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

January 8, 2010 In Reply Refer To: WTR-7

David Weed, Director, Regulatory Affairs & Facilities
ChemResearch Co., Inc.
1101 West Hilton
Phoenix, Arizona 85007-4306

Re: August 13, 2009 Clean Water Act Inspection

Dear Mr. Weed:

Enclosed is the January 8, 2010 report for our August 13, 2009 inspection of ChemResearch. Please submit a short response to the findings in Sections 2 through 5, to EPA, Phoenix, and ADEQ, by **March 30, 2010**. The main findings are summarized below:

1 ChemResearch qualifies as both an existing source job-shop electroplater under 40 CFR 413 and a new source metal finisher under 40 CFR 433, and not just under 40 CFR 433.

2 On-site treatment for the main discharge to the sewers is equivalent to the models used in setting the Federal standards. Major operational controls which improve performance are also employed, most notably redundant treatment steps, segregated collection and handling, and reaction end-point metering for treatment process controls. As a result, sampling has demonstrated consistent compliance with Federal standards and local limits.

3 The self-monitoring is representative over the sampling day and the reporting period. However, the separate discharge from non-destructive testing must be self-monitored and the internal cyanide compliance point should be self-monitored for amenable cyanide. Most pollutants could be self-monitored less frequently because of low levels in the discharge, while pH should be self-monitored more frequently.

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

Sincerely,

Original signed by:

Greg V. Arthur
CWA Compliance Office

Enclosure

cc: Deborah Swartz, Senior WQ Inspector, City of Phoenix
Moses Olade, Environmental Hydrologist, ADEQ

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION 9

CLEAN WATER ACT COMPLIANCE OFFICE

NPDES COMPLIANCE EVALUATION INSPECTION REPORT

Industrial User:	ChemResearch Co., Inc. 1101 West Hilton, Phoenix, Arizona 85007-4306 New Source Metal Finishing (40 CFR 433) Existing Source Job-Shop Electroplating (40 CFR 413 >10kgal)
Treatment Works:	City of Phoenix 91st Avenue Wastewater Treatment Plant NPDES Permit No. AZ0020524
Pretreatment Program:	City of Phoenix
Date of Inspection:	August 13, 2009

Inspection Participants:

US EPA:	Greg V. Arthur, Region 9, CWA Compliance Office, (415) 972-3504
Arizona DEQ:	None.
City of Phoenix:	Deborah Swartz, Senior WQ Inspector, (602) 534-2082 Dan Cantu, Senior WQ Inspector, (602) 495-5925
ChemResearch:	David Weed, Director Regulatory Affairs & Facilities, (602) 253-4304

Report Prepared By: Greg V. Arthur, Environmental Engineer
January 8, 2010

1.0 Scope and Purpose

On August 13, 2009, EPA and the City of Phoenix conducted a compliance evaluation inspection of ChemResearch Company, Inc., in Phoenix, Arizona. The purpose was to ensure compliance with the Federal regulations covering the discharge of non-domestic wastewaters into the sewers. In particular, it was to ensure:

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

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

See Appendix 1 on page 20 for a schematic of the layout and configuration of wastewater handling. ***Also*** see Appendix 2 on pages 21 through 23 for a process inventory. Photo documentation of this inspection follows in Section 1.7 on pages 6 and 7. ***Also*** attached to the pdf file of this report as Appendix 5 on pages 27 and 28 are corrections provided by ChemResearch on February 9, 2010.

1.1 Process Description

ChemResearch is a full-service job-shop metal finisher of aluminum, stainless steel, and steel parts for commercial, industrial, and military applications. The surface finishing operations involve Type I chromic-acid anodizing, Type II and III sulfuric-acid anodizing, manganese and zinc phosphating, hard chrome, electroless nickel, nickel, silver, gold, copper, chem-film chromium conversion coating, passivation, zincate coating, aluminum coloring, grinding, painting, and non-destructive testing. The operations by processing line as well as when the line was installed follow below.

<u>Pre-Clean Line</u> (installed 1997) – alkaline cleaning, nitric/hydrofluoric-acid etching, nitric-acid desmut, zincate coating.

<u>Chrome Plating and Anodizing Lines</u> (installed 1992) – alkaline cleaning, acid-chromium electroplating, chromic-acid Type I anodizing, hot water solder mask reflow, nickel acetate seal, hydrochloric-acid chrome strip.

<u>General Cyanide Plating Line</u> (rebuilt 1989 over cyanide sump) – cyanide-silver plating, cyanide-silver strike, cyanide-copper plating, cyanide-copper strike, anti-tarnish, zinc phosphating, cyanide-zincate coating, cyanide nickel/silver strip.

<u>Manganese Phosphate Line</u> (installed 2009) – alkaline cleaning, hydrochloric-acid pickling, manganese phosphating, oil coating.

General Plating Line (rebuilt 1989 over general sump) – tungsten etch, nitric-acid passivation, alkaline soap cleaning, aluminum caustic etching, nitric/hydrofluoric-acid etching, nitric-acid desmut, alkaline electrocleaning, acid-nickel strike, sulfamate-nickel plating, acid activation, nitric/phosphoric-acid bright dip, nitric-acid strip.

Electroless Nickel Line (installed before the early 1980's) – alkaline soap cleaning, hydrofluoric-acid etching, alkaline electrocleaning, acid activation, acid-nickel strike, electroless nickel plating, nitric-acid strip, nitric-acid rack strip, cyanide-zincate coating.

Anodizing Line (installed in the 1970's) – alkaline soak cleaning, alkaline etching, nitric-acid deoxidation, nitric/hydrofluoric-acid etching, phosphoric-acid cleaning, Type II sulfuric-acid anodizing, Type III sulfuric-acid anodizing, gold dye, red dye, blue dye, black dye, green dye, nickel acetate seal, Teflon dip.

Special Processes Lines (installed after 1987) – alkaline etching, nitric-acid activation, sulfuric-acid passivation, dichromate seal, chem-film chromium conversion coating, nitric-acid etching, zinc phosphating, wax masking.

R & D Room (installed 2006) – 22 tanks (<50 gal each) for various plating steps.

Other Processes – dry electrostatic painting, magnaflux non-destructive testing, dye penetrant testing, bead blast honing and descale, parts marking, laboratory, salt spray exposure testing, machining (centerless grinding, breaking, lathe, sawing), caustic wet fume scrubber.

ChemResearch does not own the parts it finishes. Operations began in 1950 and have expanded or were rebuilt a number of times since then. ChemResearch discharges non-domestic wastewaters to the Phoenix domestic sewers primarily through a single sewer connection, although a small amount discharges through a second unpermitted connection. Domestic sewage discharges through separate connections downstream of the industrial wastewater connection.

1.2 Facility SIC Code

ChemResearch is assigned the SIC code for plating, polishing, anodizing, and coloring (SIC 3471) and metals coating (SIC 3479).

1.3 Facility Wastewater Sources

The plating, anodizing, coating, phosphating, stripping, and cleaning lines, and the support operations generate spents, rinses, washdowns, bleeds, and residuals. There is one main non-domestic connection to the sewers that receives contributions from the industrial wastewater treatment plant ("IWTP") as its only source. There is also a secondary connection to the sewers from the non-destructive testing station. The 2009 Phoenix permit identifies the main sewer connection but does not identify the second sewer connection. These compliance sampling points are designated in this report as IWD-1350.02 and IWD-1350.04.

Spent Solutions – The imparted contamination from the processing of parts and the progress-sive drop in bath solution strength results in the generation of spents. The generation rates depend on bath usage, effectiveness of bath contamination control, and the amount of drag-out lost into the rinses or to the floor. Most spents are handled on-site through metered bleeds into the lift station sumps for combined treatment with the rinses. Nickel-bearing spents are separately handled through separate batch treatment for nickel and electroless nickel. The cyanide-bearing and chromium-bearing solutions are regenerated strictly through additions, also with in-line ion exchange for the reclaim of chrome plating baths, and thus do not generate spents. Losses from these "adds-only" baths therefore must be through the drag-out of solution into the rinses, since baths without outlets would foul through contamination or fail through use.

