



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

October 3, 2005

In Reply Refer To: WTR-7

Jesse McClellan
Environmental Health and Safety Manager
Embee, Incorporated
2158 South Hathaway Street
Santa Ana, California 92705

Re: June 20, 2005 Clean Water Act Inspection

Dear Mr. McClellan:

Enclosed is the September 30, 2005 report for our June 20 inspection of Embee, Inc. The report consolidates findings pertinent to the entire facility including the operations permitted by the Orange County Sanitation Districts as Embee#1, Embee#2, and Embee#3. Please submit a short response to the findings in Sections 2 through 5 of this report, to EPA, Orange County, and the Regional Water Quality Control Board, by **November 30, 2005**.

The primary findings concern dilution as a substitute for treatment. First, many rinses were found to continuously overflow whether or not there were parts to rinse. Second, nearly all wastewaters were found to bypass the on-site batch treatment units and discharge to the sewers untreated for metals, cyanide, and final pH. Third, the untreated rinses at Embee account for an estimated 85 to 90% the Federally-regulated pollutant loads discharged to the sewers. The Federal rules do not require treatment but they do prohibit dilution as a substitute for any treatment that is necessary to comply with Federal standards. This prohibition particularly applies to metal finishing facilities like Embee where the sampling results of diluted waste streams are nearly always below the Federal standards and the apparent compliance continues to justify discharge to the sewers without treatment.

As a result, at this time, compliance with the Federal standards cannot be determined because the sample records for all three discharge points to the sewers are invalidated by the dilution of untreated wastewaters from the continuously overflowing rinses. Moreover, even without dilution, compliance at Embee would not be expected because the only operational controls on-site influencing the water quality of the untreated flows are the extensive but not universal use of static drag-out rinses. Embee does not employ throughout its facility other operational controls often associated with exemplary water pollution control, such as the return of static drag-out rinses as solution tank make-up, multiple-staged static rinses, over-tank spray rinses, on-demand control of the overflow rinses, countercurrent overflows, and deactivation rinses between processing steps of differing surface chemistry.

A secondary finding concerns new source Federal standards. Embee no longer is subject solely to the Federal electroplating standards for existing sources but also is subject to the more stringent Federal metal finishing standards for new sources. This means the Federal standards as

they are applied in the Orange County permits are no longer correct. This report advances combined standards as they apply to all three discharge points.

Under the definitions in 40 CFR 403.3(k), a process constructed at an existing source metal finisher 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 the new source standards apply to the original installation of metal finishing lines, rebuilt or moved lines, or existing lines converted to do entirely new operations. This also means the new source standards generally do not apply to the piecemeal replacement of tanks for maintenance in otherwise intact metal finishing lines. The new source standards essentially apply when a change in configuration provides the opportunity to install the best-available-technology (“BAT”) treatment for new sources. Qualifying changes at Embee include the addition of a degreaser preparation line in 1998, a nickel plating line in 2004, and a hard anodizing line in 2004, as well as the relocation of a copper heat treatment line in 1995.

We certainly appreciate your helpfulness extended to us during this inspection. Greg V. Arthur of my staff remains available to Orange County and to you to assist in any way. Once again, thank you for your cooperation during this inspection. Please do not hesitate to call (415) 972-3504 or e-mail at arthur.greg@epa.gov.

Sincerely,

*Original signed by:
Alexis Strauss*

Alexis Strauss
Director, Water Division

Enclosure

cc: Royo Sohanaki, OCSD
Julio Lara, RWQCB-Santa Ana



U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION 9

CLEAN WATER ACT COMPLIANCE OFFICE

NPDES COMPLIANCE EVALUATION INSPECTION REPORT

Industrial User: Embee Incorporated
2136 South Hathaway, Santa Ana, California 92705
40 CFR 413 Subparts A,B,D,E,F,G – Job-shop Electroplating
40 CFR 433 Subpart A – Metal Finishing

Treatment Works: Orange County Sanitation District
Fountain Valley Wastewater Reclamation Plant No.1 and
Huntington Beach Wastewater Treatment Plant No.2
(NPDES Permit CA0110604)

Date of Inspection: June 20, 2005

Inspection Participants:

US EPA: Greg V. Arthur, Region 9, CWA Compliance Office, (415) 972-3504

RWQCB-Santa Ana: Julio Lara, Water Resources Control Engineer, (951) 782-4901
Najah Amin, Water Resources Control Engineer, (951) 320-6362

Orange County SD: Roya Sohanaki, Source Control Engineer, (714) 593-7437
Dustin Le, Source Control Inspector, (714) 713-6182

Embee, Inc: Jesse McClellan, Manager Envr Health & Safety, (714) 546-9842
Greg Penny, Operations Manager, Production, (714) 546-9842
Robert Camarena, Hazardous Waste Manager, (714) 546-9842

Report Prepared By: Greg V. Arthur, Environmental Engineer
September 30, 2005

Section 1

Introduction and Background

1.0 Scope and Purpose

On June 20, 2005, EPA, the California Regional Water Quality Control Board Santa Ana Region (“RWQCB”), and the Orange County Sanitation District (“OCSD”) conducted a compliance evaluation inspection of Embee, Inc. (“Embee”) in Santa Ana, California. 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.

Embee is a significant industrial user (“SIU”) with multiple non-domestic sewer discharges into the OCSD sewer service area whose compliance was assessed as part of a 2005 evaluation of the OCSD pretreatment program by the RWQCB, its contractor, Tetra Tech, and EPA. The inspection participants are listed on the title page. Arthur conducted the inspection of Embee on June 20.

1.1 Process Description

Embee is a job-shop metal finisher operating in seven buildings on the 2100 block of South Hathaway Street near the terminus of Santa Fe Street in Santa Ana, California. Embee metal finishes aerospace-related parts, made primarily of steel, but also of aluminum, and titanium. Embee performs electroplating, electroless plating, anodizing, etching, stripping, coating, phosphating, dyeing, cleaning, annealing, embrittlement relief, painting, metals deposition, and non-destructive testing.

Bldg 2144	<ul style="list-style-type: none">• degrease/prep line – alk soap degreasing, iron phosphating, derust• electroless-nickel line – HF/H₂SO₄-activation, nickel strike, HCl-desmut, sulfamate-nickel plating, alk clean, caustic etch, H₂SO₄-deactivation, nickel strip, electroless-nickel plating• coating/finish line – magnesium phosphating, zinc phosphating, chromate seal, zincate coating, black oxide coating, HNO₃-strip, acid-tin plating, HNO₃-activation, acid-copper plating, caustic etch, HNO₃ -deoxidation• new nickel line – sulfamate nickel plating, nickel strike• chrome line – H₂SO₄-activation, NaOH-clean, chrome plating, Cr-strip• ion exchange of water supply preconditioning
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Bldg 2150	<ul style="list-style-type: none"> • metals deposition – vacuum cadmium, ion vapor aluminum • painting – dry-booth, water-booth
Bldg 2139	<ul style="list-style-type: none"> • curing ovens – hydrogen embrittlement relief, annealing, e-less nickel hardening, paint curing • cadmium line – alk soap degrease, NaHSO₄-pickling, NaOH-electroclean, bright cyanide-cadmium plating, dull cyanide-cadmium plating, titanium cyanide-cadmium plating, chrome conversion coating, HNO₃-strip • flaw detection line – HNO₃-etching, HCl-etching, caustic etch, nickel nitrate/phosphate seal • magnaflux line – alk soap degrease, derust with hot DI • copper heat treat line – cyanide-copper plating, cyanide-copper strip • nickel strike line – nickel strike, cyanide-silver plating, cyanide-silver strike, cyanide-silver strip, silver tarnish deoxidation • sand blast department • batch industrial treatment unit (IWTU#1) • batch industrial treatment unit (IWTU#2)
Bldg 2148	<ul style="list-style-type: none"> • passivation line – alk soap degrease, HCl-desmut, alk soap clean, NaOH-electroclean, hex-chrome passivation, HNO₃/H₂CrO₄-passivation, HNO₃-passivation, HNO₃/HF-etch for dye penetrant prep • dye penetrant testing line • chromic acid anodizing line – alk soap degrease, alk soap clean, HNO₃-deoxidation, caustic etch, chromic-acid deoxidation, chromate seal, chromic-acid anodizing, alodine chrome conversion coating, chromate seal, anodize coat strip, HF-titanium rack strip, HNO₃-dye strip, HNO₃-post peen steel removal, copper etch, tri acid etch • sulfuric acid anodizing line – H₂SO₄-anodizing, black dye, brown dye, blue dye, red dye, gold dye, green dye, nickel acetate seal • hard anodizing line – alk soak clean, alk degrease, caustic etch, HNO₃-deoxidation, H₂SO₄-hard anodizing, dewaxer
Bldg 2155	<ul style="list-style-type: none"> • laboratory • grinding department – CNC grinding using water-based coolants • maintenance shop
Bldg 2136	<ul style="list-style-type: none"> • shipping and receiving
Bldg 2158	<ul style="list-style-type: none"> • dry-booth powder coating • warehousing and administrative offices

Embee began operations in 1967. There have been significant changes in the configuration and capabilities since then with a number of them instituted since 1983. In particular, the Bldg 2144 degreaser preparation line was added in 1998; the Bldg 2144 new nickel plating line was installed in 2004; the Bldg 2139 copper heat treatment line was moved in 1995; and the Bldg 2148 hard anodizing line was added in 2004.

