layout



Appendix 2 - Table 1
South Bay Circuits - Tank Inventory, Tank Number, and Volume

gals	Tank Designations and Contents		gals	Tank Designations and Contents	
Automated and Hand Plating			Hole Plating		
?	T-1	tri-acid cleaning	?	DS-1	resin swell
?	T-2	1° overflow for T-1/T-3	?	DS-2	1° overflow rinse for DS-1
?	T-3	microetch	?	DS-3	desmear
?	T-4	acid activation	?	DS-4	1° overflow rinse for DS-3
?	T-5	acid copper plating	?	DS-5	2° overflow rinse for DS-3
?	T-6	1° overflow rinse for T-5	?	DS-6	acid neutralizating
?	T-7	acid pre-dip activation	?	DS-7	1° drag-out for DS-6
?	T-8	acid tin plating	?	DS-8	2° overflow rinse for DS-6
?	T-9	1° overflow rinse for T-8	?	EC-1	acid activation
?	T-10	electroless nickel plating	?	EC-2	1° overflow rinse for EC-1
?	T-11	cyanide gold plating	?	EC-3	2° overflow rinse for EC-1
?	T-12	1° overflow rinse for T-11	?	EC-4	micro etch
?	T-13	2° overflow rinse for T-11	?	EC-5	1° drag-out for EC-4
?	T-14	acid tin strip	?	EC-6	2° overflow rinse for EC-4
?	T-15	1° overflow rinse for T-14	?	EC-9	catalyst prep
Surface Finishing			?	EC-10	palladium catalyst
?	EN-1	acid activation	?	EC-12	1° overflow rinse for EC-10
?	EN-2	1° overflow rinse for EN-1	?	EC-13	acid/peroxide rack strip
?	EN-3	2° overflow rinse for EN-2	?	EC-16	electroless copper plating
?	EN-4	microetch	?	EC-17	1° drag-out for EC-16
?	EN-5	1° drag-out for EN-4	?	EC-18	2° overflow rinse for EC-16
?	EN-6	2° overflow rinse for EN-4	?	EC-19	acid activation
?	EN-7	3° overflow rinse for EN-4	?	EC-21	methanol anti-tarnish
?	EN-8	acid activation	?	EC-22	1° overflow rinse for EC-21
?	EN-9	acid activation	?	EC-23	2° overflow rinse for EC-21
?	EN-10	acid activation	Imaging, Photo Resist and Strip		
?	EN-12	1° ovrflw rinse for EN-8,9,10	?	T-16	photo resist strip
?	EN-14	nitrate silver plating	?	T-17	1° overflow rinse for T-16
?	EN-15	1° overflow rinse for EN-14	?	T-18	photo resist developer
?	EN-16	electroless nickel plating	?	n/a	film developer spents/rinses
?	EN-17	1° overflow rinse for EN-16	Solder and Solder Masking		
?	EN-18	2° overflow rinse for EN-16	?	T-21	micro etch
?	EN-19	cyanide gold plating	?	T-22	1° overflow rinse for T-21
?	EN-20	1° overflow rinse for EN-19	?	T-23	acid solder flux
?	EN-21	2° overflow rinse for EN-19	?	T-24	solder mask developer
Copper Etching			?	T-25	1° overflow rinse for T-24
?	T-19	ammonium etching	Bldg 99 Final Board Wash		
?	T-20	1° ccurrent rinse for T-19	?	T-26	1° overflow rinsing

The tank designations listed here as "EN" "EC" and "DS" are in use by the facility. The designations of the tanks listed with a single letter "T" are by EPA for the purposes of this report.