Rinses – Most solution steps employ either first-stage countercurrent rinses or first-stage overflow rinses. The chromium plating baths specifically employ both over tank spray rinses and first-stage drag-outs. There are also in use a limited number of second-stage and third-stage overflow rinses, and final hot water or DI rinses following final steps. Overflow rinses from the pre-clean line alkaline cleaning steps bypass treatment for combined discharge with the treated wastewaters through the main compliance sampling point IWD-1350.02.

Miscellaneous Wastewaters – Additional wastewaters are also treated through prior to dis-charge. Among these treated flows are the blowdown bleed from the caustic fume scrubber, sink drainage from parts marking, sink drainage from non-destructive testing, drainage from an outdoor trench, and the rinses and spents from the R & D room. In addition, laboratory spents collect in labeled waste pails for hauling to the IWTP and the laboratory rinses dis-charge to the sewers downstream of treatment. Spent machine shop coolants are off-hauled for non-hazardous disposal. ***See*** Photos #1 and #4 in Section 1.7 of this report on page 6.

Residuals – The operations generate spent ion exchange canisters, machining coolant spent, and IWTP sludges for off-site disposal as hazardous, and silver-bearing spents for reclaim.

1.4 Facility Process Wastewater Handling

Discharge – Most process wastewaters from ChemResearch drain through a single sewer connection into the Phoenix domestic sewers. A final Parshall flume in the IWTP is identi-fied in the Phoenix permit as the final compliance sample point, designated in this report, after the permit number as IWD-1350.02. A cyanide sample point, IWD-1350.03, is located after cyanide destruction. A second discharge from non-destructive testing to the sewers is unidentified by the permit, but is designated here in this report as IWD-1350.04. The permit establishes the average discharge as 80,000 gpd. Effluent metering averaged 47,000 gpd since 2007. ***See*** Photos #11 and #12 in Section 1.7 on page 7.

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

Delivery – Rinses and other low-strength wastewaters are hard-plumbed either to the IWTP or to intermediate lift stations sumps. Most spents are delivered to treatment or the lift station pumps by portable pump and hose. Chromium plating spents drain to a pit for pumped delivery through ion exchange canisters and return to the tanks. Most wastewaters from the metal finishing lines are delivered to the IWTP through a number of lift station sumps, each designed to collect and deliver by hard-pipe segregated wastewaters to separate handling and treatment. There are lift station sumps for the capture and delivery of the wastewaters listed on the following page. ***See*** Photos #2 and #3 in Section 1.7 of this report on page 6.

- Chrome Pit – chromium-bearing wastewaters from the chrome plating line
- Seal Pit – general wastewaters from nickel acetate sealing, and wet honing
- Cyanide Sump – cyanide-bearing wastewaters from the general plating lines
- Anodizing Sump – general wastewaters from non-Cr anodizing and MN-phosphating
- Specialty Sump – general wastewaters from the special process lines
- General Sump – general wastewaters from pre-clean, general plating, electroless nickel, non-destruct testing, R & D, lab, outdoor trench drainage, fume scrubbing.

Treatment – Cyanide-bearing wastewaters are treated through two-stage alkaline chlorination followed by a holding tank. Chromium-bearing wastewaters collect into equalization Tank 1 for pumped feed through two-stage chromium reduction. General wastewaters collect into equalization Tank 2 for pumped feed through two-stage metal precipitation, along with the pre-treated cyanide-bearing and chromium-bearing wastewaters, to a lift station. The treated wastewaters are pumped into equalization Tank 3 for pumped feed through chemical-aided Lamella clarification, final pH adjustment, and discharge to the sewers. The cyanide destruction, chromium reduction, metals precipitation, and final pH adjustment steps are all outfitted with process monitoring meters for pH, ORP, or both. The precipitate solids removed by the Lamella clarifier are dewatered through sludge decanting and filter pressing.

Nickel-bearing spents are batch treated for solids removal through the filter press. Chrome plating baths are treated by in-line ion exchange for reuse. Some low-strength flows discharge untreated with the treated wastewaters to the sewers. These include lab rinses, non-destructive testing sink drainage, and pre-clean line rinses. ***See*** Sections 3.2 of this report on page 14, and Photos #5 to #10 in Section 1.7 of this report on pages 6 and 7.

1.5 Sampling Record

ChemResearch self-monitors from biweekly to semiannually depending on parameter as required by the City of Phoenix permit. The Phoenix also collects its own samples monthly.

1.6 POTW Legal Authorities

The City of Phoenix has enacted an ordinance to implement a pretreatment program in the areas serviced by the 91st and 23rd Avenue Wastewater Treatment Plants. Under this authority, the City issued City permit No.1350 authorizing discharge of non-domestic wastewater to the sewers.

1.7 Photo Documentation

Eight of the 11 photographs taken during this inspection are depicted below and saved as *chemresearch-01.jpg through -13.jpg.*

Photo #1: Lab Spent Reagent Collection Pails
Taken By: Greg V. Arthur
Date: 08/13/09

Photo #2: Cr-plating Ion Exchange Canisters
Taken By: Greg V. Arthur
Date: 08/13/09

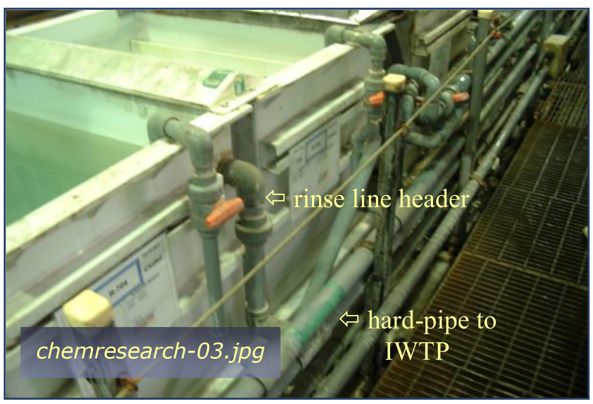


Photo #3: Rinse Tank Hard-Piping
Taken By: Greg V. Arthur
Date: 08/13/09

Photo #4: Collected Outdoor Drainage to IWTP
Taken By: Greg V. Arthur
Date: 08/13/09

Photo #5: IWTP Tanks Below Grade in Lined Pit
Taken By: Greg V. Arthur
Date: 08/13/09

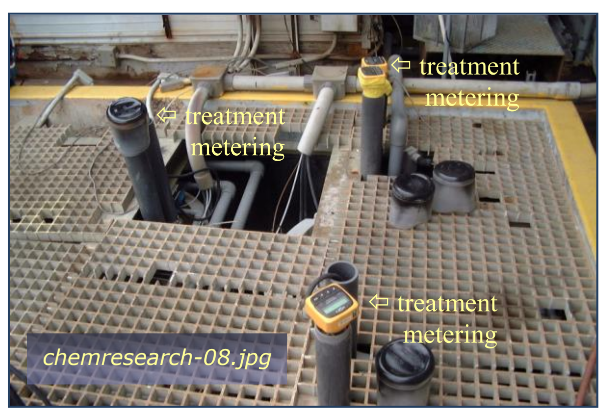


Photo #6: IWTP Process Tanks – pH/ORP Meters
Taken By: Greg V. Arthur
Date: 08/13/09

Additional photographs taken during this inspection are depicted below.