Embee discharges its non-domestic and domestic wastewaters to the City of Santa Ana domestic sewers to the Orange County wastewater treatment plants. Non-domestic wastewaters discharge into the domestic sewers through three sewer connections, designated in this report by building address as IWD-2144, IWD-2148, and IWD-2139. See Appendix 1.

1.2 Facility SIC Code

Embee is assigned the SIC code for electroplating, plating, polishing, anodizing, and coloring, (SIC 3471).

1.3 Facility Wastewater Sources

The various metal finishing lines in Bldgs 2144, 2139 and 2148 generate metal finishing spents, rinses, and sump-captured drainages (which together account for most of facility process wastewater), as well as fume scrubber blowdown, spent ion exchange columns, and dye penetrant wash water. Bldg 2155 generates spent machining coolants and Bldg 2150 generates painting booth blowdown and vapor deposition blowdown.

- Spent Solutions – The imparted contamination from the processing of parts and the progressive drop in solution strength results in the generation of spent solutions. Embee hauls off-site for disposal spent stripping, cyanide-bearing, and tin plating solutions. Embee batch treats for discharge to the sewers spent preparation, phosphating, coating, anodizing, chromium-bearing, and electroless nickel plating solutions. The remaining solutions lose enough through drag-out for regeneration strictly through additions.

Spent Solutions		
Hauled Off-site	To IWTU#1	To IWTU #2
cadmium strip	alkaline soap degreasing	acid passivation
chromium strip	alkaline clean	sulfuric-acid anodize
anodizing strip	alkaline electroclean	chromic-acid anodize
nickel strip	alkaline sour dip pickling	chromium plating
bright cyanide-cad plating	caustic etch	chromate seal
dull cyanide-cad plating	iron phosphating	chrome conversion coat
titanium-cad plate	magnesium phosphating	nickel acetate seal
cyanide-copper plating	zinc phosphating	
cyanide-silver plating	acid activation	
acid-tin plating	acid desmut	
	acid deoxidation	
Regenerated by Additions	acid strip	
metal dyes	cyanide-copper strip	
dye penetrant	acid-copper plating	
dewaxer	zincate coating	
	black oxide coating	
	electroless nickel plating	
	sulfamate-nickel plating	
No Sewer Discharge	Discharged @ IWD-2139	Discharged @ IWD-2148

- Rinses – Embee follows many but not all of its metal finishing solution steps with first-stage static drag-out rinses. Spent static rinses are pumped down on an internal schedule by portable hose and suction pump to the two batch industrial wastewater treatment units.

Embee does not reuse the spent static rinses as make-up for the solution tanks. Some first- and second-stage continuous overflow rinses follow either the solution steps or first-stage static rinses. All overflow rinses discharge to the sewers without treatment through one of the three permitted discharge points. Some overflow rinses (*marked in italics below*) were observed during this inspection to be operating without parts processing. The 2003 Orange County pre-permit inspection report identifies the use of on-demand flow controls on a limited number of overflowing rinses but none of these were observed.

Bldg 2144 Rinses		
Static Rinses to IWTU#1	Static Rinses to IWTU#2	1° Overflowing Rinses
nickel strike nickel strip electroless nickel plating magnesium phosphating chromate seal nitric-acid strip acid-tin plating zincate coating acid-copper plating caustic etch acid deoxidation black oxide coating sulfamate-nickel plating	chromium plating chromium strip acid activation	<i>alk soap degreasing</i> <i>alk soap soaking</i> <i>iron phosphating</i> <i>alkaline clean</i> acid deactivation acid activation
		2° Overflowing Rinses <i>electroless nickel plate</i> chromate seal zincate coating <i>sulfamate-nickel plating</i>
Discharged @ IWD-2139	Discharged @ IWD-2148	Discharged @ IWD-2144

Bldg 2139 Rinses		
Static Rinses to IWTU#1	Static Rinses to IWTU#2	1° Overflowing Rinses
1° bright cyanide-cad plate 2° bright cyanide-cad plate 3° bright cyanide-cad plate 1° dull cyanide-cad plate 2° dull cyanide-cad plate 3° dull cyanide-cad plate cyanide-copper plate cyanide-copper strip cyanide-silver plate	chrome conversion coat	<i>alk soap degreasing</i> <i>alk sour dip pickling</i> alk electroclean magnaflux alk soap
Discharged @ IWD-2139	Discharged @ IWD-2148	Discharged @ IWD-2139

Bldg 2150 Rinses		
Static Rinses to IWTU#1	Static Rinses to IWTU#2	1° Overflowing Rinses
None	vapor deposition by roll-off	none
	Discharged @ IWD-2148	

Bldg 2148 Rinses		
Static Rinses to IWTU#1	Static Rinses to IWTU#2	1° Overflowing Rinses
dye penetrant wash dye penetrant acid etch acid rack clean acid dye strip	chromate passivation passivation alodine chromic-acid deox chromic-acid anodize anodize alodine anodize dye nickel acetate seal	<i>alk soap degreasing</i> <i>alk sour dip pickling</i> chromic-acid passivation alk soap degreasing nitric-acid deox chromate seal sulfuric-acid anodize nickel acetate seal anodize alk soak anodize alk degrease anodize caustic etch hard anodize
		2° Overflow Rinses nitric-acid passivation <i>alodine</i> chromic-acid deox chromic-acid anodize sulfuric-acid anodize black dye
Discharged @ IWD-2139	Discharged @ IWD-2148	Discharged @ IWD-2148

- Other Non-domestic Wastewaters and Residuals – Spills, splash, drag-out, and drainage from the metal finishing lines throughout the Embee buildings accumulate in under-tank floor sumps for pumping and batch treatment in the two industrial treatment units. Other batch treated wastewaters include various blowdowns such as the acidic blowdown from the fume scrubbers servicing the chromium plating and chromic-acid anodizing fume hoods in Bldg 2148. Embee also generates and hauls off-site spent ion exchange columns for regeneration and sand blasting debris for disposal.

Other Non-domestic		
To IWTU#1	To IWTU#2	Untreated
nickel-lines drainage cadmium-line drainage	chromium-line drainage passivation-line drainage anodizing-lines drainage fume scrubber blowdown paint booth blowdown	cooling tower blowdown boiler blowdown
Discharged @ IWD-2139	Discharged @ IWD-2148	Discharged @ IWD-2144

- Domestic Sewage – Domestic sewage discharges into the City of Santa Ana sewer lateral through separate connections downstream of the industrial wastewater connection.

1.4 Facility Process Wastewater Composition

The following determinations of the composition of the wastewaters listed above in section 1.3 were determined strictly by interview, observation, and literature search. There were no sample results in the sample record for Embee specific to these wastewaters with the exception of the untreated discharges to IWD-2144.

