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

November 9, 2005

In Reply Refer To: WTR-7

Tim Grandcolas
President
Reid Metal Finishing, Incorporated
3110 West Harvard, No.14
Santa Ana, California 92704

Re: June 21, 2005 Clean Water Act Inspection

Dear Mr. Grandcolas:

Enclosed is the November 9, 2005 report for our June 21 inspection of Reid Metal Finishing. 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 **December 30, 2005**.

The primary finding concerns the numerous cadmium and cyanide violations and the single nickel violation documented in the sample record and why these violations were not identified before. The violations became apparent only in comparison against the appropriate Federal standards that apply to Reid Metal Finishing. Reid Metal Finishing is not regulated under the Federal electroplating standards for existing sources but rather 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 permit are no longer correct.

The secondary finding concerns the design and operation of the treatment on-site. The Federal standards were based on the model treatment of wastewaters containing no cadmium. This means it will be difficult to achieve consistent compliance with the Federal new source standards for cadmium through treatment. Instead, cadmium plating must be closed-loop with all generated cadmium-bearing wastes hauled off-site for disposal. The Federal standards were also based on the model treatment for cyanide of only amenable-cyanide bearing wastewaters. This results in a downward adjustment in the standards to reflect dilution from non-cyanide bearing flow. The cyanide violations appear to be related to partial or compromised treatment, bypassing, or cyanide measurement, since the on-site treatment includes the model treatment for cyanide standards.

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 printed circuit board manufacturing 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. The entire facility

qualifies because in 1985 all plating lines were moved out in order to install secondary containment and then reinstalled.

I certainly appreciate your helpfulness extended to me during this inspection. I remain 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 me at (415) 972-3504 or e-mail at arthur.greg@epa.gov.

Sincerely,

Greg V. Arthur
CWA Compliance Office

Enclosure

cc: Chris Pelletier, 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:	Reid Metal Finishing, Incorporated 3110 West Harvard, No.14, Santa Ana, California 92704 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 21, 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:	Chris Pelletier, Source Control Engineer, (714) 962-2411 Mary Sue Thompson, Source Control Inspector, (714) 962-2411
Reid Metal Finishing	Tim Grandcolas, President, (714) 549-3771 Ivan Padron, General Manager, (714) 549-3771 Jerry Reid, Reid Consulting, (714) 549-3771

Report Prepared By:	Greg V. Arthur, Environmental Engineer October 26, 2005

1.0 Scope and Purpose

On June 21, 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 Reid Metal Finishing, Inc. 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.

Reid Metal Finishing is a significant industrial user ("SIU") within 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 on June 21.

1.1 Process Description

Reid Metal Finishing is a job-shop metal finisher of aluminum, steel, copper, beryllium-copper, and brass parts for aerospace, military, automotive, and medical applications at 3110 West Harvard, Suite #14 and #9, in Santa Ana, California. The metal finishing capabilities include chromic-acid anodizing, sulfuric-acid anodizing, metal dyeing, electroless nickel plating, the electroplating of cadmium, zinc, zinc-nickel, zinc-cobalt, and bright nickel, as well as steel passivation, chromium conversion coating, and parts preparation. The metal finishing operations for aluminum is in Suite #14. The metal finishing operations for steel, copper, beryllium-copper, and copper are in Suite #9.

Suite #14	• prep – alk soap clean, HNO_3/NH_4HF_2-deox, alk etch, H_2SO_4-activation • anodizing – chromic acid anodizing, H_2SO_4-anodizing (type II), H_2SO_4-anodizing (type III), DI-water seal • chem film – chrome conversion coat (iridite/alodine/etc), Ni acetate sealing • dyeing – green, orange, blue, black, brown, gold • anodize strip – H_3PO_4 anodizing strip
Suite #9	• preparation – alk degreaser, alk cleaning, $KMnO_4$-descale, HCl-activation • cad/zinc plating – CN-cadmium, dull CN-cad, CN-zinc, CN-copper strike • nickel plating – bright nickel, nickel strike, alk cleaning, HCl-etching, chem film chromium conversion coating, nickel strip • passivation – HNO_3/chromic passivation, HNO_3 passivation • other plating – zinc/cobalt, electroless nickel, zinc/nickel

Reid Metal Finishing began chromium and cadmium plating operations in 1978 and added anodizing in 1979 and nickel and zinc plating in 1981. In 1985, a spill release from Reid Metal Finishing resulted in the removal of the entire shop, the installation of secondary containment and the reinstallation and replumbing of the metal finishing operations.

Reid Metal Finishing discharges its non-domestic wastewaters to the City of Santa Ana domestic sewers to the Orange County wastewater treatment plants through a single sewer connection designated in this report by permit number as IWD-511376. Domestic sewage discharges through separate connections downstream of the industrial wastewater connection.