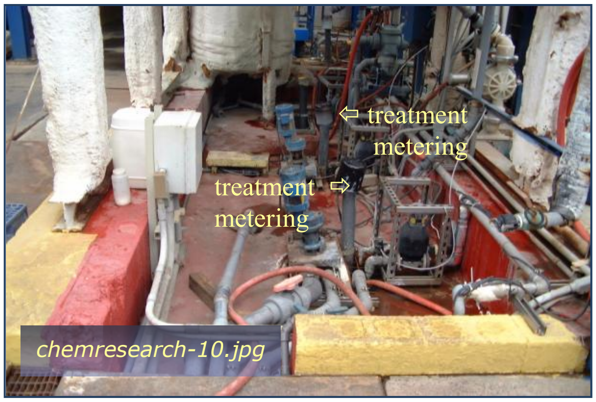


Photo #7: IWTP Metals Precip Tanks Below Grade
Taken By: Greg V. Arthur
Date: 08/13/09

Photo #8: Equalization Tanks 1 through 3
Taken By: Greg V. Arthur
Date: 08/13/09

Photo #9: IWTP Lamella Clarifier
Taken By: Greg V. Arthur
Date: 08/13/09

Photo #10: IWTP Filter Press
Taken By: Greg V. Arthur
Date: 08/13/09

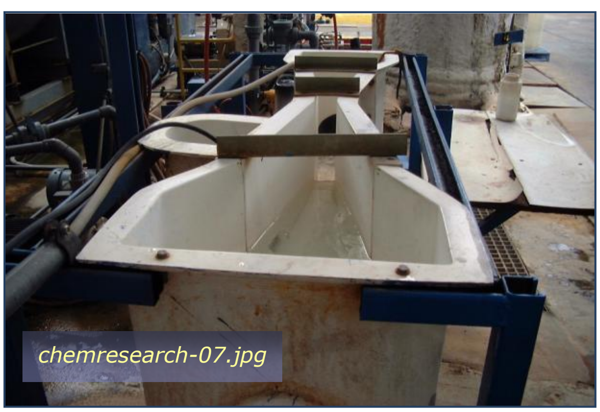


Photo #11: Final Discharge Point, IWD-1350.02
Taken By: Greg V. Arthur
Date: 08/13/09

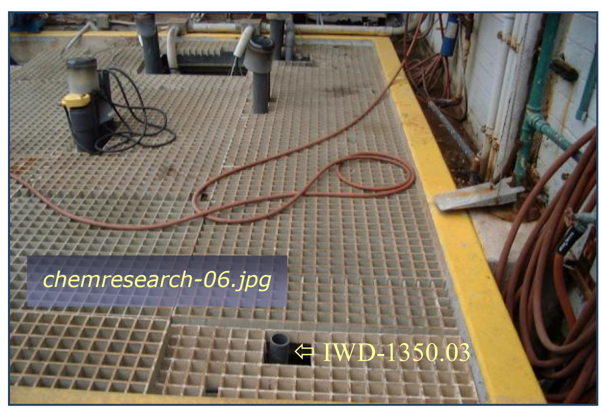


Photo #12: CN Sampling Point, IWD-1350.03
Taken By: Greg V. Arthur
Date: 08/13/09

2.0 Sewer Discharge Standards and Limits

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

Summary

The Federal categorical pretreatment standards for existing source job-shop electroplating in 40 CFR 413 and for new source metal finishing in 40 CFR 433 apply to the process waste-water discharges from ChemResearch. The Federal cyanide standards apply to just cyanide bearing wastewaters after cyanide treatment with adjustment for dilution. The Phoenix per-mit only applied the local limits and the Federal standards for new sources, and thus does not accurately state the discharge requirements for ChemResearch. The application of Federal categorical standards, national prohibitions, and local limits was determined through visual inspection. ***See*** Appendix 3 on page 24 of this report for the permit limits.

Requirements

- The Federal standards for existing source job-shop electroplating and new source metal finishing must be applied to the discharges using the combined wastestream formula.

- The permits must prohibit dilution as a substitute for any treatment that is necessary to comply with Federal standards.

- The permit must identify the second discharge to the sewer from non-destructive testing.

Recommendations

- ChemResearch should determine the percentage of flow generated by existing sources, new sources, cyanide-bearing source, and dilution sources for all sampling points.

2.1 Classification by Federal Point Source Category

ChemResearch qualifies as a job-shop metal finisher subject to the Federal job-shop electro-plating standards for existing sources in 40 CFR 413 (>10,000 gallons per day) and the metal finishing standards for new sources in 40 CFR 433. The Phoenix permit applied only the new source standards. Federal standards are self-implementing which means they apply to regulated wastestreams whether or not they are implemented in a local permit. The Federal rules in 40 CFR 403.6 define domestic sewage and non-contact waters as dilution waters.

<u>New or Existing Sources</u> – In 40 CFR 403.3(k), a metal finishing process constructed after August 31, 1982 is a new source (1) if it entirely replaces a process which caused a discharge from an existing source or (2) if it is substantially independent of the existing sources on-site. The preamble to the 1988 Federal rule states that the new source standards apply when "an existing source undertakes major construction that legitimately provides it with the

opportunity to install the best and most efficient production process and wastewater treatment technologies" (*Fed Register, Vol.53, No.200, October 17, 1988, p.40601*). So after the 1982 deadline, the new source standards apply to the new installation of metal finishing lines, rebuilt or moved lines, lines temporarily removed to install secondary containment, or existing lines converted to do new operations. New source standards generally do not apply to the piecemeal replacement of tanks for maintenance in otherwise intact metal finishing lines.

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

Start	Number of Tanks by Process Line	433 Rinses	433 Spents	413 Rinses	413 Spents
1997	Pre-Clean	10	8	0	0
1992	Chrome Plating / Type I Anodizing	5	10	0	0
1989	Cyanide-Bearing General Plating	9	3	0	0
1989	Non-CN Bearing General Plating	17	20	0	0
2009	Manganese Phosphating	4	4	0	0
1970s	Electroless Nickel	0	0	9	12
1970s	Type II and III Anodizing	0	0	13	20
1987	Special Processing	13	10	0	0
2006	Research and Development	small	small	0	0
Number of Discharging Tanks by Category		58	55	22	32
Number of Cyanide-Bearing Tanks		6	1	0	0
Estimated Flow Percentages by Category		~70%		~30%	

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 Phoenix local limits apply to non-domestic discharges in the service areas of the City treatment plants.

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 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 an estimated 70% of the process wastewater discharges to IWD-1350.02, as well as to all of the discharges to IWD-1350.04 and through the cyanide sample point, IWD-1350.03.

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 2.5 on page 11 of this report for the adjustments in the standards for multiple categories, dilution, cyanide, and toxic organics monitoring.

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

2.4 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), 413.44(c)(g), 413.54(c)(g), 413.64(c)(g) and 413.74(c)(g) apply to the process wastewater discharges at ChemResearch from the non-chrome anodizing line, the electroless nickel line and their related operations of alkaline cleaning, stripping, sealing, and coloring continuing in operation since August 31, 1982. The Federal standards in 40 CFR 413 do not apply 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 the August 31, 1982 deadline.

As a result, at ChemResearch, the job-shop electroplating standards apply to an estimated 30% of the process wastewater discharges to IWD-1350.02. These standards do not apply to the other compliance sampling points. ***See*** Section 2.1 on page 8 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.

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 – See Section 2.5 below for the adjustments in the standards for multiple categories, dilution, cyanide, and toxic organics monitoring.

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.

2.5 Combined Federal Standards and Adjustments

The Federal categorical pretreatment standards must be adjusted to account for dilution, if it exists, for multiple Federal categories, if more than one applies. ***See*** Appendix 3 on page 24 of this report for the permit limits.

Multiple Categories – The Federal standards in 40 CFR 413 for existing sources and 40 CFR 433 for new sources must be mathematically combined to apply to the main sewer discharge at IWD-1350.02, using the combined wastestream formula as specified in 40 CFR 403.6(e). At IWD-1350.03 and IWD-1350.04, the standards are not combined since only new source standards apply. 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 then be mathematically combined with the monthly-average standards in 40 CFR 433.

Dilution – Under 40 CFR 403.6(d,e), Federal categorical pretreatment standards must be adjusted using the combined wastestream formula to account for any dilution from non-contact cooling waters, boiler blowdown, water preconditioning, and domestic sewage. These flows, which are specifically listed as dilution waters in 40 CFR 403.6(e), were not identified during this inspection nor in the permit. As a result, the Federal standards do not need to be adjusted.

Cyanide Standards (IWD-1350.03) – All identified cyanide-bearing wastewaters are generated by new sources and treated through the cyanide destruction unit. The Phoenix permit assigns the Federal compliance sample point for cyanide after the last stage of cyanide destruction, and does not apply a Federal standard to the overall discharge to the sewer. The new source standards allow the appropriate application of either the total cyanide standards or alternate standards for cyanide amenable to alkaline chlorination to IWD-1350.03 immediately after treatment. In addition, under 40 CFR 433.12(c), the cyanide standards as applied to new source metal finishing wastewater discharges must be adjusted to account for dilution from non-cyanide bearing waste streams. An estimated ~75% of the flow through IWD-1350.03 qualifies as cyanide-bearing, based solely on the proportions of overflow rinses (6 cyanide-bearing and 2 non-cyanide bearing) discharging through IWD-1350.03.