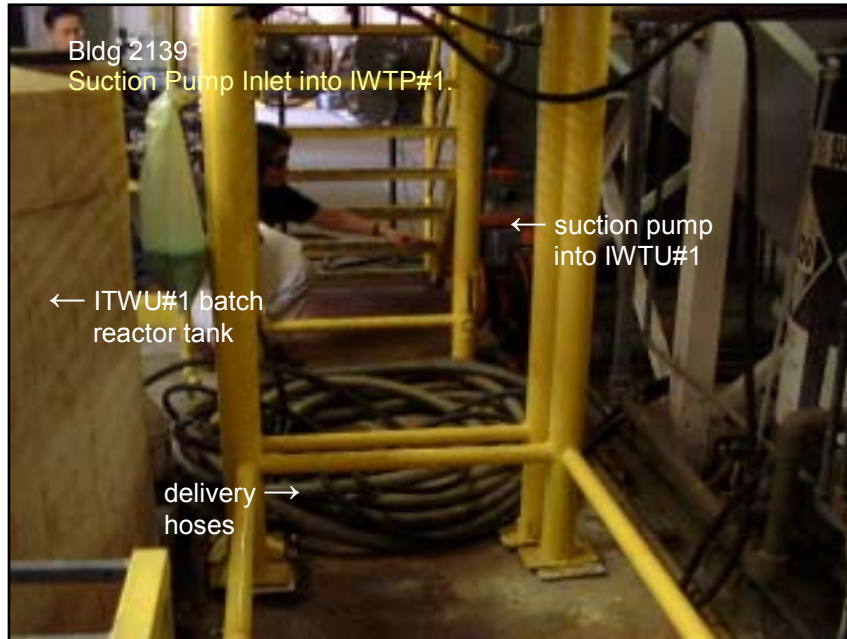
Discharges to IWD-2139	Discharges to IWD-2148	Discharges to IWD-2144
IWTU#1 Influent Sources	IWTU#2 Influent Sources	Sources Bypassing IWTUs
cadmium, copper, nickel, zinc, tin, iron, magnesium, amenable cyanide, dissolved solids, low pH, high pH, surfactants	chromium, nickel, iron, aluminum, complexed cyanide, organic dyes, dissolved solids, paint solids, low pH, high pH, surfactants	chromium, nickel, zinc, low pH, high pH, surfactants, biocide, corrosion inhibitor
IWTU#1 Chemicals	IWTU#2 Chemicals	
caustic, lime, polymer, ferrous sulfate, sulfuric acid, sodium borohydride, sodium hypochlorite, sodium metabisulfate	caustic, lime, sulfuric acid, ferrous sulfate, polymer, sodium metabisulfate	
Sources Bypassing IWTU#1	Sources Bypassing IWTU#2	
iron, high pH, surfactants	chromium, nickel, iron, aluminum, complexed cyanide, organic dyes, dissolved solids, low pH, high pH, surfactants	

The boiler blowdown discharged to IWD-2144 would be expected to be alkaline and contain a corrosion inhibitor. The fume scrubber blowdown would be expected to contain entrained metals from acidic mists. The cooling tower blowdown would be expected to be alkaline and contain an introduced biocide. The chemical make-up of the introduced conditioning chemicals in the blowdowns was not determined during this inspection.

1.5 Facility Process Wastewater Treatment

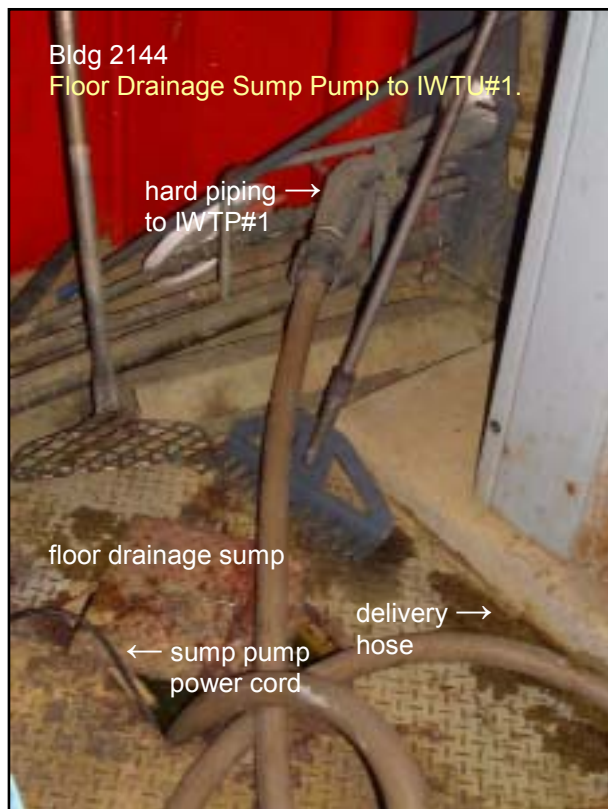
Embee operates two batch industrial wastewater treatment units to treat most spent solutions, first-stage static drag-out rinses, and floor drainage. These batch treatment units are referred to as IWTU#1 and IWTU#2 for the purposes of this report. The other wastewaters, comprising overflow rinses, some first-stage drag-outs, and blowdowns, all bypass around the batch treatment units for discharge to the sewers, without treatment for toxic metals, cyanide, and pH. All treated wastewaters are delivered to the treatment plant through portable hosing and pumps. See Appendix 1.

- Delivery – All treated wastewaters are delivered to the IWTUs through portable hosing and pumps. Hose lengths originating in the tanks are connected to the inlet of the suction pumps serving the IWTUs as needed. Portable sump pumps in the floor sumps are connected to hoses that feed into the batch treatment units as needed as well. The overflow rinses are plumbed to discharge without treatment to the building in-plant process wastewater sewers through the permitted discharge points into the domestic sewers.



This shows the suction pump inlet into IWTU#1 as well as some of the hosing used to draw from the metal finishing lines to the batch treatment unit.

Photo No.1
Taken by: Greg V. Arthur
Date: June 20, 2005



This shows a sump pump and portable hose connection from one of the floor drainage sumps in Bldg 2144. The portable hose connects to hard plumbing leading out of the building to the first batch reaction tank of IWTU#1 in Bldg 2139.

Photo No.2
Taken by: Greg V. Arthur
Date: June 20, 2005

- IWTU#1 – This batch treatment unit handles cyanide-bearing waste streams and consists of two 1,900 gallon batch reactor tanks and a filter press. The first reactor tank is for cyanide destruction, metals precipitation, and coagulation. The second is for flocculation and settling. Clarified decant discharges after in-house testing to a sump pumped to the sewers through the permitted compliance sampling point, IWD-2139. Subnatant proceeds through the filter press with the filtrate returned to the second reactor tank. Cyanide destruction involves alkaline chlorination with sodium hypochlorite and caustic. Metals precipitation involves hydroxide precipitation with caustic or the reduction and elemental metal precipitation of complexed metals with sodium borohydride. Coagulation involves lime and ferrous sulfate. Flocculation and settling involves polymer addition. For each batch, Embee records the wastewater sources, chemical dosages, volume treated, in-house testing results for cadmium, chromium, copper, and nickel, and the target (not actual) final pH.
- IWTU#2 – This batch treatment unit handles chromium-bearing waste streams and also consists of two 1,900 gallon batch reactor tanks and a filter press. The first reactor tank is used for chromium reduction, metals precipitation, and coagulation. The second is used for flocculation and settling. Clarified decant discharges after in-house testing to the sewers through the permitted compliance sampling point IWD-2148. The subnatant proceeds through a filter press with the filtrate returned to the second reactor tank. The chromium reduction step involves reduction with sodium metabisulfate and sulfuric acid. Metals precipitation involves hydroxide precipitation with caustic. Coagulation involves lime and ferrous sulfate. Flocculation and settling involves polymer addition. For each batch, Embee records the wastewater sources, chemical dosages, volume treated, in-house testing results for chromium, and the target (not actual) final pH.
- Treatment Capacity – Embee operates at less than 10% capacity. IWTU#1 and IWTU#2 treat around 200 and 175 batches per year, with their volumes per batch averaging 825 and 1500 gallons, and their treatment times averaging 4-6 and 2-4 hours to complete. Each year around 160,000 and 260,000 gallons are batch treated through IWTU#1 and IWTU#2. Around-the-clock operation at full capacity could increase throughputs up to 2.8 million gallons per year at IWTU#1 and 4.2 million gallons per year at IWTU#2.
- Untreated Discharges – All remaining waste streams discharge to the sewers untreated for metals, cyanide, or final pH. Untreated waste streams account for nearly all wastewaters discharged. The average flow rates for the treated flows in gallons per day are based on total treated volumes discharged over 250 working days per year. The estimated flow rate averages for the untreated flows are from the 2004 Orange County annual report.