1.2 Facility SIC Code

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

1.3 Facility Wastewater Sources

The metal finishing lines in Suite #14 and Suite #9 generate spents, rinses, sump-captured drainages, and fume scrubber blowdown, as well as tramp oils from parts degreasing. The 2003 Orange County pre-permit inspection report provides a detailed list of the solution and rinse tanks on-site identified by tank number. See Appendix 1.

Spent Solutions – The imparted contamination from the processing of parts and the progressive drop in solution strength results in the generation of spent solutions. Reid Metal Finishing hauls off-site for disposal cyanide bearing plating solutions and chromic anodizing solution. Reid Metal Finishing batch treats everything else prior to treatment for discharge.

Spents Hauled Off-site	Batch Treated Spents	Regenerated By Additions
Cr-anodizing CN-cadmium plating dull CN-cadmium plating CN-zinc plating HNO_3-deoxidation	$KMnO_4$-descale HCl-activation bright nickel plating chem film conversion coat nickel strip nickel strike HNO_3/chromic-passivation HNO_3-passivation zinc/cobalt plating zinc/nickel plating electroless nickel plating alk cleaning alk etch aluminum dyes nickel acetate seal H_2SO_4-anodizing H_3PO_4-anodizing strip	HCl-casting etch CN-copper strike
No Sewer Discharge	Discharged @ IWD-511376	No Sewer Discharge

Static Rinses – Reid Metal Finishing follows many of its metal finishing steps with static drag-out or overtank spray rinses, most of which return to the solution tanks as make-up. A few static rinses are treated on-site.

Chemically Treated Statics	Batch Treated Statics	Solution Make-Up Returns
KMnO4-descale	passivation DI 2°-rinse aluminum dyes 1°-static	HCl-activate overtank spray CN-cadmium plate drag-out Zn/Ni plate overtank spray Cr-anodize 1°-drag-out Cr-anodize overtank spray alk etch overtank spray chem film overtank spray chem film drag-out anodize strip drag-out bright nickel plate drag-out
Discharged @ IWD-511376	Discharged @ IWD-511376	No Sewer Discharge

Running Rinses – Reid Metal Finishing employs a number of on-demand or low-overflow running rinses, all of which are treated on-site through flow-through treatment. There were no running rinses found discharging untreated to the sewers. Some running rinses serve multiple processes. The cyanide-based zinc-cadmium-copper strike and bright nickel plating steps all utilize a common low-overflow rinse. Other common running rinses are used for (1) the zinc/cobalt-zinc/nickel-electroless nickel plating steps, (2) both passivation steps, (3) the descale-nickel strike-nickel strip-alkaline cleaner steps, (4) the chromic-hard anodizing steps, and (5) the soap-deox-anodize strip steps.

Chemically Treated Rinses	Batch Treated Rinses	Untreated
descale countercurrent HCl-active countercurrent CN-plating low-overflow passivate 1°-low-overflow Zn/Ni/Co plate low-overflw chem film low-overflow alk etch on-demand deox/alk clean on-demand H_2SO_4 anodize 2°-overflow bright nickel low-overflow Cr-anodize 2°-overflow		
Discharged @ IWD-511376	n/a	n/a

Blowdowns and Residuals – The fume scrubber blowdown discharges through flow-through treatment. Skimmed free oils from alkaline degreasing are off-hauled as hazardous.

1.4 Facility Process Wastewater Composition

The process wastewaters listed in section 1.3 above would be expected to contain cadmium, chromium, cobalt, copper, nickel, zinc, amenable and complexed cyanide, acidity, salts, dyes, and surfactants, as well as iron, aluminum, free oils, sulfides, and suspended solids.

1.5 Facility Process Wastewater Treatment

Reid Metal Finishing operates a flow-through treatment unit that provides cyanide destruction and removal of metals including chromium and a batch treatment unit for spent solutions and certain static rinses. All process-related wastewaters discharged to the sewer undergo flow-through treatment. The 2004 Orange County annual report lists Reid Metal Finishing as discharging an average of 8,000 gallons per day ("gpd") to the sewers. See Appendix 1.

Delivery – Chromium-bearing rinses, cyanide-bearing rinses and the remaining general acid rinses drain into separate sumps outfitted with pumps that are hard-plumbed to feed into the flow-through chemical wastewater treatment plant. Spills are shop vacuumed for delivery into the sumps. EPA did not determine how the spent solutions are conveyed to the batch treatment unit, whether by hard-plumbing, or through portable pumps and hoses, or by portable pumps and bowsered delivery.

Flow-Through Treatment – Cyanide-bearing rinses are preconditioned through two-stage cyanide destruction by alkaline chlorination, followed by sulfide metals precipitation and settling. Acidic general rinses are preconditioned through pH neutralization. Preconditioned rinses, the remaining chromium-bearing rinses, and batch treated wastewaters, together then are treated through equalization with a surge tank, chromium reduction, sulfide metals precipitation, flocculant-aided plate settling, and final diatomaceous earth filter polishing.