Cyanide Standards (IWD-1350.2) – There is no straight forward way to apply combined new source and existing sources standards at the final discharge point. The adjusted-for-dilution standards applied to IWD-1350.03 immediately after cyanide treatment fulfills the objective of the Federal categorical pretreatment standards to ensure consistent performance of BAT treatment for cyanide. As long as there are no other untreated sources of cyanide in the final discharge, compliance at the internal sample point IWD-1350.03 after cyanide treatment accurately reflects facility compliance for cyanide. However, if there are cyanides in other waste streams (ex: certain chem films with ferro-cyanides), then combined standards for cyanide apply at IWD-1350.02. The calculations involve applying adjusted-for-dilution new source standards to ~70% of the flow and the unadjusted existing source standards to the remaining ~30%. In order to verify no untreated sources of cyanide in the final discharge, these combined standards should apply by default.

Cyanide Standards (IWD-1350.04) – New sources standards for total cyanide apply by default without adjustment to the discharge at IWD-1350.04 because there are no cyanide-bearing flow contributions.

Toxic Organics Standards – The Federal standards in 40 CFR 433.12 and 40 CFR 413.03 also allow facilities with an approved toxic organics management plan to certify instead of sample for toxic organics. ChemResearch self-monitors for total toxic organics at IWD-1350.02 twice per year. No samples are collected at IWD-1350.04.

2.6 Federal Prohibitions

The Federal standards in 40 CFR 403.6(d) and 403.17(d) prohibit dilution as a substitute for treatment, and the bypassing of any on-site treatment necessary to comply with standards, respectively. The City of Phoenix sewer use ordinance establishes the prohibition against the dilution as a substitute for treatment (§28-8g), but not for the bypassing treatment necessary to comply. The ordinance does establish related provisions for protection from accidental discharges (§28-53).

2.7 Compliance Sampling and Point(s) of Compliance

The permit designates the Parshall flume inside the facility as the location of the compliance sampling point following industrial wastewater treatment for nearly all facility wastewaters (designated in this report as IWD-1350.02). The permit does not identify the compliance sampling point for the separate non-destructive testing discharge (designated in this report as IWD-1350.04). The permit also designates the discharge from the final stage of cyanide treatment to the following metals precipitation treatment step as the Federal cyanide sampling point (designated in this report as IWD-1350.03).

Federal Standards - Federal categorical pretreatment standards apply end-of-process-after-treatment to all Federally-regulated discharges to the sewers. Together both compliance sample points for discharge to the sewers, IWD-1350.02 and IWD-1350.04, are suitable end-of-process-after-treatment sample point representative of the day-to-day discharge of

Federally-regulated wastewaters from ChemResearch. The internal sample point for cyanide, IWD-1350.03 is also a suitable end-of-process-after-treatment sample point representative of the day-to-day discharge of cyanide-bearing wastewaters from ChemResearch, as long as there are no other untreated cyanide-bearing flows discharging to the sewers.

Local Limits - Local limits and the national prohibitions apply end-of-pipe to non-domestic flows. The sample points IWD-1350.02 and IWD-1350.04 are suitable end-of-pipe sample point representative of the day-to-day non-domestic wastewater discharges from ChemResearch.

Sampling Protocols – The national prohibitions are instantaneous-maximums comparable to samples of any length. Federal categorical pretreatment standards are daily-maximums comparable to 24-hour composites. The 24-hour composites can be replaced with single grabs or manually-composited grabs representative of the sampling day's discharge. The City of Phoenix permit specifies these sampling protocols by parameter (page 2 of 5). ***See*** Section 4.0 on page 17 and Appendix 3 on page 24.

3.0 Compliance with Federal Categorical Standards

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

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

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

ChemResearch employs wastewater treatment equivalent to the models used in originally setting the Federal standards for almost all of its wastewater discharges to the sewers. Excellent built-in controls also further improve reliability and performance, most notably the redundant treatment steps, segregation by type, and the consistent use of reaction end-point metering. As a result, ChemResearch consistently complies with the Federal standards as reapplied in this report. ***See*** Section 2.0 on page 8 of this report. ***Also*** see Appendix 4 on pages 26 of this report for a summary of the compliance sampling.

Requirements

- None.

Recommendations

- Hard-piping and permanent standpipe stations should be established for the delivery of spents to treatment in order to eliminate the use of long flexible hosing.
- Non-destructive testing wastewaters should be handled through the existing treatment.
- The treatment reaction metering should be telemetered to an alarm system.
- The alkaline overflowing rinses that bypass treatment must be operated only on-demand.

3.1 Sampling Results

The two-year sample record consists of biweekly to semiannual self-monitoring (depending on pollutant), and monthly sampling collected by Phoenix. Nearly all samples collected of the main discharge through IWD-1350.02 were 24-hour composites.

3.2 Best-Available-Technology Treatment

Nearly all process-related wastewaters generated by ChemResearch, an average of 47,000 gpd, discharge from the industrial wastewater treatment plant through the main sewer connection. ChemResearch is designed and operated with best-available-technology ("BAT") model treatment for these discharges. As a result, the sampling results for IWD-1350.02 consistently comply with Federal standards, with average and calculated 99th% peak concentrations of 0.001 and 0.004 mg/l cadmium, 0.382 and 2.251 mg/l chromium, 0.075 and 0.250 mg/l copper, 0.005 and 0.026 mg/l lead, 0.123 and 0.548 mg/l nickel, 0.038 and 0.134 mg/l silver, 0.151 and 0.634 mg/l zinc, 0.038 and 0.309 mg/l total cyanide at IWD-1350.03, and 0.047 and 0.074 mg/l total toxic organics.

These sampling results indicate that the statistical probabilities of violating any of the Federal standards are essentially 0% for any sampling day or any monthly-average for the main treated discharge through IWD-1350.02. Not only is the treatment in-place equivalent in design to the model treatment but there are operational controls which would be expected to significantly further improve performance. A few minor deficiencies in the design and operation was observed during this inspection. The improvements (+) and deficiencies (-) are listed below.

+ Treatment capacity with redundant cyanide destruction and chromium reduction steps.
+ Segregated handling of wastewaters by type through dedicated sumps and pits.
+ Bypassing incompatible low-strength alkaline soapy rinses around treatment.
+ Separate handling of the cyanide-bearing and electroless nickel spents.
+ Clear labeling of tankage and knowledge of process wastewater generation and treatment.
+ Excellent chemically-aided Lamella clarifier capacity.
+ Excellent reaction end-point metering.
- Reaction end-point metering is not telemetered to alarms or remote alerts.
+ Comprehensive secondary containment.
- Spent solutions are delivered by portable pump and hosing to the collection sumps.

3.4 Dilution as a Substitute for Treatment

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

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

1350.02. Therefore it is possible that there is "dilution as a substitute for treatment" from the bypassing alkaline rinses.

3.5 Bypass Provision

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

There were no observed methods of bypassing at ChemResearch. In particular, the delivery of all waste streams was observed to lead to treatment and discharge through the permitted sample point. However, the delivery of spents involves portable pumps and long flexible hosing which makes an inadvertent bypassing of treatment possible.

4.0 Compliance with Local Limits and National Prohibitions

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

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

The sample record indicates that ChemResearch consistently complies with its local limits for metals, cyanide, organics, and pH. ***See*** Appendix 4 on page 26 of this report. ***Also*** see Sections 3.0 and 5.0 on pages 14 and 19 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 Phoenix 91st Avenue and 23rd Avenue 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

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

Metals and Cyanide – For the main discharges, IWD-1350.02, there were no violations of the local limits for arsenic, cadmium, copper, lead, mercury, selenium, silver, zinc, and cyanide. For the secondary non-destructive testing discharge, IWD-1350.04, there were no sample results. However, the NDT wastewaters would not be expected to contain metals or cyanide at levels approaching the local limits. As a result, there is no evidence that these discharges resulted in the operational interference of the Phoenix collection systems and wastewater treatment plants.