Appendix 2 - Table 2
South Bay Circuits - Spent Solutions Generated On-Site

Spent Solutions	Handling	Spent Solutions	Handling
acid cleaner	Batch Treat ✧	catalyst prep	Batch Treat ✧
microetchants	Batch Treat ✧	palladium catalyst	Adds Only
acid activation	Batch Treat ✧	acid rack strippant	Batch Treat ✧
acid copper plating	Carbon – Adds	electroless copper plating	Batch Treat ✧
tin acid predip	Batch Treat ✧	methanol anti-tarnish	Batch Treat ✧
tin plating	Adds Only	acid tin strippant	Batch Treat ✧
image film fixant	Silver Treat ✧	acid solder flux	Haul Off-Site
image film developer	Silver Treat ✧	solder mask developer	Drummed ✦
photo resist developer	Drummed ✦	nitrate silver plating	Adds Only
photo resist strippant	Batch Treat ✦	electroless nickel plating	Batch Treat ✧
ammonium etchant	Haul Off-Site	cyanide gold plating	Adds Only
resin swell	Batch Treat ✧		

✧ Discharge to the sewers through on-site metal bearing industrial wastewater treatment.
✦ Discharge to the sewers through on-site non-metal bearing industrial wastewater treatment.

Appendix 2 - Table 3
South Bay Circuits - Rinses and Wash Waters Generated On-Site

Rinses or Wash Waters	Handling	Rinses or Wash Waters	Handling
pumice scrub rinses	Bag Filter ✧	microetch drag-out rinses	Bath Make-Up
image film rinse / worksink	Silver Treat ✧	palladium catalyst rinse	Hard Pipe ✧
acid clean rinse	Hard Pipe ✧	e-less copper plate drag-out	Bath Make-Up
microetch rinses	Hard Pipe ✧	e-less copper plate rinse	Hard Pipe ✧
acid copper plating rinse	Hard Pipe ✧	methanol anti-tarnish rinses	Hard Pipe ✧
tin plating rinse	Hard Pipe ✧	acid tin strip rinse	Hard Pipe ✧
photo resist strip rinse	Hard Pipe ✦	nitrate silver plating rinse	Hard Pipe ✧
ammonium etch rinse	Hard Pipe ✧	e-less nickel plating rinses	Hard Pipe ✧
resin swell rinse	Hard Pipe ✧	cyanide gold plating rinses	Hard Pipe ✧
desmear rinses	Hard Pipe ✧	solder mask developer rinse	Hard Pipe ✦
acid activation rinses	Hard Pipe ✧	final board rinse	Hard Pipe ✧

✧ Discharge to the sewers through on-site metal bearing industrial wastewater treatment.
✦ Discharge to the sewers through on-site non-metal bearing wastewater handling.

Appendix 2 - Table 4
South Bay Circuits - Residuals Generated On-Site

Residual	Handling	Residual	Handling
spent pumice scrub bag filters	Haz waste ①	spent copper plate carbon	Haz waste
board drilling dust collection	Haz waste ①	filter press cake	Haz waste ①
silver cementation canisters	Off-site Reclaim	ammonium etchant	Off-site Reclaim

① Hauled off-site in a solids roll-off container.

Appendix 2 - Table 5
Sewer Discharge Standards and Limits for South Bay Circuits @ IWD-26-1 and 26-3

pollutants of concern	Fed stds (d-max)	Fed stds (mo-avg)	nat'l pro (instant)	local lim (inst/dmax)	monitoring frequency ① discharger	city
arsenic	-	-	-	0.30	-	③
boron	-	-	-	2.40	-	③
cadmium	0.11	0.07	-	0.40	1/six-mos	1/six-mos
chromium	2.77	1.71	-	4.40	1/six-mos	1/six-mos
copper	3.38	2.07	-	3.30	**4/six-mos** ⑤	1/six-mos
fluoride	-	-	-	10.0	-	③
lead	0.69	0.43	-	0.50	1/six-mos	1/six-mos
manganese	-	-	-	48.0	-	③
mercury	-	-	-	0.30	-	③
nickel	3.98	2.38	-	3.70	**4/six-mos** ⑤	1/six-mos
selenium	-	-	-	1.20	-	③
silver	0.43	0.24	-	0.90	1/six-mos	1/six-mos
zinc	2.61	1.48	-	17.0	1/six-mos	1/six-mos
total cyanide	②	②	-	0.40	-	③
total toxic organics	2.13	-	-	-	1/six-mos ④	1/six-mos
dissolved sulfides	-	-	-	0.50	-	③
phenolic compounds	-	-	-	177.0	-	③
total oil and grease	-	-	-	100.0	-	③
flow (gpd)	-	-	-	160,000	daily	-
pH (s.u.)	-	-	<5.0	5.5-11.0	**daily**	1/six-mos
explosivity	-	-	<140°F ⑥	<10% LEL	③	③