Batch Treatment – Most non-cyanide-bearing spent solutions and certain static rinses are batch treated in a chemical reaction tank and then metered by pump into the flow-through treatment. It was not determined what treatment steps are involved in batch treatment, however the contents are identified as non-cyanide bearing and undergo further treatment.

Residuals Handling – Solids from the settling for the preconditioning of cyanide-bearing rinses, the flow-through treatment plate settling, and the final polishing filter backwash tank, all feed through a filter press. The filter cake is hauled off-site as hazardous while the filtrate returns for treatment through the flow-through treatment unit.

Operational Controls – Reid Metal Finishing incorporates a number of good operational controls that improve the reliability and performance of the on-site wastewater treatment.

- Reaction End-Points – The pH and oxidation/reduction potential are continuously measured to ensure the chemical reaction end-points are reached. In particular, the first and second stages for cyanide destruction are operated to the appropriate set points of >10.0 pH / >400mv ORP, and 8.5 pH / >600mv ORP. The pH adjustment of acids is operated to an alkaline set point of 8.2-9.2 pH. Chromium reduction is operated at a set point of 6.5-7.5 pH / >200mv ORP, although effective reduction occurs at pHs of ~2.0.

- Metered Batch Treatment – The batch treatment benefits from operating in batch mode, from the sequenced treatment of waste streams delivered and segregate by type, from the restricted batch treatment of non-cyanide bearing wastewaters, and most importantly, from the metered discharge of the batch treated flows to the flow-through chemical treatment unit.

- Segregated Delivery and Equalized Flow-Through Treatment – The flow-through chemical treatment unit benefits from the segregated delivery and preconditioning of wastewaters by type and strength (cyanide-bearing, acidic, high-strength), as well as from the equalization coupled with a surge tank to even out the inflow into the flow-through chemical treatment unit including the surge-sensitive settling and polishing filter steps.

- Rinsing Practices – Reid Metal Finishing also implements a number of operational controls that influence the discharge water quality including the extensive but not universal use of on-demand low overflow running and countercurrent rinses, over-tank spray rinses, first-stage static drag-out rinses, and common rinse tanks for processing steps with shared surface chemistry.

Sewer Discharge – Treated wastewaters discharge from the polishing filter through an effluent sample box, which serves as the permitted compliance sampling point, IWD-511376.

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 an industrial user permit to Reid Metal Finishing, No. 51-1-376 covering the sewer discharge from IWD-511376.

1.7 Photo Documentation

Arthur took two digital photographs during this inspection. The file names are *reid1.jpg,* and *reid2.jpg*. One of the photographs is depicted below. The other is a duplicate.

Left shows the effluent sample box (*reid2.jpg*). Reid Metal Finishing collects 24-hour composite samples everyday for internal testing of metals through atomic adsorption.

Photo Taken by: Greg V. Arthur
Date: June 21, 2005

2.0 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 sewered discharges from industrial users. (40 CFR 403.5 and 403.6).

The Federal categorical pretreatment standards for metal finishing in 40 CFR 433 for new sources apply to all process wastewater discharges from Reid Metal Finishing through IWD-511376. The OCSD permit applied local limits and misapplied the Federal job-shop electroplating standards for existing sources in 40 CFR 413. As a result, the permit does not accurately state the discharge requirements for Reid Metal Finishing. The application of Federal categorical standards, national prohibitions, and local limits was determined through visual inspection. See Appendix 2 for the sewer discharge standards and limits.

Requirements

- The Federal standards for new source metal finishing must be applied to the discharge through IWD-511376.
- The permit must prohibit dilution as a substitute for any treatment that is necessary to comply with Federal standards.
- The permit must prohibit the bypassing of treatment necessary to comply with Federal standards.

Recommendations

- Reid Metal Finishing should determine the percentage of process wastewaters that are cyanide-bearing for the permitted compliance sampling point, IWD-511376.

2.1 Classification by Federal Point Source Category

Reid Metal Finishing qualifies as job-shop metal finisher subject to the Federal metal finishing standards for new sources in 40 CFR 433. OCSD misclassified Reid Metal Finishing as subject to the Federal job-shop electroplating standards for existing sources discharging less than 10,000 gallons per day. 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 – Reid Metal Finishing 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. All process wastewaters at Reid Metal Finishing qualify for regulation under the new source Federal metal finishing standards because the entire shop was rebuilt after the installation of secondary containment in 1985.

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
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. 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 and polishing, 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 all of the process wastewater discharges to IWD-511376.

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 printed circuit board manufacturers and other 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 – No adjustments are necessary to account for multiple Federal categories or unregulated flows. However, 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). The proportion of cyanide-bearing and non-cyanide-bearing wastewaters was determined strictly through the proportion of solution tanks and rinses that are cyanide-bearing and non-cyanide-bearing.