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

Metals and Cyanide – For the main discharges, IWD-1350.02, there were no violations of the local limits for arsenic, cadmium, copper, lead, mercury, selenium, silver, zinc, and cyanide. For the secondary non-destructive testing discharge, IWD-1350.04, there were no sample results. However, the NDT wastewaters would not be expected to contain metals or cyanide at levels approaching the local limits. As a result, there is no evidence that these discharges resulted in a pass-through of pollutants from the Phoenix wastewater treatment plants to the receiving waters.

Toxic Organics – For the main discharges, IWD-1350.02, there were no violations of the local limits for benzene, chloroform, pesticides, and PCBs. For the non-destructive testing discharge, IWD-1350.04, there were no sample results, however these flows would not be expected contain toxic organics at levels approaching the local limits.

Oil and Grease – There are no local limits for oil and grease.

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

Corrosion - Sewer collection system interferences related to the formation of hydrogen sulfide and the resulting acidic disintegration of the sewers are possible but not expected. The wastewaters discharged to the sewers are not high-strength in biodegradable organics. The main discharge through IWD-1350.02 is composed of both untreated wastewaters of likely alkaline but uncontrolled pH and pretreated wastewaters from the industrial wastewater treatment unit. For this reason, the final discharge through IWD-1350.02 needs to have daily discharge monitoring for pH. The second discharge through IWD-1350.04 is insignificant enough in volume to not warrant frequent monitoring for pH.

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

5.0 Compliance with Federal Monitoring Requirements

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

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

Permit Requirements – ChemResearch has successfully fulfilled the self-monitoring requirements set forth in the city permit. Over the a recent two year period, the sample record for the main discharge point, IWD-1350.02, and the cyanide treatment point, IWD-1350.03, shows that ChemResearch (1) submitted sample results for all permit listed parameters at the frequencies set forth in the permt, (2) collected all samples from the designated compliance sampling points, and (3) correctly obtained 24-hour composites for metals and grabs for the other pollutants. It was not determined in this inspection whether appropriate chain-of-custody procedures were followed. There were no sampling requirements in the permit for the second discharge point, IWD-1350.04.

Representativeness – The sample record for IWD-1350.02 appears to be representative of the main discharge to the sewers over the sampling day and the six-month reporting period. Some pollutants present at concentrations well below the Federal standards and local limits can be self-monitored less frequently even down to the Federal minimum level set forth in the permit. However, the self-monitoring at IWD-1350.02 for pH should be increased to daily given the variable and uncontrolled nature of the combined treated and untreated discharge. The second sample point, IWD-1350.04 has not been identified. The Federal amenable (free) cyanide sampling point, IWD-1350.03, is appropriately sited to be representative of the cyanide destruction process over the sampling day and six-month reporting period.

Requirements

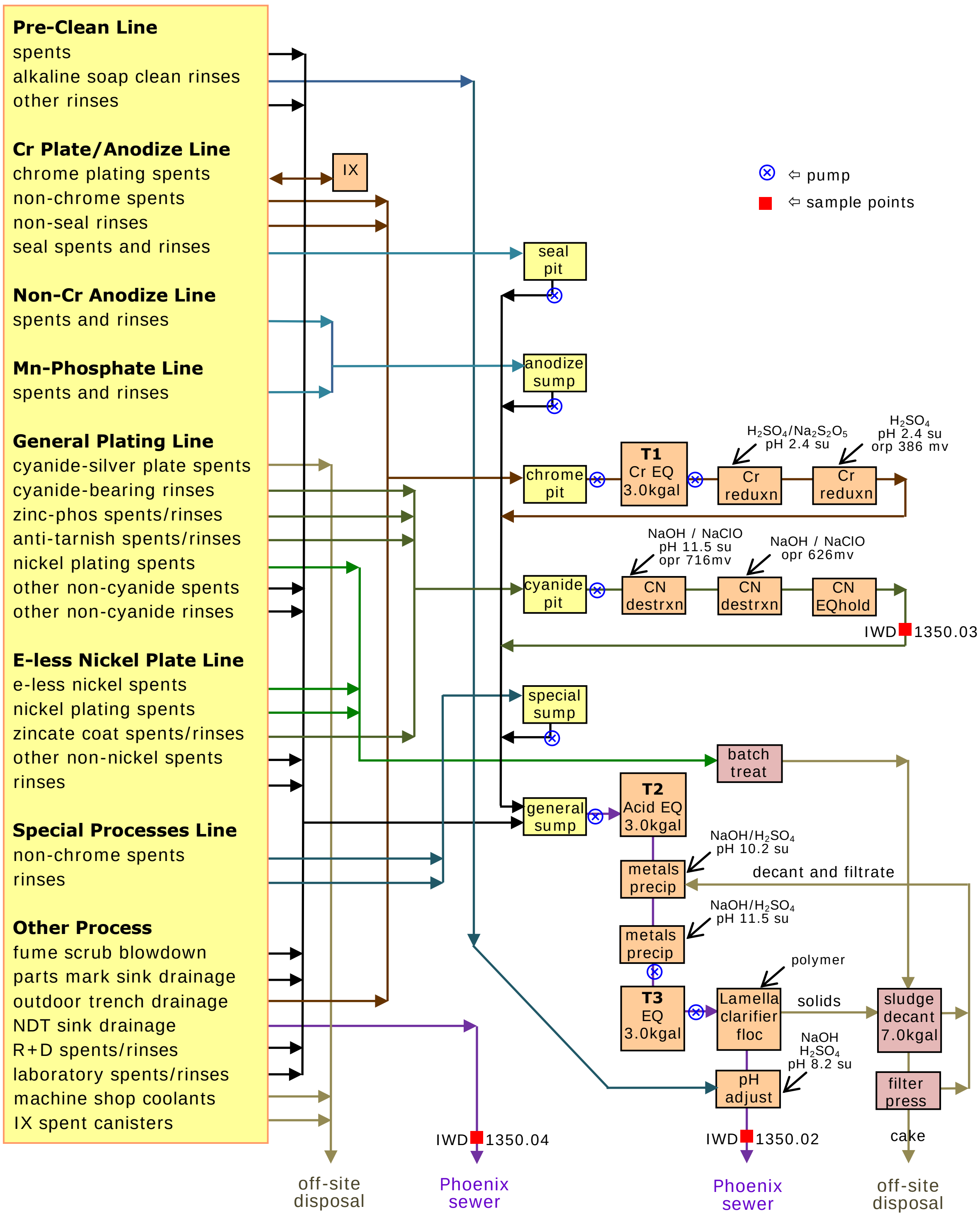
- ***See*** Appendix 3 on pages 24 and 25 of this report for the self-monitoring and city monitoring requirements for that would be considered to be representative of the discharges.

Recommendations

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

- ***See*** Sections 4.0 and 4.4 on pages 17 and 18 of this report for findings regarding self-monitoring for pH.