Sewer Discharge Point	@ IWD-2139	@ IWD-2148	@ IWD-2144
Treated Flows (2005 average)	639 gpd	1043 gpd	0 gpd
Total Flows (2004 OCSD report)	20,000 gpd	40,000 gpd	17,000 gpd
Untreated %	98%	97%	100%

- Residuals Handling – The IWTUs filter press sludges are hauled off-site as hazardous to Heritage Environmental Services in Coolidge, Arizona.

- Sewer Discharge and Compliance Sampling – Treated and untreated wastewaters mix together for combined discharges through three separate sampling vaults located in Bldgs 2139, 2148 and 2144. Each of these sampling vaults serves as a permitted compliance sampling point. The three compliance sample points are illustrated in Photos No.3, No.4 and No.5 below and on the next page.



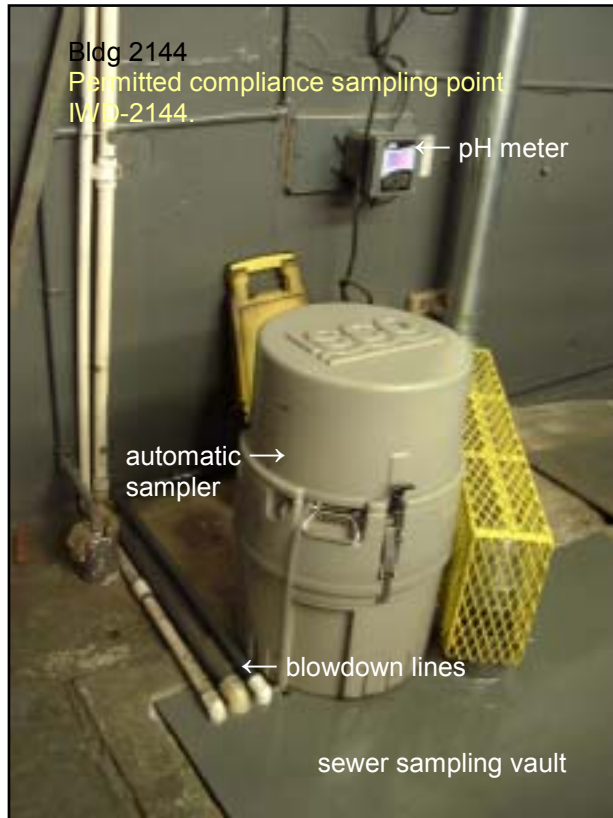
This shows the effluent discharge point to the sewers in Bldg 2139, designated in this report as IWD-2139, and referred to by Orange County as Embee#3.

Photo No.3
Taken by: Greg V. Arthur
Date: June 20, 2005



This shows the effluent discharge point to the sewers in Bldg 2148, designated in this report as IWD-2148, and referred to by Orange County as Embee#2.

Photo No.4
Taken by: Greg V. Arthur
Date: June 20, 2005



This shows the effluent discharge point to the sewers in Bldg 2144, designated in this report as IWD-2144, and referred to by Orange County as Embee#1.

*Photo No.5
Taken by: Greg V. Arthur
Date: June 20, 2005*

- Operational Controls – Embee incorporates a number of good operational controls that improve the reliability and performance of the on-site wastewater treatment. In particular, the treatment units benefit from operating in batch mode, from sequenced treatment of waste streams delivered and segregate by type, and from on-site testing prior to discharge. Nevertheless, Embee is configured to depend primarily on the operational control of the processes that generate wastewaters rather than on wastewater treatment itself because most flows discharge untreated. The only operational controls on-site influencing the water quality of the untreated flows is the extensive but not universal use of static drag-out rinses. Embee does not employ facility-wide the sorts of operational controls often associated with exemplary water pollution control, such as the return of static drag-out rinses as solution tank make-up, multiple-staged static rinses, over-tank spray rinses, on-demand control of the overflow rinses, countercurrent overflows, and deactivation rinses between processing steps of differing surface chemistry.

1.6 POTW Legal Authorities

Orange County Sanitation Districts – OCSD operates an EPA-approved pretreatment program as required by the State of California in the Santa Ana RWQCB's Waste Discharge Requirements, No. R8-2004-0062, reissued to OCSD in 2004, and serving as NPDES Permit No. CA0110604. As part of this, OCSD has established sewer use Ordinance No.1 that applies to all industrial users of its sewer system. Under this authority, Orange County issued three separate industrial user permits to Embee, Nos. 1-1-026, 1-1-025, and 1-1-027 covering the sewer discharges from IWD-2139, IWD-2148, and IWD-2144, respectively.

Section 2

Sewer Discharge Standards and Limits

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

2.0 Summary

The Federal categorical pretreatment standards for job-shop electroplating in 40 CFR 413 for existing sources and for metal finishing in 40 CFR 433 for new sources apply to the process wastewater discharges from Embee through IWD-2139, IWD-2148, and IWD-2144. The OCSD permits only applied local limits and the Federal standards for existing sources in 40 CFR 413. As a result, the permits do not accurately state the discharge requirements for Embee. The application of Federal categorical standards, national prohibitions, and local limits was determined through visual inspection. See Appendices 2, 3, and 4 for the sewer discharge standards and limits.

Requirements

- The Federal standards for existing source job-shop electroplating and new source metal finishing must be applied to the discharges through IWD-2139, IWD-2148, and IWD-2144, using the combined wastestream formula.
- The permits must prohibit dilution as a substitute for any treatment that is necessary to comply with Federal standards.

Recommendations

- Embee should determine the percentage of wastewaters generated by the new sources and by non-contact blowdowns for each of the permitted compliance sampling points.

2.1 Classification by Federal Point Source Category

Embee qualifies as a job-shop metal finisher subject to the Federal job-shop electroplating standards for existing sources in 40 CFR 413 (>10,000 gallons per day) and to the Federal metal finishing standards for new sources in 40 CFR 433. OCSD classified Embee as subject to just the job-shop electroplating standards. Federal standards are self-implementing which means they apply to regulated waste streams whether or not they are implemented in a local permit. The Federal rules in 40 CFR 403.6 define domestic sewage and non-contact wastewaters to be dilution waters.

New or Existing Sources – Embee no longer is subject solely to the Federal standards for existing sources. Under the definitions in 40 CFR 403.3(k), a process constructed at an existing source metal finisher 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 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. This also means the new source standards generally do not apply to the piecemeal replacement of tanks for maintenance in otherwise intact metal finishing lines. The new source standards apply when a change in configuration provides the opportunity to install the best-available-technology (“BAT”) treatment for new sources.

The non-domestic wastewater discharges delineated by Federal category classification follow below. The rough flow estimates by category were based solely on proportions by category of the number of overflow tanks and of treated wastewater batches.

Discharged to IWD-2139		
Metal Finishing New Sources 40 CFR 433.17	Job-Shop Electroplating Existing Sources 40 CFR 413 et seq.	Unregulated or Dilution Waters 40 CFR 403.6
B2144 alk degrease spent B2144 alk soak spent B2144 Fe-phosphate spent B2144 sulf-Ni plate spent B2144 sulf-Ni strike spent B2139 cyan-Cu strip spent B2144 sulf-Ni strike static B2144 sulf-Ni plate static B2144 nickel strip static B2144 nickel line drainage	All other IWTU#1 discharges alk sour dip pickling overflow alk electroclean overflow magnaflux alk overflow	
estimated flow ~ 2%	estimated flow ~ 98%	estimated flow ~ 0%

Discharged to IWD-2144		
Metal Finishing New Sources 40 CFR 433.17	Job-Shop Electroplating Existing Sources 40 CFR 413 et seq.	Unregulated or Dilution Waters 40 CFR 403.6
alk degrease overflow alk soak overflow iron-phosphate overflow sulf-nickel plate overflow	electroless-Ni alk clean overflow electroless-Ni acid activate overflow electroless nickel overflow chromate seal overflow zincate coat overflow nitric-acid activate overflow	fume scrubber blowdown boiler blowdown
estimated flow ~ 35%	estimated flow ~ 50%	estimated flow ~ 15%

Discharged to IWD-2148		
Metal Finishing New Sources 40 CFR 433.17	Job-Shop Electroplating Existing Sources 40 CFR 413 et seq.	Unregulated or Dilution Waters 40 CFR 403.6
B2148 hard-ano alk spent B2148 hard-ano deox spent B2148 hard anodize spent B2148 hard-ano etch spent B2148 hard-ano dgrease spnt hard-ano alk soak overflow hard-ano degrease overflow hard-ano alk etch overflow hard anodizing overflow	All other IWTU#2 discharges passivate degrease overflow passivate alk soap overflow Cr-acid passivate overflow nitric-acid passivate overflow anodize alk soak overflow anodize deox overflow anodize Cr-deox overflow alodine overflow Cr-acid anodize overflow sulfuric-acid anodize overflow black dye overflow chromate seal overflow nickel acetate seal overflow	
estimated flow ~ 25%	estimated flow ~ 75%	estimated flow ~ 0%

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 OCSD local limits apply to non-domestic discharges in the OCSD service area.