Cyanide-Bearing Spents and Rinses	Non-Cyanide-Bearing Spents	Rinses and Blowdowns
CN-plating low-overflow chem film low-overflow (3) chem film spents (8) • 8 spent solutions • 0 static rinses • 4 running rinse • 0 blowdowns	$KMnO_4$-descale spent HCl-activation spent (2) bright nickel plating spent nickel strip spent nickel strike spent HNO_3/Cr-passivate spent HNO_3-passivation spent zinc/cobalt plating spent zinc/nickel plating spent e-less nickel plating spent alk cleaning spents alk etch spent aluminum dyes spents (11) nickel acetate seal spent H_2SO_4-anodizing spent H_3PO_4-anodizing strip spent	descale countercurrent HCl-active countercurrent passivate 1°-low-overflow Zn/Ni/Co plate low-overflw alk etch on-demand deox/alk clean on-demand H_2SO_4 anodize 2°-overflow bright nickel low-overflow Cr-anodize 2°-overflow fume scrubber blowdown KMnO4-descale static passivation DI 2°-rinse aluminum dyes 1°-static • 27 solution tanks • 3 static rinses • 9 running rinses • 1 blowdown
estimated flow ~ 25%	estimated flow ~ 75%	

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

2.4 Point(s) of Compliance

Local limits and the national prohibitions apply end-of-pipe to all non-domestic flows from Reid Metal Finishing. The sample point designated in this report as IWD-511376 is a suitable end-of-pipe sample point representative of the day-to-day non-domestic wastewater discharges. Federal categorical pretreatment standards apply end-of-process-after-treatment to all Federally-regulated discharges to the sewers. The sample point IWD-511376 is also a suitable sample point representative of the day-to-day discharge of Federally-regulated wastewaters including all cyanide-bearing flows.

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.

3.0 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).

Wastewater treatment at Reid Metal Finishing is not equivalent to the model best-available-technology treatment used in originally setting the Federal standards. As a result, Reid Metal Finishing has not achieved the consistent compliance expected of metal finishers, with its samples regularly exceeding the Federal standards for cadmium, cyanide, and on occasion, nickel. Nevertheless, the likely cause of the cadmium violations is not design related because the Federal standards are based on the model treatment of wastewaters bearing no cadmium. The likely cause of the cyanide violations also is operational possibly from incomplete treatment, the inadvertent untreated bypass of cyanide-bearing wastewaters, or treatment reaction interferences. Finally, operations were further influenced by the misapplication of the Federal standards in the OSCD permit. There is no evidence of dilution as a substitute for treatment or of bypassing treatment necessary to comply. See Appendices 3 and 4.

Requirements

- Reid Metal Finishing must achieve consistent compliance with its Federal standards for cadmium, cyanide, and nickel.

Recommendations

- The cadmium plating line should employ only static rinses so that all cadmium-bearing wastewaters can be hauled off-site.
- Batch treatment should include cyanide destruction, chromium reduction, metals precipitation, and flocculation, with the treated batches metered directly to the filter press.
- Batch treated wastewaters should be metered into the filter press only after first verifying compliance with the cyanide standards through water quality testing.
- All cyanide-bearing spents, rinses, floor drainage, and drag-out, should be identified by source and traced to the point(s) of disposal or discharge.
- The alkaline chlorination treatment steps should specifically exclude complexed-cyanides (alodine, etc.), as well as any wastewaters that could form stable cyanide complexes.
- Reid Metal Finishing should consider installation of final equalization large enough to impound a day's discharge for testing prior to metered batch discharge to the sewers.

3.1 Sampling Results

The 2003-2005 sample records for Reid Metal Finishing at IWD-511376 consists of quarterly self-monitoring samples collected by Reid Metal Finishing and quarterly samples collected by OCSD. All samples were 24-hour composites, either automatic composites for metals or manual composite grabs for cyanides. These samples indicate that Reid Metal Finishing, as currently designed and operated, does not consistently comply with its Federal standards for cadmium and cyanide, but achieves consistent compliance with the Federal standards for the other metals and toxic organics most of the time.

For cadmium and amenable cyanide, most samples exceeded the Federal standards at IWD-511376. The average and calculated 99th% peak concentrations of 0.12 and 0.34 mg/l cadmium, and 0.64 and 2.69 mg/l amenable cyanide, respectively result in an estimated ~60% and ~75% statistical chance of exceeding the Federal standards. Only one other sample exceeded a Federal standard at IWD-511376, with average and calculated 99th% peak concentrations of 0.57 and 1.41 mg/l chromium, 0.06 and 0.16 mg/l copper, <0.02 and <0.10 mg/l lead, 1.54 and 3.55 mg/l nickel, 0.01 and 0.02 mg/l silver, 0.45 and 1.27 mg/l zinc, and 0.01 and 0.03 mg/l total toxic organics.