Appendix 1
ChemResearch - Configuration and Layout



Appendix 2
ChemResearch - Tank Inventory, Tank Number, and Delivery Method

Delivery ✓	Tank Designations and Contents		Delivery ✓	Tank Designations and Contents	
Pre-Clean Line			Type II and III Anodizing and Dye Lines		
G-sump	R701	alkaline cleaning	A-sump	A225	alkaline etch rack strip
G-sump	R702	alkaline cleaning	A-sump	A226	1° overflow for A225
G-sump	R703	alkaline cleaning	A-sump	A227	alkaline soak cleaning
G-sump	R704/705	1° ccurrent for R701-703	A-sump	A228	1° overflow for A227, 229
G-sump	R706	HNO_3/HF acid etching	A-sump	A229	alkaline etching
G-sump	R707/708	1° countercurrent for R706	A-sump	A233	H_3PO_4 acid cleaning
G-sump	R709	alkaline etching	A-sump	A235	2° hot DI static rinse
G-sump	R710/711	1° countercurrent for R709	A-sump	A293	HNO_3 deoxidation
G-sump	R712	HNO_3/HF acid etching	A-sump	A264	1° overflow for A293
G-sump	R713/714	1° ccurrent for R712, 715	A-sump	A275	alkaline rack strip
G-sump	R715	HNO_3 desmut	A-sump	A287	HNO_3/HF acid etching
G-sump	R716	zincate coating	A-sump	A277	1° countercurrent for A287
G-sump	R717	1° overflow for R716	A-sump	A202	Type II H2SO4 anodizing
G-sump	R718	2° overflow for R716	A-sump	A204	1° overflow for A202
Chrome Plating and Type I Anodizing Lines			A-sump	A207	nickel acetate seal
Adds Only	NC101 ✦	Cr plating + overtank spray	A-sump	A216	Type III H_2SO_4 anodizing
Adds Only	NC102 ✦	Cr plating + overtank spray	A-sump	A219	1° countercurrent for A216
CR-pit	NC111 ✦	1° drag-outs for NC101-109	A-sump	A205	blue dye
Adds Only	NC103 ✦	Cr plating + overtank spray	A-sump	A206	gold dye
CR-pit	A279 ✦	Type I anodizing	A-sump	A208	1° overflow for color dye
CR-pit	A280 ✦	1° drag-out for A279	A-sump	A210	1° overflow for color dye
Adds Only	NC105 ✦	Cr plating + overtank spray	A-sump	A212	1° overflow for color dye
Adds Only	NC106 ✦	Cr plating + overtank spray	A-sump	A213	red dye
Adds Only	NC107 ✦	Cr plating + overtank spray	A-sump	A236	green dye
Adds Only	NC108 ✦	Cr plating + overtank spray	A-sump	A272	black dye
Adds Only	NC109 ✦	Cr plating + overtank spray	A-sump	A277	1° overflow for A272
CR-pit	NC123 ✦	1° rinse station for Cr-plate	A-sump	A255	Type II H2SO4 anodizing
CR-pit	NC124 ✦	1° rinse station for Cr-plate	A-sump	A269	1° overflow for A255
SL-pit	A284	alkaline cleaning	A-sump	A256	2° hot RO rinse for A255
SL-pit	A285	1° overflow for A284	A-sump	A257	surface neutralizing
SL-pit	A281	nickel acetate seal	A-sump	A270	black dye
SL-pit	A282/283	2° overflow for A279	A-sump	A231	nickel acetate seal
CR-pit	NC113	alkaline etching	A-sump	A260	DI seal
CR-pit	NC114	alkaline etching	A-sump	D708	water dispersant tank
CR-pit	NC119	hot solder mask reflow	Adds Only	D707	vapor degreaser
CR-pit	NC138 ✦	HCl chrome strip	A-sump	A209	hot water dewaxing
CR-pit	PM585 ✦	H_2CrO_4 copper strip	Adds Only	R059	Teflon dip
✧ cyanide-bearing wastewaters			✓ A-sump – anodizing department sump to IWTP		
✦ chromium-bearing wastewaters			✓ CR-pit – chromium sump to IWTP		
			✓ G-sump – general sump to IWTP		
✓ Adds Only – adds only so no discharge to IWTP			✓ SL-pit – seal pit pumped to IWTP		

Appendix 2

ChemResearch - Tank Inventory, Tank Number, and Delivery Method

Delivery ✓	Tank Designations and Contents	
Manganese Phosphating Line		
A-sump	S462	alkaline cleaning
A-sump	S463	1° countercurrent for S463
A-sump	S464	HCl acid pickling
A-sump	S465	1° countercurrent for S464
A-sump	S466	grain refining PO_4 activation
A-sump	S467	manganese phosphating
A-sump	S468	1° countercurrent for S467
A-sump	S469	2° hot overflow for S468
Adds Only	S470	oil coat
General Plating (Cyanide-Bearing) Lines		
Reclaim	PM549 ✧	cyanide-silver plating
CN-sump	PM550 ✧	1° drag-out static for PM549
Reclaim	PM551 ✧	cyanide-silver strike
CN-sump	PM552 ✧	1° spray rinse for PM551
Adds Only	PM578 ✧	cyanide-copper plating
Adds Only	PM563 ✧	cyanide-nickel/silver strip
CN-sump	PM564 ✧	1° countercurrent for PM578
CN-sump	PM583 ✧	2° hot rinse for PM578
CN-sump	PM555	anti-tarnish
CN-sump	PM553	anti-tarnish
Adds Only	PM513 ✧	cyanide-copper plating
Adds Only	PM511 ✧	cyanide-copper strike
CN-sump	PM512 ✧	1° ccurrent for PM511,513
Adds Only	PM520 ✧	cyanide-copper plating
CN-sump	PM521 ✧	1° spray rinse for PM520
CN-sump	S443	zinc phosphating
CN-sump	S444	1° countercurrent for S443
CN-sump	S445	2° overflow for S443
Adds Only	PM509 ✧	cyanide-zincate coating
CN-sump	PM510 ✧	1° countercurrent for PM509
General Plating (Non-Cyanide-Bearing) Lines		
G-sump	NDT001	1° overflow for NDT012
G-sump	NDT002	1° overflow for NDT012
G-sump	NDT003	1° overflow for NDT012

Delivery ✓	Tank Designations and Contents	
General Plating Lines		
G-sump	NDT004	1° overflow for NDT012
G-sump	NDT005	1° overflow for NDT012
G-sump	NDT012	NH_4BF/HNO_3 tungstn etch
G-sump	PM602	HNO_3 acid Cu/Ni strip
G-sump	PM595	HNO_3 acid passivation
G-sump	PM592	HNO_3 acid passivation
G-sump	PM596	alkaline neutralization
G-sump	PM501	alkaline aluminum etching
G-sump	PM502	1° ccurrent for PM501
G-sump	PM503	HNO_3/HF acid etching
G-sump	PM504	1° ccurrent for PM503
G-sump	PM505	HNO_3 acid desmut
G-sump	PM506	1° ccurrent for PM505
G-sump	PM507	HNO_3 acid etching
G-sump	PM508	1° ccurrent for PM507
G-sump	PM554	alkaline electrocleaning
G-sump	PM548	1° ccurrent for PM554
G-sump	PM556	HCl acid activation
Batch-Ni	PM557	Woods acid-nickel plating
G-sump	PM558	1° ccurrent for PM557
Batch-Ni	PM559	sulfamate-nickel plating
G-sump	PM560	1° ccurrent for PM559
G-sump	PM562	H_2SO_4/HF acid activation
G-sump	NC144 ✦	alkaline chromium strip
G-sump	NC145 ✦	1° ccurrent for NC144
G-sump	PM535	alkaline soap cleaning
G-sump	PM536	1° ccurrent for PM535
G-sump	PM539	HCl acid activation
Batch-Ni	PM540	Woods acid-nickel strike
G-sump	PM541	1° ccurrent for PM540
G-sump	PM588	HNO_3/H_3PO_4 acid bright dip
G-sump	PM538	1° drag-out for PM588
G-sump	PM570	HNO_3 acid strip
G-sump	PM571	1° overflow for PM570

✧ cyanide-bearing wastewater
✦ chromium-bearing wastewater

✓ Batch-Ni – pump to batch treat for Ni
✓ A-sump – anodizing department sump to IWTP
✓ CN-sump – cyanide sump to IWTP
✓ G-sump – general sump to IWTP
✓ Reclaim – hauled off-site for reclaim
✓ Adds Only – adds only so no discharge to IWTP