① Recommended reductions in **green**. Recommended increases in **red**.
② Federal cyanide standards apply specifically to the gold rinses at IWD-26-2 and IWD-26-4.
③ As part of periodic priority pollutant scans in order to identify changes in discharge quality
④ Self-certification to following an approved toxic organics management plan is allowed in lieu of sampling. A City inspection could then qualify as an independent determination.
⑤ Four samples in one calendar month. Monthly four-sample sets once every six-months.
⑥ Closed-cup flashpoint

Appendix 2 - Table 6
Sewer Discharge Standards and Limits for South Bay Circuits @ IWD-26-2 and 26-4

pollutants of concern	Fed stds (d-max)	Fed stds (mo-avg)	national (instant)	local lim (inst/dmax)	monitoring frequency ① discharger	city
total cyanide	1.20	0.65	-	-	1/six-mos	1/six-mos

① Recommended reductions in green. Recommended increases in red.

Appendix 3 – Table 1
Wastewater Discharge Quality for South Bay Circuits @ IWD-26-1, 26-2 and 26-4

Sample Record Summary

pollutants (µg/l)	effluent sampling results				violation rate ① ②			sample count
	mean	99th%	min	max	d-max	mo-av	instant	
arsenic	6.3	37.9	1.7	75	-	-	0/28	28
boron	275.6	492.8	140	570	-	-	0/27	27
cadmium	1.0	5.2	<1	9.3	0/19	0/18	0/28	28
chromium	13.6	32.1	<10	32	0/19	0/18	0/28	28
copper	897.6	2558.9	190	3400	0/20	0/19	**1/29**	29
fluoride	1350	3060	500	2400	-	-	0/26	26
lead	46.2	173.2	<10	250	0/19	0/18	0/28	28
manganese	568.6	1711.3	20	2200	-	-	0/28	28
mercury	0.5	5.9	<0.2	12	-	-	0/28	28
nickel	236.6	969.4	16	1600	0/19	0/18	0/28	28
selenium	5.9	18.8	<2	25	-	-	0/28	28
silver	19.9	175.8	<5	280	0/22	**2/21**	0/31	31
zinc	19.6	102.1	<50	170	0/19	0/18	0/28	28
total cyanide (26-1) ③	<5.0	<20.0	<5	<20	-	-	0/19	19
total cyanide (26-2) ③	67.5	577.3	<8	930	0/18	0/17	-	18
total cyanide (26-4) ③	91.0	592.0	<8	850	0/15	0/14	-	15
total toxic organics	497.4	1959.8	<5	1922	0/28	-	-	28
oil+grease (mg/l)	19.2	86.3	4.1	110	-	-	0/20	20
dissolved sulfides (mg/l)	0.07	0.33	<0.04	0.44	-	-	0/23	23
BOD (mg/l)	104.6	265.8	31	290	-	-	0/19	19
TSS (mg/l)	16.4	29.2	10	26	-	-	0/19	19
flow (gpd)	95461	152585	25440	129000	-	-	-	19
pH (s.u.)	6.9 min - 9.0 median - 10.0 max				-	-	0/19	19

Federal Standard Violations

sample dates	type	sampler	Fed standards / local limits ①		violations	days
Sep 2008	24-hr	IU	silver – Fed mo-avg	0.24 mg/l	0.26	30
Jun 2008	24-hr	IU	silver – Fed mo-avg	0.24 mg/l	0.28	30
Local Limit Violations						
07/24/08	grab	POTW	copper – Local limits instant	3.3 mg/l	3.4	1
					total days of violation	**61**

Statistical Violation Probabilities

violation probability ①	mean (µg/l)	std dev (µg/l)	statistical probability		percent
Fed – silver (mo-avg)	µ = 19.9	σ = 66.9	α(240)	= 0.0005	~0%
Fed – total toxic organics (d-max)	µ = 497.4	σ = 627.7	α(2130)	= 0.0047	~0%
Local Limit - copper (instant)	µ = 897.6	σ = 713.0	α(3300)	= 0.0004	~0%

① Monthly averages calculated by calendar month of both self-monitoring and Chandler sampling
② Fed stds for metals compared only 24-hr composite samples. Local limits to all samples.
③ For cyanide, only Fed stds apply to IWD-26-2 and 26-4; only local limits apply to IWD-26-1.