2.3 Federal Categorical Pretreatment Standards

Existing Source Job-Shop Electroplating >10,000 gpd - 40 CFR 413

40 CFR 413 >10kgpd	Cd	Cr	Cu	Pb	Ni	Ag	Zn	CNt	TTO	TM
daily-maximum (mg/l)	1.2	7.0	4.5	0.6	4.1	1.2	4.2	1.9	2.13	10.5
four-day average (mg/l)	0.7	4.0	2.7	0.4	2.6	0.7	2.6	1.0	-	6.8
stat conversion to mo-avgs	0.5	2.5	1.8	0.3	1.8	0.5	1.8	0.55	-	5.0

Applicability - The Federal job-shop electroplating standards apply to job-shop metal finishers that do not own more than 50% of the parts processed and were in operation in their present configuration before the August 31, 1982 proposal date of the Federal metal finishing rule. This means the job-shop electroplating standards in 40 CFR 413.14(c)(g), 413.24(c)(g), 413.44(c)(g), 413.54(c)(g), 413.64(c)(g) and 413.74(c)(g) apply to the process wastewater

discharges at Embee from the electroplating, precious metals plating, anodizing, chemical coating, chemical etching, electroless plating lines and their related operations of alkaline cleaning, stripping, sealing, and coloring continuing in operation since August 31, 1982. The Federal job-shop electroplating standards in 40 CFR 413 do not apply at Embee to any new metal finishing lines, rebuilt or moved lines, or existing lines converted to do entirely new operations, if these changes in configuration occurred after August 31, 1982. See section 2.1 of this report for the list of wastewater discharges subject to the existing source standards in 40 CFR 413 and to the new source standards in 40 CFR 433. As a result, the job-shop electroplating standards apply to some of the process wastewater discharges to IWD-2139, IWD-2148, and IWD-2144.

Basis of the Standards – The job-shop electroplating standards were based on a model pretreatment unit that comprises metals precipitation, settling, sludge removal, source control of toxic organics, and if necessary, cyanide destruction and chromium reduction. The best-available-technology standards were set where job-shop 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 – The Federal categorical pretreatment standards at IWD-2139, IWD-2148, and IWD-2144 must be adjusted to account for dilution and for dual Federal categories because the wastewaters through each of these compliance sampling points qualify as Federally-regulated under 40 CFR 413 and 40 CFR 433, and as dilution waters under 40 CFR 403.6 at IWD-2144. The Federal standards in 40 CFR 413 for existing sources and 40 CFR 433 for new sources would have to be adjusted using the combined wastestream formula as specified in 40 CFR 403.6(e). The Federal job-shop electroplating standards include a provision to statistically convert the four-day average standards in 40 CFR 413 to monthly-averages which can be mathematically combined with the monthly-average standards in 40 CFR 433. See Appendices 2, 3, and 4 for the adjusted Federal categorical pretreatment standards as applied to IWD-2139, IWD-2148, and IWD-2144.

Compliance Deadline - Existing source job-shop metal finishers were required to comply with all Federal job-shop electroplating standards by the final compliance deadline of July 31, 1986.

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

40 CFR 433.17	Cd	Cr	Cu	Pb	Ni	Ag	Zn	CNt	CNa	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 the new source metal finishing lines because the facility’s operations involve electroplating, electroless plating, anodizing, chemical coating, and etching. 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, such as cleaning, 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 new source core or associated operations. As a result, the metal finishing standards apply to some of the process wastewater discharges to IWD-2139, IWD-2148, and IWD-2144.

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 – See section 2.3, Adjustments, on page 15 above. In addition, 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 the new sources at Embee, cyanide-bearing wastewaters are generated by copper-cyanide plating and cyanide stripping. As a result, the cyanide standards as applied to the new source discharges through IWD-2139, IWD-2148, and IWD-2144 first must be adjusted proportionally downward to account for dilution from the non-cyanide bearing new source waste streams. EPA estimates the dilution at IWD-2139 to be ~10:1 based on the number of treated wastewater batches. As a result, at IWD-2139, the metal finishing standards for total cyanide adjust downward to 0.12 mg/l daily-maximum and 0.07 mg/l monthly-average. At IWD-2148 and IWD-2144 since there are no discharges of cyanide-bearing wastewaters from new sources, the metal finishing standards for total cyanide default to 0.00 mg/l for both daily-maximum and monthly-average.

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

2.5 Point(s) of Compliance

Local limits and the national prohibitions apply end-of-pipe to all non-domestic flows from Embee. The sample points designated in this report as IWD-2139, IWD-2148, and IWD-2144 are suitable end-of-pipe sample point representative of the day-to-day non-domestic wastewater discharges from Embee. Federal categorical pretreatment standards apply end-of-process-after-treatment to all Federally-regulated discharges to the sewers. Since most wastewaters are untreated, IWD-2139, IWD-2148, and IWD-2144 are also suitable sample points representative of the day-to-day discharge of Federally-regulated wastewaters.

2.6 Compliance Sampling

Local limits and the national prohibitions are instantaneous-maximums and are comparable to samples of any length including single grab samples. Federal categorical pretreatment standards are daily-maximums comparable to 24-hour composite samples. The 24-hour composite samples can be supplanted with single grabs or manually-composited grabs that are representative of the sampling day's discharge.

Section 3

Compliance with Federal 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).

3.0 Summary

It is unlikely that a job-shop metal finisher like Embee can comply with the full list of Federal metal finishing and electroplating standards without also treating its large discharge of overflow rinses for metals and cyanide. Embee employs batch treatment equivalent in design to the best-available-technology treatment used in setting the Federal standards, but only to handle small volumes of spents, sludges, and spills. As a result, the sample results (nearly all reported in compliance) are invalidated by dilution from the extensive use of continuously overflowing rinses. Conversely, the sample results are useable to determine violations. Even with dilution, the sample record for one of the discharge points document non-compliance with the Federal standards for cadmium. See Appendices 5, 6 and 7.

Requirements

- The overflowing rinses must be operated only on-demand or treated prior to discharge.

Recommendations

- The final overflow rinse tanks should be retrofitted with conductivity-controls.
- Parts should be spray rinsed over the solution tanks and final rinse tanks between steps.
- Every batch of treated wastewaters should continue to be tested and discharged to the sewers if found in compliance or hauled off-site for disposal.

3.1 Sampling Records

The 2003-2005 sample records for Embee at IWD-2139, IWD-2148, and IWD-2144 consists of quarterly self-monitoring samples collected by Embee and quarterly samples collected by

OCSD. The sample results are not usable for determining compliance with the Federal standards because a number of overflowing rinses that make up the typical discharges to the sewers operate continuously during working hours irrespective of whether there are parts undergoing processing. This results in samples that are diluted by excess make-up water, a practice which is prohibited by the Federal rule against dilution as a substitute for treatment. Composite sampling from IWD-2139, IWD-2148, and IWD-2144 would become usable to determine compliance with the Federal best-available-technology standards once the overflow rinses either are retrofitted to operate on-demand or treatment to remove metals and destroy cyanide is installed to handle all wastewater discharges. Representative sampling over time also would require samples to be collected both on days when the discharge to the sewers consists of the treated/retrofitted rinses and on days when the discharge also includes the batch treated wastewaters. See section 3.3 below.