The sample results are usable for determining compliance with the Federal standards. The 24-hour composite samples are representative over the sampling day as well as over the Federally-required six month reporting period. Four of the five main wastewater contributions that report to the flow-through treatment would be expected to exhibit little day-to-day variability (*alkaline rinses, acid rinses through pH adjust, chrome-bearing rinses, and cyanide-bearing wastewaters through alkaline chlorination*). The fifth (*batch treatment effluent*) would be expected to vary depending on which spent solutions or static rinses are treated per batch, however that variability would be mitigated by the control over the discharge quality inherent in batch treatment. As a result, the variability in the effluent quality evident in the sample record for cyanide, cadmium, and to a lessor degree, nickel, indicates that there may be other potential sources of variability, most likely related to the operation of the wastewater treatment itself. Variability from wastewater treatment itself points to the need to increase the frequency of sampling for cadmium, chromium, cyanide, nickel, and possibly for copper, and zinc as well. See section 5.0 on page 17.

3.2 Best-Available-Technology Treatment

Reid Metal Finishing discharges concentratred spents through batch chemical treatment, as well as dilute rinses and the batch treatment effluent through flow-through continuous chemical treatment. Most static rinses are drag-outs returned as solution make-up. The spray rinses are overtank also returning drag-outs as solution make-up. As far as could be determined through inspection, no process wastewaters discharge without treatment.

Flow Through Treatment – Reid Metal Finishing provides cyanide destruction for approximately 25% of the total wastewater volume, and chromium reduction, metals precipitation, flocculation, settling, and filter polishing for 100% of the total wastewater volume. This configuration, provided that all amenable cyanides undergo cyanide

destruction, exceeds in design the BAT model treatment used in setting the Federal standards for metal finishing for cyanides, and all metals except cadmium. In particular, the on-site treatment adds to the model treatment a final polishing filter to further remove metals precipitates. However, the model treatment also involves the closed-loop zero-discharge handling of cadmium-bearing wastewaters. In fact, the Federal cadmium standards for new source metal finishing are the statistical representation of zero based on the model treatment of process wastewaters from which all cadmium-bearing wastewaters have been diverted away from treatment and discharge. As a result, in this way for cadmium, the on-site treatment at Reid Metal Finishing falls short in operation and performance of the model treatment even though it exceeds it in design.

Operational Controls – Reid Metal Finishing has not achieved consistent compliance with its cyanide standards, even though the on-site treatment is equivalent in design to the BAT model treatment for cyanide. Perhaps some unidentified cyanide-bearing wastewaters bypass the alkaline chlorination steps, or are handled through batch treatment steps without cyanide destruction. Potentially, high concentrations of sulfides could interfere with the amenable cyanide test results or entrained iron, ammonia, or organics could form cyanide complexes that interfere with the alkaline chlorination of the amenable cyanides. Perhaps, the metering probes are fouled, resulting in the reaction end-points not being reached even though the metering indicates otherwise. Listed below is a url to an article on metering probes.

http://www.metalfinishing.com/editors_choice/articles/may04_probing_problems.html

Batch Chemical Treatment – Reid Metal Finishing provides unspecified batch treatment for the spent solutions. Spent solutions would not be expected to account for a significant percentage of the total wastewater flow but they would be expected to entrain the majority of pollutant loadings. As a result, the batch treatment unit should be operated to achieve the Federal standards on its own. This means that Reid Metal Finishing should provide batch cyanide destruction, chromium reduction, metals precipitation, flocculation, and settling in order to handle the spent solutions. Moreover, the batch treated contents should be tested for compliance with the Federal standards prior to release. It would be efficient to utilize the filter press to remove the thick sludges expected to form through the full batch treatment of the spents, as long as the filtrate returns either to the equalization tank or to either plate settling or filter polishing. Under this configuration, the batch treatment would be completed to the measured set end-points and tested just for cyanide prior to release.

Finally, batch treatment would be expected to produce mineralized effluents that could greatly vary by batch depending on the quality of the wastewaters undergoing treatment.

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.

Reid Metal Finishing does not meet the first condition of non-compliance since all Federally-regulated waters discharge through model treatment. There is also no evidence that Reid Metal Finishing meets the second condition since the rinsing practices appeared to be entirely on-demand.

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.

For the most part, there cannot be bypassing at Reid Metal Finishing since the majority of the Federally-regulated wastewater undergoes treatment that exceeds or is equivalent to the BAT model treatment. However, the cyanide violations indicate the possibility that unidentified cyanide-bearing wastewaters bypass the cyanide destruction steps.

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).

Compliance with the Federal requirements would be expected to also result in compliance with the local limits for cyanide and the Federally-regulated metals. No controls are necessary for the other metals, pesticides, sulfides, flammability, or PCBs because Reid Metal Finishing is not expected to discharge wastewaters containing significant levels of these locally-limited pollutants. However, the acidic and alkaline nature of the metal finishing wastewaters and the pH adjustment inherent in operating treatment supports the need to install continuous final pH metering. 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. See Appendices 3 and 4. Also see Section 3.0 of this report.