Appendix 2
ChemResearch - Tank Inventory, Tank Number, and Delivery Method

Delivery ✓	Tank Designations and Contents		Delivery ✓	Tank Designations and Contents	
Electroless Nickel Line			Special Processes Lines		
G-sump	E306	alkaline electrocleaning	SP-sump	PM555	alkaline cleaning
G-sump	E307	1° countercurrent for E306	SP-sump	PM566	1° countercurrent for E555
G-sump	E309	HCl acid activation	SP-sump	PM567	HNO_3 acid activation
Batch-Ni	E310	Woods acid-nickel strike	SP-sump	PM591	Type II H_2SO_4 anodising
G-sump	E311	1° countercurrent for E311	SP-sump	PM568	1° overflow for E591
G-sump	E312	HCl pickling	SP-sump	PM589	2° overflow for E591
G-sump	E313	1° overflow for E312	SP-sump	PM593	3° hot DI rinse for E591
G-sump	E314	e-less nickel strip	Adds Only	PM594 ✦	dichromate seal
Batch-eNi	E302	e-less nickel plating	Adds Only	A209 ✦	dichromate seal
G-sump	E303	HNO_3 acid rack strip	SP-sump	A223 ✦	1° ovrflow for PM594, A209
G-sump	E328	HNO_3 acid rack strip	Adds Only	A222 ✦	chem film coating
Batch-eNi	E327	e-less nickel plating	Adds Only	A274 ✦	clear chem film coating
G-sump	E326	1° ccurrent for e-less nickel	SP-sump	A276 ✦	1° overflow for A222, 274
G-sump	E325	1° overflow for acid strip	SP-sump	A286	anodizing strip
G-sump	S452	HF acid prep etch	SP-sump	S433	HNO_3/HF acid activation
G-sump	E345	alkaline soak cleaning	SP-sump	S434	alkaline etching
G-sump	E346	1° overflow for E345	SP-sump	S435	1° ccurrent for S434
CN-sump	E323 ✧	cyanide-zincate coating	SP-sump	S436	HNO_3/HF acid etching
CN-sump	E222 ✧	1° overflow for E323	SP-sump	S437	1° ccurrent for S436
G-sump	E340	2° final countercurrent rinse	SP-sump	S438	HNO_3 acid etching
G-sump	E341	3° final hot rinse	SP-sump	S446 ✦	zinc phosphating
Other Processes			SP-sump	S447 ✦	1° ccurrent for S446,453
G-sump	-	outdoor trench drainage	Adds Only	S453 ✦	chem film coating
SL-pit	-	wet honing washdown	SP-sump	S450	zinc phosphating
CR-pit	✦	trench drainage around IX	SP-sump	NDT001	1° overflow for dye pen
G-sump	-	lab spents and rinses	SP-sump	NDT007	1° overflow for dye pen
G-sump	-	R & D wastewaters	SP-sump	NDT009	1° overflow for dye pen
G-sump	-	scrubber blowdown bleed	SP-sump	NDT011	1° overflow for dye pen
			Adds Only	-	wax masking
✧ cyanide-bearing wastewaters			✓ Batch-eNi – pump to batch treat for e-less Ni		
✦ chromium-bearing wastewaters			✓ Batch-Ni – pump to batch treat for Ni		
			✓ CN-sump – cyanide sump to IWTP		
			✓ CR-pit – chromium pit to IWTP		
			✓ G-sump – general sump to IWTP		
			✓ SL-pit – seal pit pumped to IWTP		
			✓ SP-sump – specialty room sump to IWTP		
			✓ Adds Only – adds only so no discharge to IWTP		

Appendix 3 – Main Treated Discharges
Sewer Discharge Standards and Limits for ChemResearch @ IWD-1350.02

Pollutants of concern	Fed stds (d-max)	Fed stds (mo-avg)	nat'l pro (instant)	local lim (inst/dmax)	monitoring frequency ① discharger	city
arsenic	-	-	-	0.13	③	2/month
cadmium	0.44	0.20	-	0.047	1/six-mos	2/month
chromium	4.04	1.95	-	-	2/month	2/month
copper	3.72	1.99	-	1.5	2/month	2/month
lead	0.66	0.39	-	0.41	1/six-mos	2/month
mercury	-	-	-	0.0023	③	2/month
molybdenum	-	-	-	-	③	2/month
nickel	4.02	2.21	-	-	2/month	2/month
selenium	-	-	-	0.10	③	2/month
silver	0.66	0.32	-	1.2	2/month	2/month
zinc	3.09	1.58	-	3.5	2/month	2/month
amenable cyanide	②	②	-	-	n/a	n/a
total cyanide	1.20	0.62	-	2.0	1/six-mos	1/year
total toxic organics	2.13	-	-	-	1/six-mos ④	1/six-mos ④
benzene	-	-	-	0.035	③	1/six-mos
chloroform	-	-	-	2.0	③	1/six-mos
pesticides and PCBs	-	-	-	⑥	③	1/six-mos
BOD	-	-	-	-	③	2/month
TSS	-	-	-	-	③	2/month
TDS	-	-	-	-	③	2/month
flow (gpd)	-	-	-	100,000	2/month	n/a
pH (s.u.)	-	-	<5.0	5.0-10.5	**daily**	2/month
explosivity	-	-	<140°F ⑤	<10% LEL	③	③

① Recommended reductions in green. Recommended increases in red.
② Federal amenable cyanide standards apply only to cyanide treated flows at IWD-1350.03.
③ As part of periodic priority pollutant scans in order to identify changes in discharge quality
④ Self-certification to following an approved toxic organics management plan is allowed in lieu of sampling. A City inspection could then qualify as an independent determination.
⑤ Closed-cup flashpoint
⑥ City ordinance prohibits the introduction of these pollutants in any amount.

Appendix 3 – Internal Cyanide Treatment
Sewer Discharge Standards and Limits for ChemResearch @ IWD-1350.03

Pollutants of concern	Fed stds (d-max)	Fed stds (mo-avg)	national (instant)	local lim (inst/dmax)	monitoring frequency ① discharger	city
amenable cyanide ⑦	0.65	0.24	-	-	**2/month**	1/year
total cyanide	0.90	0.49	-	-	③	n/a

① Recommended reductions in green. Recommended increases in red.
⑦ New sources standards adjusted down ~25% to account for non-cyanide bearing dilution.

Appendix 3 - Untreated Non-Destructive Testing Discharge
Sewer Discharge Standards and Limits for ChemResearch @ IWD-1350.04

pollutants of concern	Fed stds (d-max)	Fed stds (mo-avg)	nat'l pro (instant)	local lim (inst/dmax)	monitoring frequency ① discharger	city
arsenic	-	-	-	0.13	③	③
cadmium	0.11	0.07	-	0.047	1/six-mos	1/year
chromium	2.77	1.71	-	-	1/six-mos	1/year
copper	3.38	2.07	-	1.5	1/six-mos	1/year
lead	0.69	0.43	-	0.41	1/six-mos	1/year
mercury	-	-	-	0.0023	③	③
molybdenum	-	-	-	-	③	③
nickel	3.98	2.38	-	-	1/six-mos	1/year
selenium	-	-	-	0.10	③	③
silver	0.43	0.24	-	1.2	1/six-mos	1/year
zinc	2.61	1.48	-	3.5	1/six-mos	1/year
total cyanide	1.20	0.65	-	2.0	1/six-mos	1/year
total toxic organics	2.13	-	-	-	1/six-mos ④	1/year ④
benzene	-	-	-	0.035	③	③
chloroform	-	-	-	2.0	③	③
pesticides and PCBs	-	-	-	⑤	③	③
BOD	-	-	-	-	③	③
TDS	-	-	-	-	③	③
flow (gpd)	-	-	-	n/a	1/six-mos	n/a
pH (s.u.)	-	-	<5.0	5.0-10.5	1/six-mos	1/year
explosivity	-	-	<140°F ②	<10% LEL	③	③

① Recommended reductions in green. Recommended increases in red.
② Closed-cup flashpoint
③ As part of periodic priority pollutant scans in order to identify changes in discharge quality
④ Self-certification to following an approved toxic organics management plan is allowed in lieu of sampling. A City inspection could then qualify as an independent determination.
⑤ City ordinance prohibits the introduction of these pollutants in any amount.