3.2 Best-Available-Technology Treatment

Embee discharges just untreated rinses from IWD-2144, and untreated rinses with small volumes of batch treated spents from IWD-2139 and IWD-2148. The untreated rinses account for an estimated ~85%, ~85%, and 100% of the Federally-regulated pollutant loads discharged to the sewers at IWD-2139, IWD-2148, and IWD-2144, respectively. Overall, at Embee the untreated rinses account for an estimated 87% of the Federally-regulated pollutant loads to the sewers.

Untreated Overflow Rinses – Embee does not treat the overflow rinses to remove metals and destroy cyanide through best-available-technology (“BAT”) treatment or any other controls considered equivalent in performance (such as evaporation with slurry off-hauling or dedicated ion exchange columns). Nearly all job-shop metal finishers need to employ BAT or its equivalent in order to achieve consistent compliance with the Federal standards because their operations generate the Federally-regulated pollutants and the difficulties inherent in controlling pollutant loadings through operations alone. This is borne out at Embee as well because the sample records for IWD-2139, IWD-2148, and IWD-2144 document significant pollutant levels that are not accounted for by the small loadings from the batch treatment units. In fact, even with dilution, the sample record for IWD-2139 includes violations of the Federal monthly-average standards for cyanide. Nevertheless, the sample results however cannot indicate compliance with Federal standard in the overflow rinses because of dilution from excess make-up water.

Treated Wastewaters – Embee provides batch metals removal and cyanide destruction for less than 3% of the total wastewater volume generated. The on-site batch treatment units are nearly equivalent in design to the BAT used in setting the Federal standards for metal finishing and existing source job-shop electroplating. The only non-equivalence to BAT involves the fact that the new source BAT treatment incorporates no discharge of cadmium-bearing wastewaters. Nevertheless, the samples collected at IWD-2139, IWD-2148, and IWD-2144 cannot indicate compliance with the Federal standards by the batch treatment units because of dilution from excess make-up water and the preponderance of overflow rinses collected from the sampling vaults over any sampling period.

3.3 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. Embee meets the first condition of non-compliance since most of the Federally-regulated rinses waters discharge untreated for metals and cyanide. Embee meets the second condition as well since a number of overflowing rinses discharge continuously irrespective of whether there are parts undergoing processing. The most common methods of linking rinsing to production include conductivity-controlled make-up water inlet valves and on-demand kick-plate switches, although there are many others.

It is conceivable that retrofitting the final overflowing rinses to be on-demand would sufficiently reduce water consumption to the point that the combined discharges from existing sources to the sewers through IWD-2139, IWD-2148, and IWD-2144 together always would remain below 10,000 gpd. In that case, Embee would qualify for the abbreviated list of Federal standards in 40 CFR 413.14(b)(f) et seq. for just cadmium, lead, amenable cyanide, and toxic organics. However, qualifying for the abbreviated list would not change the need to treat for metals and cyanide since Embee generates both cadmium and cyanide and since the Federal metal finishing standards continue to apply to IWD-2139, IWD-2148, and IWD-2144 irrespective of the discharge flow rate.

3.4 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.

No determination can be made because nearly all of the Federally-regulated wastewaters discharge untreated.

Section 4

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).

4.0 Summary

Compliance with the Federal requirements would be expected to also result in compliance with the local limits for metals, cyanide, toxic organics, oil & grease, and flammability. No controls are necessary for pesticides, PCBs, or sulfides because Embee is not expected to discharge wastewaters containing significant levels of these locally-limited pollutants. However, the acidic and alkaline nature of the overflowing rinses through all three discharge points supports the need to install final pH adjustment and continuous pH metering for all wastewater discharges from Embee. Acidic wastewaters in particular pose a risk to worker health and safety through exposure and the release of toxic fumes, as well as acidic degradation of the sewers themselves. The need for final pH control should be more evident as the overflowing rinses are curtailed in response to the Federal prohibition against dilution as a substitute for treatment. See Appendices 5, 6 and 7. Also see Section 3.0 of this report.

Requirements

- Metal finishing wastewaters must undergo final pH adjustment prior to discharging to the sewers.

Recommendations

- None.

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 OCSD wastewater treatment plants through consistent compliance with their sludge and discharge limits.

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

The wastewaters discharged to the sewers at IWD-2139, IWD-2148, and IWD-2144, are not high enough in organics strength to pose a risk of interference, with average and statistical maximums for BOD of 23 and 37 mg/l at IWD-2139, 18 and 48 mg/l at IWD-2148, and <20 mg/l at IWD-2144.

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

Federally-Regulated Metals – The corrective actions necessary to achieve consistent compliance with the Federal prohibition against dilution as a substitute for treatment and the Federal standards for metals, would be expected to also result in compliance with the local limits for metals at all three discharge points. The Federal monthly-average standards are more stringent than local limits for cadmium, copper, nickel, lead, silver, and zinc at all three discharge points. Only the local limit for chromium is more stringent but not by much.

Mercury and Arsenic – Although mercury and arsenic are regulated solely by local limits and not by Federal standards neither pollutant would be expected in the discharges in concentrations requiring treatment beyond the model BAT treatment for Federal standards, if at all.

Total or Amenable Cyanide – Again, the corrective actions necessary to achieve consistent compliance with Federal standards and prohibitions would be expected to also result in compliance with the local limits for cyanide at IWD-2139 and IWD-2148. Moreover, the wastewaters discharged through IWD-2148 would be expected to contain just complexed cyanides from certain chromium conversion steps (like alodining) and thus consistent compliance could be achieved simply through the application of the amenable cyanide limits instead of total cyanide limits. The wastewaters discharged through IWD-2144 are not expected to contain any cyanide-bearing wastewaters.

Toxic Organics – OCSD reviewed and approved toxic organics management plans for all three discharge points with self-certifications in lieu of self-monitoring. As a result, toxic organics are not expected in significant amounts. OCSD sample maximums for all three discharge points are just above detection but orders of magnitude below the Federal standards and local limits at 17.3, 10.9 and 10.5 µg/l total toxic organics for IWD-2139, IWD-2148, and IWD-2144.

Oil and Grease – Petroleum oil and grease is likely to be entrained in the wastewaters generated by the alkaline cleaning of dirty job-shop parts. Compliance with the local limits for oil and grease cannot be determined until completion of the corrective actions necessary to achieve compliance with the Federal prohibition against dilution as a substitute for

treatment. Oily wastewaters would require preconditioning to remove emulsified and free oils prior to any further treatment to remove metals or cyanide.

Pesticides and PCBs – These pollutants are not expected in the discharges to the sewers through all three sample discharge points.

4.4 Flammability

Flammability would not be expected because the toxic organics management plans prevent the discharge of volatile organics to the sewers.

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

Sewer collection system interferences related to the formation of hydrogen sulfide and the resulting acidic disintegration of the sewers are not expected because the wastewaters discharged to the sewers through all three discharge point are not high-strength in biodegradable organics. However, uncontrolled acidic and alkaline discharges can result in safety hazards related to the release of toxic fumes, worker exposure risks, and acidic disintegration of the sewers. The untreated rinses discharged through all three discharge points do not undergo final pH adjustment to ensure neutral conditions in the sewers.

Section 5

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).