Requirements

- None.

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 are not high enough in organics strength to pose a risk of interference, with average and statistical maximums for BOD of 102 and 339 mg/l essentially equivalent to domestic sewage.

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

Federally-Regulated Metals – There were no violations of the local limits for cadmium, chromium, copper, lead, nickel, silver, or zinc. The Federal monthly-average standards are more stringent than local limits for all of these Federally-regulated metals.

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.

Cyanide – Compliance with the Federal standards would be expected to also result in consistent compliance with the much less stringent local limits.

Toxic Organics – OCSD reviewed and approved a toxic organics management plan with self-certifications in lieu of self-monitoring. As a result, toxic organics are not expected in significant amounts. The OCSD sample maximum is above detection but orders of magnitude below the Federal standards and local limits at 26.1 μg/l total toxic organics.

Oil and Grease – There are no sample results indicating the effectiveness of oil skimming from degreasing in preventing the discharge of petroleum oil and grease to the sewers.

Pesticides and PCBs – These pollutants are not expected in the discharge to the sewers.

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 are not high-strength in biodegradable organics. Uncontrolled acidic and alkaline discharges, however, can result in safety hazards related to the release of toxic fumes, worker exposure risks, and acidic disintegration of the sewers. The discharge to the sewers does not undergo final pH adjustment to ensure neutral conditions in the sewers.

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).

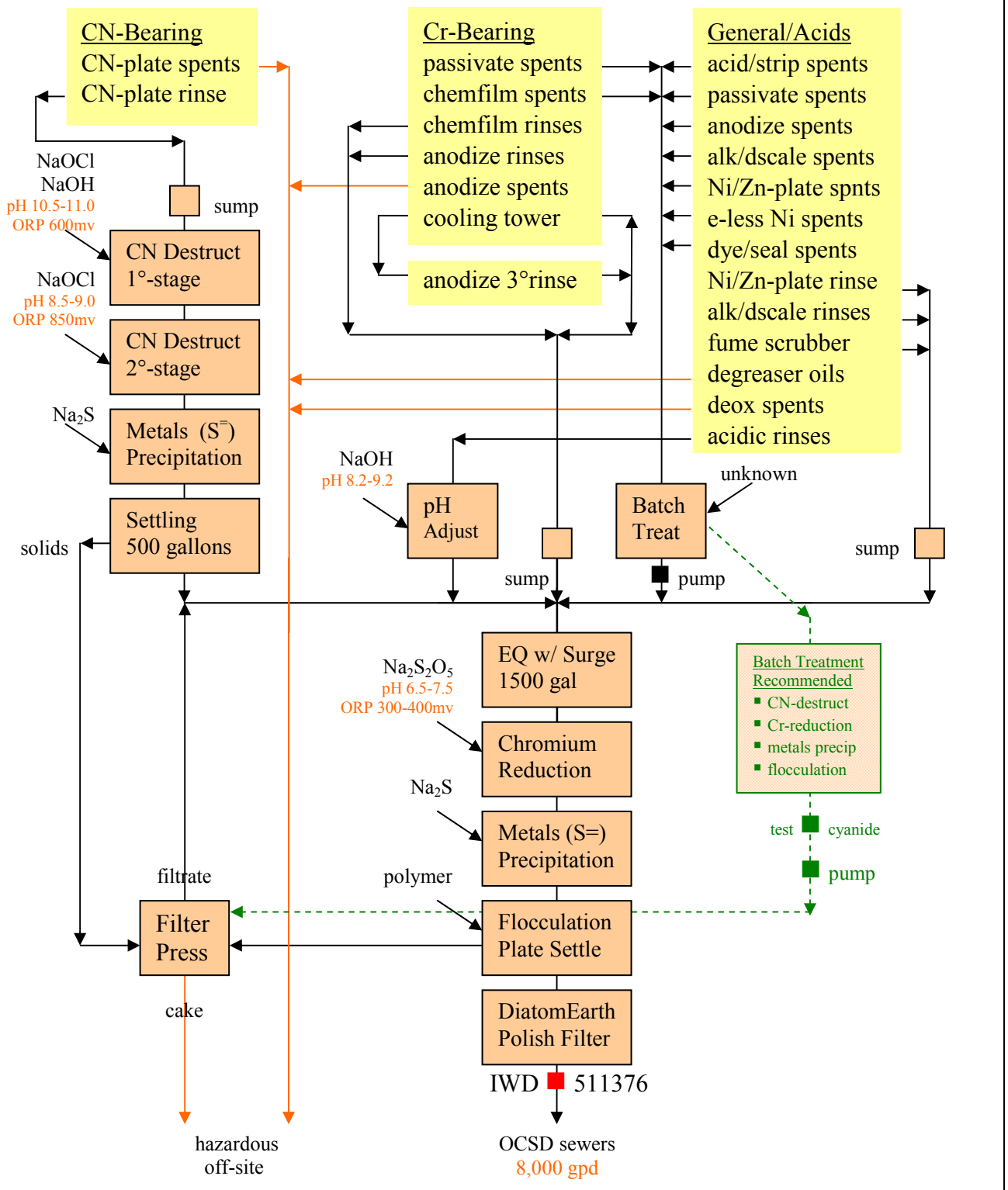
Each sample must be representative of the sampling day's operations. Sampling must be representative of the conditions occurring during the reporting period. 40 CFR 403.12(g) and 403.12(h).