Appendix 4
Wastewater Discharge Quality for ChemResearch @ IWD-1350.02, 1350.03, and 1350.04

Sample Record Summary for IWD-1350.02 and IWD-1350.03 (08/01/07-09/12/09)

pollutants (µg/l)	effluent sampling results				violation rate ① ②			sample count
	mean	99th%	min	max	d-max	mo-av	instant	
arsenic	<5.0	<5.0	<5.0	<5.0	n/a	n/a	0/53	53
beryllium	<1.0	<1.0	<1.0	<3.0	n/a	n/a	0/50	50
cadmium	0.9	4.0	<1.0	6.0	0/56	0/16	0/56	56
chromium	382.1	2250.9	47	8940	**2/232**	0/23	n/a	232
copper	74.6	249.7	<20	540	0/222	0/23	0/222	222
lead	5.0	26.2	<20	40	0/57	0/16	0/57	57
mercury	<0.2	<0.2	<0.2	0.3	n/a	n/a	0/51	51
molybdenum	6.7	14.5	<5	21	n/a	n/a	n/a	53
nickel	122.5	547.9	<20	1630	0/220	0/23	0/220	220
selenium	<1.9	<1.9	<1.0	2.2	n/a	n/a	0/53	53
silver	38.1	134.4	<5	199	0/100	0/23	0/100	100
zinc	150.7	633.5	43	1760	0/100	0/23	0/100	100
total cyanide @ 1350.02	<100	<100	<10	<100	0/11	0/8	0/11	11
total cyanide @ 1350.03	37.8	309.1	<5	800	0/94	0/21	n/a	94
free cyanide @ 1350.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
total toxic organics	47.2	74.3	34.5	57.2	0/3	n/a	n/a	3
benzene	<5.0	<5.0	<5.0	<5.0	n/a	n/a	0/3	3
chloroform	28.3	52.2	17	37	n/a	n/a	0/3	3
pesticides and PCBs	<5.0	<5.0	<5.0	<5.0	n/a	n/a	0/3	3
BOD (mg/l)	18.9	68.8	2	116	n/a	n/a	n/a	39
COD (mg/l)	96.5	402.5	<50	310	n/a	n/a	n/a	39
TSS (mg/l)	13.1	60.2	<2.5	90	n/a	n/a	n/a	39
TDS (mg/l)	3391	5795	1930	5620	n/a	n/a	n/a	18
flow (gpd)	47311	70875	21345	66053	0/48	n/a	n/a	48
pH (s.u.)	7.62 min - 9.83 median - 10.41 max				-	-	0/260	260

Federal Standard Violations (07/31/07-09/12/09)

sample dates	type	sampler	point	Fed standards / local limits ①		viols	days
12/14/07	24-h	POTW	1350.02	chromium –Fed d-max	4.04 mg/l	8.94	**1**
04/10/08	24-h	IU + POTW	1350.02	chromium –Fed d-max	4.04 mg/l	7.51	**1**
Local Limit Violations (07/31/07-09/12/09)							
				all parameters			
					total days of violation		**2**

Statistical Violation Probabilities (07/31/07-09/12/09)

violation probability ①	mean (µg/l)	std dev (µg/l)	statistical probability	percent
Fed – chromium (d-max)	μ = 382.1	σ = 802.1	$\alpha(4040)$ = 0.0000	~0%

① Monthly averages calculated by calendar month of both self-monitoring and Phoenix sampling
② Fed stds for metals compared only 24-hr composite samples. Local limits to all samples.

Appendix 5 – Added to the pdf File on February 22, 2010
Corrections to the Inspection Report Provided by ChemResearch

February 9, 2010

EPA Region IX
Greg Arthur – CWA Compliance Office
75 Hawthorne Street
San Francisco, CA 94105

Re: WTR-7

Mr. Arthur,

We have reviewed the Inspection report dated 1/8/10, and have found numerous areas of incorrect information which we feel is imperative to correct. On 2/3/10, David Weed met with Deborah Swartz with the City of Phoenix to review the report and to make note of some of the City's corrections as well. Therefore, prior to ChemResearch Co., Inc. (CRC) being able to properly respond to the report we would ask that the below noted corrections be made and the Inspection report be re-issued. While many of these corrections may not necessarily change any of the findings or recommended actions, some certainly may. I have listed the items by the referenced page and section number, as well as the paragraph when necessary.

Pg 3, section 1.1, under "Other Processes":
¶1 CRC does not perform dry electrostatic painting, but rather wet solvent or water based painting.
¶2 CRC operations began in 1959, not 1950.

Pg 4, section 1.3, under "Spent Solutions":
It is correct that spent Electroless Nickel solutions are batch treated, though standard nickel solutions (electrolytic) are not batch treated but are rather fed directly into the WWTU for treatment. Depending on volume and nickel concentration, the spent solutions are either bleed-fed into the system or are drained into the system as is at one time.

Pg 5, section 1.4, under "Delivery":
¶1 Chromium plating bath spents are not drained to a pit then pumped to the IX unit, but rather are transferred by hard plumbing from the plating tanks to one of two holding tanks in the back room which feed the IX unit.
¶2 Specialty Sump should be renamed Special Processes Sump, and is a chromium-bearing wastewater stream.

Pg 5, section 1.5"
The City of Phx. does not perform monthly site sampling, but rather quarterly, at a minimum. CRC does submit self-monitoring reports to the City each month, per permit requirement.

Pg 6, section 1.7, photo #2:
Photo shows the Anodize sump pit basket strainers for the two sump pumps, not the Cr IX canisters (no photo was submitted in the report showing the Cr IX system).

Pg 11, section 2.5, under "Cyanide Standards":
Final sentence states there are 2 non-cyanide rinses being comingled with the cyanide rinses, when in fact there is only 1 non-cyanide rinse that is plumbed into the cyanide waste stream. If necessary, this rinse line could be re-piped to feed to the General Waste sump instead.

Appendix 5 (continued)
Corrections to the Inspection Report Provided by ChemResearch

Pg 12, section 2.5, under "Cyanide Standards":
Note that our chemfilms do not contain Ferro-cyanides.
Pg 12, section 2.5, under "Toxic Organics Standards":
CRC does not monitor for TTO's, but rather Certifies as part of its monthly SMR to the City.
Pg 20, Appendix 1, under "Cr Plate/Anodize Line":
Recommend re-titling as "Cr Plate/TI Anodize Line" to avoid confusion as to the kind of Anodize process taking place in that room.
Non-chrome spents do not go to the Chrome pit, but rather to the Seal pit.
Non-seal rinses do not go to the Chrome pit (unless this is referring to the chrome rinses – which is not listed as such), but rather to the Seal pit.
As a rule in this process room, if the spents/rinses contain chrome as a product or contaminate then it goes to the chrome pit, if it does not contain chrome then it goes to the Seal pit.
Pg 20, Appendix 1, under "General Plating Line":
Zinc Phosphate spents are pumped to General sump, not cyanide sump (though Zinc Phos rinse does presently go to the cyanide sump).
Anti-tarnish spents are dumped to the General sump, not cyanide sump (very infrequent – about every 5 yrs).
There are no rinses for the Anti-tarnish tanks as it is a final step prior to drying.
Nickel Plating spents go to General sump, not batch treatment, as previously noted above.
Pg 20, Appendix 1, under "E-less Nickel Plate Line":
Nickel Plating spents go to General sump, not batch treatment, as previously noted above.
Pg 22, Appendix 2, under "General Plating (Cyanide-bearing) Lines":
PM583 does not go to the CN-sump, but is hard-piped over to the G-sump.
S443 does not go to the CN-sump, but rather to the G-sump.
Pg 22, Appendix 2, under "General Plating (Non-Cyanide-bearing) Lines":
PM540, PM557, and PM559 do not go to Batch-Ni, but rather into G-sump.
NC144 does not go to G-sump, but rather to the Cr pit.
NC145 does not go to G-sump, but is hard-piped to the Cr pit in the adjoining department.
Pg 23, Appendix 2, under "Special Processes Lines":
S446 should be renamed Zinc phosphate chromate seal; it is not a zinc phosphate tank.
S450 was relocated to General Plating Line on the G-sump side of the room, in Nov. 2009.
Pg 24, Appendix 3:
As previously noted, City monitoring frequency is not monthly, but typically quarterly.

For the most part I believe we have noted each area where an incorrect fact is referenced (i.e. Ni-Batch), but we would ask that EPA review the revised document in its entirety and make any other necessary changes based upon the informational changes. These changes may alter the current recommendations or requirements, which will then allow CRC to properly and fully respond accordingly.

Sincerely,

David Weed
Director Regulatory Affairs & Facilities
ChemResearch Co., Inc.