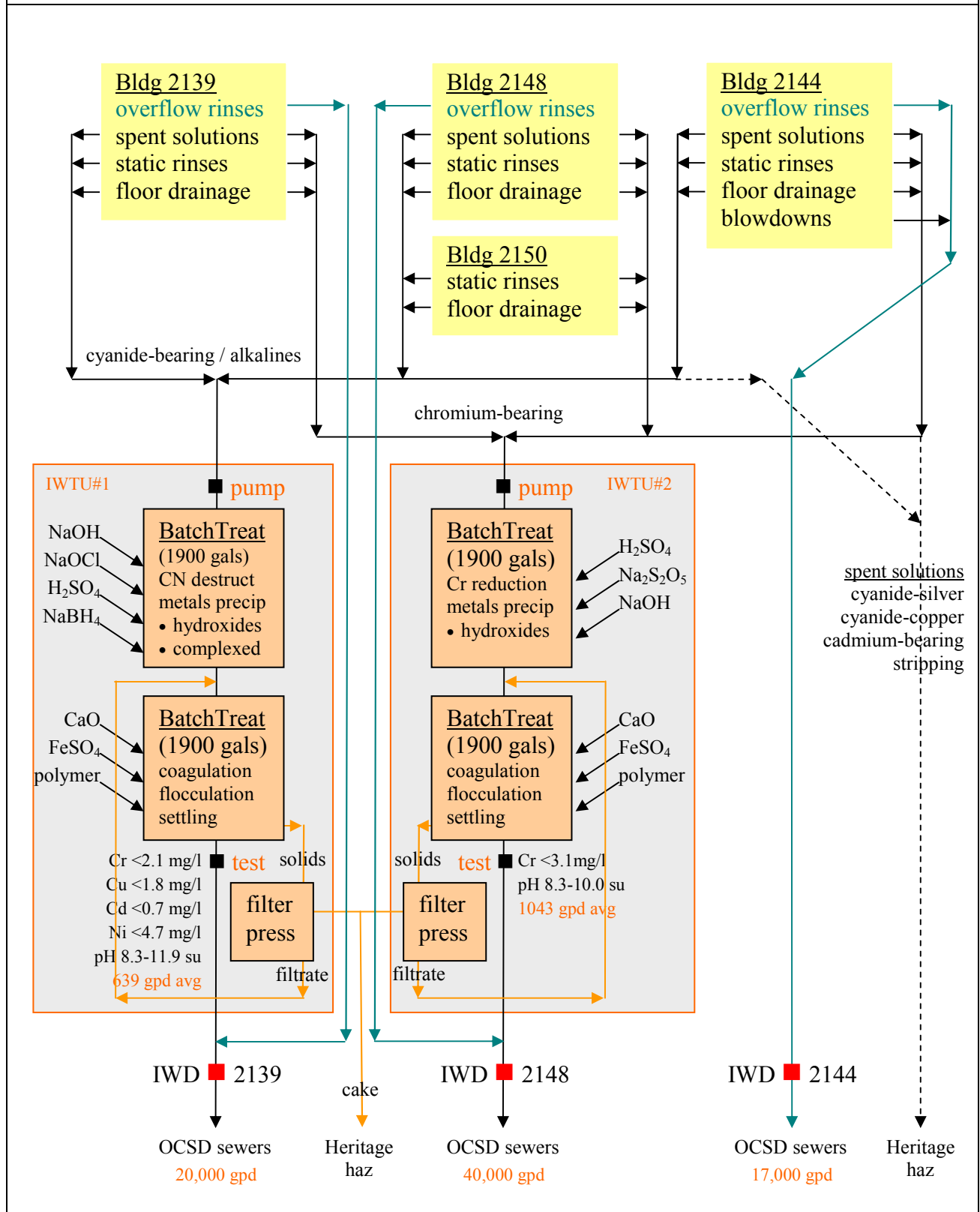
5.0 Summary

The sample record for Embee for the pollutants of concern is representative of the sampling day's discharge but is not representative of the sampling day's operations because of excess make-up in the overflow rinses. A sample record that results in more than 10 samples per year may be statistically representative over the reporting period if the discharge of treated batches and overflowing rinses are essentially random. Otherwise, if there is a statistical bias from certain significant discharges occurring on schedules, then the number minimum number of samples has to increase to account for the scheduled bias. Discharge flow rate and pH need to be continuously monitored as long as overflowing rinses discharge without treatment.

Requirements

- See Appendices 2, 3, and 4 for the expected self-monitoring requirements for IWD-2139, IWD-2148, and IWD-2144, respectively.

Appendix 1
 Embee, Incorporated
 Schematic of the Wastewater Collection and Treatment



Appendix 2
Sewer Discharge Standards and Limits
Embee @ IWD-2139

pollutants of concern (mg/l)	expected upon revision of the Embee OCSD industrial users permit				
	① Federal standards (daily-max)	① Federal standards (month-avg)	national prohibitions (inst-max)	OCSD local limits (daily-max)	Projected monitoring frequency
arsenic	-	-	-	2.0	④
cadmium	1.18	0.49	-	1.0	1/month
chromium	6.92	2.48	-	2.0	1/month
copper	4.48	1.81	-	3.0	1/month
lead	0.60	0.30	-	2.0	1/month
mercury	-	-	-	0.03	④
nickel	4.10	1.81	-	10.0	1/month
silver	1.18	0.49	-	5.0	1/month
zinc	4.17	1.79	-	10.0	1/month
total cyanide	1.86	0.54	-	5.0	1/month
amenable cyanide	0.86	0.32	-	1.0	-
total toxic organics	2.13	-	-	0.58	⑤
total metals	10.5	6.80	-	-	1/month
pesticides	-	-	-	0.01	④
PCBs	-	-	-	0.01	④
total sulfides	-	-	-	5.0	④
dissolved sulfides	-	-	-	0.5	④
oil and grease - petroleum flow (gpd)	-	-	-	100.0	1/month
pH (s.u.)	-	-	<5.0	6.0 to 12.0	continuous
explosivity	-	-	<140°F ②	10% LEL ③	④

① From the Combined Wastestream Formula, 40 CFR 403.6(e)

$$C_{2139} = \frac{(C_{433} \times Q_{433}) + (C_{413} \times Q_{413})}{(Q_{433} + Q_{413})} \times \frac{(Q_{total} - Q_{dilution})}{Q_{total}}$$

C_{2139} = Limit @ IWD-2139
 C_{433} = 40 CFR 433.17
 C_{413} = 40 CFR 413.24cg
 Q_{total} = Flow @ IWD-2139
 Q_{433} ≈ 2% of Q_{total}
 Q_{413} ≈ 98% of Q_{total}
 $Q_{dilution}$ = 0% of Q_{total}

② Closed-cup flashpoint

③ 10% of the Lower Explosivity Limit

④ As part of periodic priority pollutant scans in order to identify changes in discharge quality

⑤ Toxic organics management plans allow certifications in lieu of twice-per-year self-monitoring.

Appendix 3
Sewer Discharge Standards and Limits
Embee @ IWD-2148

pollutants of concern (mg/l)	expected upon revision of the Embee OCSD industrial users permit				
	① Federal standards (daily-max)	① Federal standards (month-avg)	national prohibitions (inst-max)	OCSD local limits (daily-max)	Projected monitoring frequency
arsenic	-	-	-	2.0	④
cadmium	0.93	0.39	-	1.0	1/month
chromium	5.94	2.30	-	2.0	1/month
copper	4.22	1.87	-	3.0	1/month
lead	0.62	0.33	-	2.0	1/month
mercury	-	-	-	0.03	④
nickel	4.07	1.95	-	10.0	1/month
silver	1.01	0.44	-	5.0	1/month
zinc	3.80	1.72	-	10.0	1/month
total cyanide	1.43	0.41	-	5.0	1/month
amenable cyanide	0.86	0.32	-	1.0	-
total toxic organics	2.13	-	-	0.58	⑤
total metals	10.5	6.80	-	-	1/month
pesticides	-	-	-	0.01	④
PCBs	-	-	-	0.01	④
total sulfides	-	-	-	5.0	④
dissolved sulfides	-	-	-	0.5	④
oil and grease - petroleum flow (gpd)	-	-	-	100.0	1/month
pH (s.u.)	-	-	<5.0	6.0 to 12.0	continuous
explosivity	-	-	<140°F ②	10% LEL ③	④

① From the Combined Wastestream Formula, 40 CFR 403.6(e)

$$C_{2148} = \frac{(C_{433} \times Q_{433}) + (C_{413} \times Q_{413})}{(Q_{433} + Q_{413})} \times \frac{(Q_{total} - Q_{dilution})}{Q_{total}}$$

C_{2148} = Limit @ IWD-2148
 C_{433} = 40 CFR 433.17
 C_{413} = 40 CFR 413.24cg
 Q_{total} = Flow @ IWD-2148
 Q_{433} ≈ 25% of Q_{total}
 Q_{413} ≈ 75% of Q_{total}
 $Q_{dilution}$ = 0% of Q_{total}

- ② Closed-cup flashpoint
- ③ 10% of the Lower Explosivity Limit
- ④ As part of periodic priority pollutant scans in order to identify changes in discharge quality
- ⑤ Toxic organics management plans allow certifications in lieu of twice-per-year self-monitoring.