Appendix 3 – Table 2
Wastewater Discharge Quality for South Bay Circuits @ IWD-26-3

Sample Record Summary

pollutants (µg/l)	effluent sampling results				violation rate ①			sample count
	mean	99th%	min	max	d-max	mo-av	instant	
arsenic	7.2	38.7	1.0	75	-	-	0/28	28
boron	230.4	463.9	100	640	-	-	0/27	27
cadmium	0.7	3.7	<10	4.7	0/28	0/25	0/28	28
chromium	12.5	37.5	<10	48	0/28	0/25	0/28	28
copper	63.2	221.9	<10	26000	**1/29**	**1/26**	**1/29**	29
fluoride	604.2	993.7	440	980	-	-	0/26	26
lead	26.4	172.5	<15	14000	**1/29**	**1/26**	**1/29**	29
manganese	9.1	54.0	<10	92	-	-	1/28	28
mercury	<0.2	<0.2	<0.2	<0.2	-	-	0/28	28
nickel	55.5	362.9	<10	500	0/28	0/25	0/28	28
selenium	2.0	12.9	<1	25	-	-	0/28	28
silver	2.3	12.3	<5	19	0/28	0/25	0/28	28
zinc	249.8	2313.6	<50	4600	**1/28**	**1/25**	0/28	28
total cyanide (26-3)	<20	<20	<5	<20	0/19	0/19	0/19	19
total toxic organics	126.2	633.9	<5	845	0/19	-	-	19
oil+grease (mg/l)	6.8	15.4	<5	14	-	-	0/18	18
dissolved sulfides (mg/l)	<40	<40	<40	<40	-	-	0/19	19
BOD (mg/l)	1.3	7.8	<2	12	-	-	0/18	18
TSS (mg/l)	<10	<10	<10	<10	-	-	0/18	18
flow (gpd)	~25	~	~	~	-	-	-	2
pH (s.u.)	5.1 min – 8.3 median – 9.5 max				-	-	**1/19**	19

Federal Standard Violations

sample dates	type	sampler	Fed standards / local limits ①		violations	days
07/30/09	grab	POTW	copper – Fed d-max	3.38 mg/l	26.0	1
07/30/09	grab	POTW	lead – Fed d-max	0.69 mg/l	14.0	1
07/30/09	grab	POTW	zinc – Fed d-max	2.61 mg/l	4.60	1
Jul 2009	grab	POTW	copper – Fed mo-avg	2.07 mg/l	26.0	31
Jul 2009	grab	POTW	lead – Fed mo-avg	0.43 mg/l	14.0	31
Jul 2009	grab	POTW	zinc – Fed mo-avg	1.48 mg/l	4.60	31
Local Limit Violations						
07/30/09	grab	POTW	copper – local instant	3.30 mg/l	26.0	1
07/30/09	grab	POTW	lead – local instant	0.50 mg/l	14.0	1
07/30/09	grab	POTW	pH minimum – local instant	<5.5 s.u.	5.1	1
				total days of violation		**99**

Statistical Violation Probabilities

violation probability ① ②	mean (µg/l)	std dev (µg/l)	statistical probability	Percent
Fed Stds (per sample month)	µ = n/a	σ = n/a	α(**) = 0.038	0-5%
Local Limit / Fed Stds (per sample)	µ = n/a	σ = n/a	α(**) = 0.034	0-5%

① Mo-avgs calculated by calendar month. Fed stds and local limits compared to all samples.
② Statistics determined by estimated outlier probability because outlier values dominate stat calcs.