The sample record for Reid Metal Finishing is representative over the sampling day as well as over the six-month reporting period. However, the variability in the effluent quality evident in the sample record for cyanide, cadmium, and to a lessor degree, nickel, indicates that there may be other potential sources of variability, most likely related to the operation of the wastewater treatment itself. Variability from wastewater treatment itself points to the need to increase the frequency of sampling for cadmium, chromium, cyanide, nickel, and possibly for copper, and zinc as well. The final pHs need to be continuously monitored as long as most flows discharge without final pH adjustment. See section 3.1 on page 11.

Requirements

- See Appendix 2 for the expected self-monitoring requirements for IWD-511376.

Appendix 1
Reid Metal Finishing
Schematic of the Wastewater Collection and Treatment



Appendix 2
Sewer Discharge Standards and Limits
Reid Metal Finishing @ IWD-511376

pollutants of concern (mg/l)	expected upon revision of the OCSD industrial users permit				
	Federal standards (daily-max)	Federal standards (month-avg)	national prohibitions (inst-max)	OCSD local limits (daily-max)	projected monitoring frequency
arsenic	-	-	-	2.0	④
cadmium	0.11	0.07	-	1.0	1/month
chromium	2.77	1.71	-	2.0	1/month
copper	3.38	2.07	-	3.0	1/month
lead	0.69	0.43	-	2.0	2/year
mercury	-	-	-	0.03	④
nickel	3.98	2.38	-	10.0	1/month
silver	0.43	0.24	-	5.0	2/year
zinc	2.61	1.48	-	10.0	1/month
total cyanide	0.30 ①	0.16 ①	-	5.0	1/month
amenable cyanide	0.22 ①	0.08 ①	-	1.0	2/year
total toxic organics	2.13	-	-	0.58	⑤
pesticides	-	-	-	0.01	④
PCBs	-	-	-	0.01	④
total sulfides	-	-	-	5.0	④
dissolved sulfides	-	-	-	0.5	④
oil and grease - petroleum	-	-	-	100.0	④
flow (gpd)	-	-	-	-	continuous
pH (s.u.)	-	-	<5.0	6.0 to 12.0	continuous
explosivity	-	-	<140°F ②	10% LEL ③	④

① Adjusted Fed Standards from 40 CFR 433.12(c)

$$CN_{511376} = CN_{433} \times \frac{Q_{CN}}{Q_{total}}$$

C_{511376} = Limit @ IWD-511376
C_{433} = 40 CFR 433.17
Q_{total} = Flow @ IWD-511376
Q_{CN} ≈ 25% 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
Reid Metal Finishing Wastewater Discharge Quality @ IWD-511376
January 2003 – June 2005

pollutants ② (µg/l)	effluent sampling results			violation rate ①		sample count	loading (lbs/yr)
	mean	99th%	max	sample	month ③		
arsenic	-	-	-	-	-	0	-
cadmium	116.0	337.7	367	**8/17**	**11/17**	17	1.93
chromium	572.0	1413.2	1260	0/9	0/9	9	9.53
copper	55.8	162.0	160	0/9	0/9	9	0.93
lead	<20	<100	<100	0/17	0/17	17	<0.3
mercury	-	-	-	-	-	0	-
nickel	1537.0	3552.7	3450	0/9	**1/9**	9	25.6
silver	9.6	23.7	<40	0/5	0/5	5	0.16
zinc	451.1	1271.4	1190	0/9	0/9	9	7.51
total cyanide	-	-	-	-	-	0	-
amenable cyanide	638.0	2686.7	2640	**5/10**	**6/10**	10	10.63
total toxic organics	11.8	35.0	26.1	0/5	0/5	5	0.20
pesticides	-	-	-	-	-	-	-
PCBs	-	-	-	-	-	-	-
total sulfides	-	-	-	-	-	-	-
dissolved sulfides	-	-	-	-	-	-	-
oil and grease - petroleum	-	-	-	-	-	-	-
flow (gpd)	-	-	-	-	-	-	-
pH (s.u.)	-	-	-	-	-	-	-
explosivity	-	-	-	-	-	-	-

① List of violations, indicating the days of violation under the Clean Water Act, follows in Appendix 4. The statistical chance of future violation is presented below
② No sample results for the following pollutants of concern: flow, and pH
③ Monthly-averages calculated by averaging all samples in a calendar month, even if just one