Appendix 4
Sewer Discharge Standards and Limits
Embee @ IWD-2144

pollutants of concern (mg/l)	expected upon revision of the Embee OCSD industrial users permit				
	① Federal standards (daily-max)	① Federal standards (month-avg)	national prohibitions (inst-max)	OCSD local limits (daily-max)	Projected monitoring frequency
arsenic	-	-	-	2.0	④
cadmium	0.64	0.27	-	1.0	1/month
chromium	4.47	1.85	-	2.0	1/month
copper	3.43	1.62	-	3.0	1/month
lead	0.54	0.30	-	2.0	1/month
mercury	-	-	-	0.03	④
nickel	3.44	1.73	-	10.0	1/month
silver	0.75	0.49	-	5.0	1/month
zinc	3.01	0.33	-	10.0	1/month
total cyanide	0.95	0.28	-	5.0	2/year
amenable cyanide	0.73	0.27	-	1.0	-
total toxic organics	1.81	-	-	0.58	⑤
total metals	8.93	5.78	-	-	1/month
pesticides	-	-	-	0.01	④
PCBs	-	-	-	0.01	④
total sulfides	-	-	-	5.0	④
dissolved sulfides	-	-	-	0.5	④
oil and grease - petroleum flow (gpd)	-	-	-	100.0	1/month
pH (s.u.)	-	-	<5.0	6.0 to 12.0	continuous
explosivity	-	-	<140°F ②	10% LEL ③	④

① From the Combined Wastestream Formula, 40 CFR 403.6(e)

$$C_{2144} = \frac{(C_{433} \times Q_{433}) + (C_{413} \times Q_{413})}{(Q_{433} + Q_{413})} \times \frac{(Q_{total} - Q_{dilution})}{Q_{total}}$$

C_{2144} = Limit @ IWD-2144
 C_{433} = 40 CFR 433.17
 C_{413} = 40 CFR 413.24cg
 Q_{total} = Flow @ IWD-2144
 Q_{433} ≈ 35% of Q_{total}
 Q_{413} ≈ 50% of Q_{total}
 $Q_{dilution}$ ≈ 15% of Q_{total}

- ② Closed-cup flashpoint
- ③ 10% of the Lower Explosivity Limit
- ④ As part of periodic priority pollutant scans in order to identify changes in discharge quality
- ⑤ Toxic organics management plans allow certifications in lieu of twice-per-year self-monitoring.

Appendix 5
Embee Wastewater Discharge Quality @ IWD-2139
January 2003 – June 2005

pollutants ② (µg/l)	effluent sampling results			violation rate ①		sample count	loading (lbs/yr)
	mean	99th%	max	sample	month ④		
arsenic	-	-	-	-	-	0	-
cadmium	413.3	863.9	920	0/31	3/18	31	17.21
chromium	13.3	64.7	100	0/18	0/17	18	0.55
copper	99.4	239.9	230	0/19	0/17	19	4.14
lead	6.0	13.9	20	0/19	0/17	19	0.25
mercury	-	-	-	-	-	0	-
nickel	225.8	776.4	1020	0/19	0/17	19	9.40
silver	-	-	-	-	-	0	-
zinc	41.8	90.9	100	0/19	0/17	19	1.74
total cyanide	105.4	417.1	460	0/9	0/8	9	4.39
amenable cyanide	-	-	-	-	-	0	-
total toxic organics	5.1	21.0	17.3	0/5	0/5	5	0.21
total metals ③	371.1	999.8	1180	0/19	0/17	19	15.45
pesticides	-	-	-	-	-	-	-
PCBs	-	-	-	-	-	-	-
total sulfides	-	-	-	-	-	-	-
dissolved sulfides	-	-	-	-	-	-	-
oil and grease - petroleum	-	-	-	-	-	-	-
flow (gpd)	-	-	-	-	-	-	-
pH (s.u.)	-	-	-	-	-	-	-
explosivity	-	-	-	-	-	-	-

- ① Dilution as a substitute for treatment, 40 CFR 403.6(d), results in under-detected violations
 ② No sample results for the following pollutants of concern: silver, oil and grease, flow, and pH
 ③ Total metals defined as the summation of chromium, copper, nickel, and zinc, 40 CFR 413.02(e)
 ④ Monthly-averages calculated by averaging all samples in a calendar month, even if just one

Appendix 6

Embee Wastewater Discharge Quality @ IWD-2148
January 2003 – June 2005

pollutants ② (µg/l)	effluent sampling results			violation rate ①		sample count	loading (lbs/yr)
	mean	99th%	max	sample	month ④		
arsenic	-	-	-	-	-	0	-
cadmium	36.2	355.3	600	0/19	0/18	19	3.01
chromium	269.4	608.6	580	0/19	0/18	19	22.43
copper	135.9	267.0	250	0/19	0/18	19	11.32
lead	13.2	26.6	20	0/19	0/18	19	1.10
mercury	-	-	-	-	-	0	-
nickel	68.3	238.4	280	0/19	0/18	19	5.69
silver	-	-	-	-	-	0	-
zinc	91.1	165.1	150	0/19	0/18	19	7.59
total cyanide	<250	<250	<250	0/9	0/9	9	<20
amenable cyanide	-	-	-	-	-	0	-
total toxic organics	3.8	13.1	10.9	0/5	0/5	5	0.32
total metals ③	554.2	959.6	940	0/19	0/18	19	46.15
pesticides	-	-	-	-	-	-	-
PCBs	-	-	-	-	-	-	-
total sulfides	-	-	-	-	-	-	-
dissolved sulfides	-	-	-	-	-	-	-
oil and grease - petroleum	-	-	-	-	-	-	-
flow (gpd)	-	-	-	-	-	-	-
pH (s.u.)	-	-	-	-	-	-	-
explosivity	-	-	-	-	-	-	-

① Dilution as a substitute for treatment, 40 CFR 403.6(d), results in under-detected violations

② No sample results for the following pollutants of concern: silver, oil and grease, flow, and pH

③ Total metals defined as the summation of chromium, copper, nickel, and zinc, 40 CFR 413.02(e)

④ Monthly-averages calculated by averaging all samples in a calendar month, even if just one

Appendix 7

Embee Wastewater Discharge Quality @ IWD-2144
January 2003 – June 2005

pollutants ② (µg/l)	effluent sampling results			violation rate ①		sample count	loading (lbs/yr)
	mean	99th%	max	sample	month ④		
arsenic	-	-	-	-	-	0	-
cadmium	8.1	40.9	50	0/19	0/18	19	0.29
chromium	49.3	286.4	450	0/19	0/18	19	1.75
copper	36.4	146.0	210	0/19	0/18	19	1.29
lead	23.2	151.4	250	0/19	0/18	19	0.82
mercury	-	-	-	-	-	0	-
nickel	172.1	753.1	1120	0/19	0/18	19	6.09
silver	-	-	-	-	-	0	-
zinc	72.6	196.7	230	0/19	0/18	19	2.60
total cyanide	<250	<250	<250	0/9	0/9	9	<0.89
amenable cyanide	-	-	-	-	-	0	-
total toxic organics	3.7	12.6	10.5	0/5	0/5	5	0.13
total metals ③	315.8	1175.3	1700	0/19	0/18	19	11.18
pesticides	-	-	-	-	-	-	-
PCBs	-	-	-	-	-	-	-
total sulfides	-	-	-	-	-	-	-
dissolved sulfides	-	-	-	-	-	-	-
oil and grease - petroleum	-	-	-	-	-	-	-
flow (gpd)	-	-	-	-	-	-	-
pH (s.u.)	-	-	-	-	-	-	-
explosivity	-	-	-	-	-	-	-

① Dilution as a substitute for treatment, 40 CFR 403.6(d), results in under-detected violations

② No sample results for the following pollutants of concern: silver, oil and grease, flow, and pH

③ Total metals defined as the summation of chromium, copper, nickel, and zinc, 40 CFR 413.02(e)

④ Monthly-averages calculated by averaging all samples in a calendar month, even if just one