Violation Probability	mean (µg/l)	std dev (µg/l)	statistical probability		percent
Fed d-max - cadmium	µ = 116.0	σ = 95.1	α(*110*)	= 0.5251	53%
Fed d-max - nickel	µ = 1537.0	σ = 865.1	α(*3980*)	= 0.0024	<1%
Fed d-max - CN-amenable	µ = 638.0	σ = 879.3	α(*~220*)	= 0.6821	68%
Fed d-max - all others	µ =	σ =	α(*std*)	= 0.0000	~0%
Fed mo-avg - cadmium	µ = 114.7	σ = 76.7	α(*70*)	= 0.7200	72%
Fed mo-avg - nickel	µ = 1542.0	σ = 846.2	α(*2380*)	= 0.1610	16%
Fed mo-avg - CN-amenable	µ = 638.0	σ = 756.6	α(*~80*)	= 0.7696	77%
Fed mo-avg - all others	µ =	σ =	α(*std*)	= 0.0000	~0%
Local inst-max - CN-amenable	µ = 638.0	σ = 879.3	α(*1000*)	= 0.3403	34%
Local inst-max - all others	µ =	σ =	α(*std*)	= 0.0000	~0%

Appendix 4
Reid Metal Finishing – Violations @ IWD-511376
January 2003 – June 2005

sample date	type	sampler	standards and limits			violation	days viol
Mar 2005	24-hour	OCSD	Fed	Cd month-avg	0.07 mg/l	0.195	31
03/28/05	24-hour	OCSD	Fed	Cd daily-max	0.11 mg/l		
Mar 2005	24-manual	OCSD	Fed	CNa month-avg	0.08 mg/l	1.53	31
03/28/05	24-manual	OCSD	Fed	CNa daily-max	0.22 mg/l		
			local	CNa instant-max	1.0 mg/l		
Dec 2004	24-hour	OCSD	Fed	Cd month-avg	0.07 mg/l	0.208	31
12/28/04	24-hour	OCSD	Fed	Cd daily-max	0.11 mg/l		
Sep 2004	24-hour	OCSD	Fed	Cd month-avg	0.07 mg/l	0.265	30
09/27/04	24-hour	OCSD	Fed	Cd daily-max	0.11 mg/l		
Sep 2004	24-manual	OCSD	Fed	CNa month-avg	0.08 mg/l	0.29	30
09/27/04	24-manual	OCSD	Fed	CNa daily-max	0.22 mg/l		
Mar 2004	24-hour	OCSD	Fed	Cd month-avg	0.07 mg/l	0.08	31
Mar 2004	24-manual	OCSD	Fed	CNa month-avg	0.08 mg/l	0.12	31
Feb 2004	24-hour	Reid	Fed	Cd month-avg	0.07 mg/l	0.145	28
02/16/04	24-hour	Reid	Fed	Cd daily-max	0.11 mg/l		
Dec 2003	24-hour	OCSD	Fed	Cd month-avg	0.07 mg/l	0.367	31
12/22/03	24-hour	OCSD	Fed	Cd daily-max	0.11 mg/l		
Dec 2003	24-hour	OCSD	Fed	Ni month-avg	2.38 mg/l	3.45	31
Nov 2003	24-hour	Reid	Fed	Cd month-avg	0.07 mg/l	0.125	30
11/20/03	24-hour	Reid	Fed	Cd daily-max	0.11 mg/l		
Nov 2003	24-manual	Reid	Fed	CNa month-avg	0.08 mg/l	2.64	30
11/20/03	24-manual	Reid	Fed	CNa daily-max	0.22 mg/l		
			local	CNa instant-max	1.0 mg/l		
Sep 2003	24-hour	OCSD	Fed	Cd month-avg	0.07 mg/l	0.114	30
09/25/03	24-hour	OCSD	Fed	Cd daily-max	0.11 mg/l		
Sep 2003	24-manual	OCSD	Fed	CNa month-avg	0.08 mg/l	1.16	30
09/25/03	24-manual	OCSD	Fed	CNa daily-max	0.22 mg/l		
			local	CNa instant-max	1.0 mg/l		
Aug 2003	24-hour	Reid	Fed	Cd month-avg	0.07 mg/l	0.085	31
May 2003	24-hour	Reid	Fed	Cd month-avg	0.07 mg/l	0.077	31
Mar 2003	24-hour	OCSD	Fed	Cd month-avg	0.07 mg/l	0.168	31
03/26/03	24-hour	OCSD	Fed	Cd daily-max	0.11 mg/l		

Appendix 4 (continued)
Reid Metal Finishing – Violations @ IWD-511376
January 2003 June 2005

sample date	type	sampler	standards and limits			violation	days viol
Mar 2003	24-manual	OCSD	Fed	CNa month-avg	0.08 mg/l	0.52	31
03/26/03	24-manual	OCSD	Fed	CNa daily-max	0.22 mg/l		
Total Days of Violation (January 2003 June 2005)							549