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

June 24, 2009

In Reply Refer To: WTR-7

Andrew Gerrick, Chief Engineer
ASTECH Engineered Products, Inc.
3030 Red Hill Avenue
Santa Ana, California 92705-5866

Re: September 11, 2008 Clean Water Act Inspection

Dear Mr. Gerrick:

Enclosed is the June 24, 2009 report for our September 11, 2008 inspection of ASTECH Engineered Products, Inc. Please submit a short response to the findings in Sections 2 through 5 of this report, to EPA, the Orange County Sanitation Districts, and the Regional Water Quality Control Board, by **August 30, 2009**. The main findings are summarized below:

1 ASTECH qualifies as a new source titanium former and metal finisher regulated under the Federal regulations in 40 CFR 433 and 40 CFR 471F. The standards advanced in this report differ somewhat from the OCSD permit limits with most of the differences a result of lower flow rates assigned to titanium forming.

2 On-site treatment and flow reductions likely are not equivalent in performance to the models used in setting the Federal standards. Discharge is also dominated by single-pass cooling water. For these and other reasons, sampling has nearly always exceeded Federal standards for ammonia, fluoride, and silver. Remedies should involve reduced flow from ribbon forming and cleaning, dedicated treatment and alternate sampling for ammonia and fluoride, and the elimination of silver-bearing x-ray film development discharges.

3 The self-monitoring is representative over the sampling day and six-month reporting period. It could be reduced for those pollutants always at or near their detection limits.

I appreciate your helpfulness extended to me during this inspection. I remain available to the Orange County Sanitation Districts, 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,

Greg V. Arthur
CWA Compliance Office

Enclosure

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

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION 9

CLEAN WATER ACT COMPLIANCE OFFICE

NPDES COMPLIANCE EVALUATION INSPECTION REPORT

Industrial User:	ASTECH Engineered Products, Bldg 3030 3030 Red Hill Avenue, Santa Ana, California 92705-5866 New Source Metal Finisher (40 CFR 433) New Source Titanium Former (40 CFR 471 Subpart F)
Treatment Works:	Orange County Sanitation Districts Fountain Valley Wastewater Treatment Plant No.1 and Huntington Beach Wastewater Treatment Plant No.2 NPDES Permit CA0110604 - California WDRs R8-2004-0062
Pretreatment Program:	Orange County Sanitation Districts
Date of Inspection:	September 11, 2008

Inspection Participants:

US EPA:	Greg V. Arthur, Region 9, CWA Compliance Office, (415) 972-3504
RWQCB-Los Angeles:	None
Orange County SD:	Roya Sohanaki, Engineer, (714) 593-9437 Dustin Lee, Source Control Inspector, (714) 593-7425
ASTECH:	Andrew Gerrick, Chief Engineer, (949) 250-2165 James Riley, Operations and Facilities Manager, (949) 250-2159 Julian Medina, Envr Affairs Manager, (619) 258-5069 Andrew Keisic, Production Supervisor

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Report Prepared By:	Greg V. Arthur, Environmental Engineer June 24, 2009

1.0 Scope and Purpose

On September 11, 2008, EPA and the Orange County Sanitation Districts (OCSD) conducted a compliance evaluation inspection of the ASTECH Engineered Products, 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.

This inspection covered only ASTECH Bldg 3030, which is a significant industrial user ("SIU") within sewer service areas administered by the OCSD. The inspection participants are listed on the title page. Arthur conducted this inspection on September 12, 2008.

1.1 Process Description

ASTECH is a subsidiary of the GKN Aerospace Chem-tronics Company. ASTECH makes honeycomb paneling from titanium (30%), inconel (20%), and steel (50%), for use in high-strength, lightweight, noise-suppression structures in aerospace and marine applications. The manufacturing involves corrugated ribbon production, face sheet preparation, strip welding, and cleaning. The honeycomb panels are then fabricated into structures and parts. The main fabrication work is done in Bldg 3030 on Red Hill Avenue in Santa Ana. Heat treatment is done in Bldg 1900, a block away on East Deere Street. Operations began in 2000.

- Ribbon Production - The steps involved in making the corrugation within the panels include cold rolling with lubrication to thickness, slit cutting into ribbon, alkaline strip cleaning, annealing, acid pickling (HF/HNO_3), and press stamping the corrugation.

- Face Sheet Production - Fabrication of the bottom face sheet involves shearing metal sheet, hole-punched perforating, alkaline cleaning, welding, sand deburring, final alkaline cleaning, and flash acid pickling (HF/HNO_3). Fabrication of the top face sheets involves the same steps except without hole perforating and the subsequent deburring steps.

- Honeycomb Structure Fabrications - Fabrication involves the production of electrodes conforming to the shape of corrugated ribbon, for the resistence welding of the ribbon to the bottom face sheets, followed by the welding on of the top face sheet. The honeycomb panels are then alkaline cleaned, cut, machined, welded and formed to fabrication shape, and non-destructive tested (x-ray, magnaflux, dye penetrant).

1.2 Facility SIC Code

ASTECH Bldg 3030 is assigned the SIC code for aircraft parts and auxiliary equipment (SIC 3728), fabricated structural metal (SIC 3441), and metals coating (SIC 3479).

1.3 Facility Wastewater Sources

The rolling, forming, perforation, cleaning, annealing, welding, fabrication, and testing steps generate spents, rinses, cooling waters, blowdown, and residuals. A single non-domestic connection to the sewers receives (1) process-related wastewaters circulated through treatment and (2) untreated cooling waters and non-destructive test waters.

Ribbon Rolling – The cold rolling involves thinning of metal strips from 0.018" down to 0.003-0.007" ribbon. The cold rolling does not form scale but does involve neat oil lubrication. Rolling does not generate a wastewater or spent waste stream. However, lubricant is lost as drag-out on the ribbon. See Photo #1 in Section 1.7 on page 5 of this report.

Ribbon Cleaning and Forming – The rolled ribbon is pulled through alkaline can washing, annealing, and pickling can washing. The can washers involve solution sprays followed by 2-stage countercurrent spray rinses. Spent solutions are hauled off-site as hazardous with emergency overflows to the floor drains. The first-stage sprays overflow to floor drains. The annealing oven non-contact cooling water circulates through a cooling tower without a bleed but with an emergency overflow to the floor drains. The ribbon is slit and the strips stamped into corrugation without generating wastewaters. See Photo #2 in Section 1.7 on page 5.

Panel Fabrication – Face sheets are sheered to size, hole-punch perforated, sand deburred, and can washed. Single-pass weld cooling waters discharge to floor drains. The parts can washer involves two alkaline sprays followed by a spray rinse, and a flash pickling spray followed by a 2-stage spray rinse. The alkaline and pickling spents are hauled off-site as hazardous. The spray rinses overflow to a floor drain. The corrugated strips are resistance welded to the bottom face sheets using welding electrodes fabricated on-site to conform to shape. The top face sheets are welded to form honeycomb panels. The panels are alkaline cleaned, with spents and rinses treated through an evaporation unit and the resulting slurries off-hauled for non-hazardous disposal. See Photos #3 and #4 in Section 1.7 on page 5.

New Finish Cleaning Line – A new line involves spray alkaline cleaning and hydrofluoric/ nitric-acid pickling. Each step is followed by a DI-spray low-overflow rinse, with a final air knife and down-draft fume scrubber. The new finish cleaning line, surrounded by secondary containment curbing, drains rinses through a single outlet to a floor drain. Fume scrubber blowdown outlets into the new finish cleaning line secondary containment area which has a floor drain apparently sited under the line. See Photos #5 and #6 in Section 1.7 on page 6.

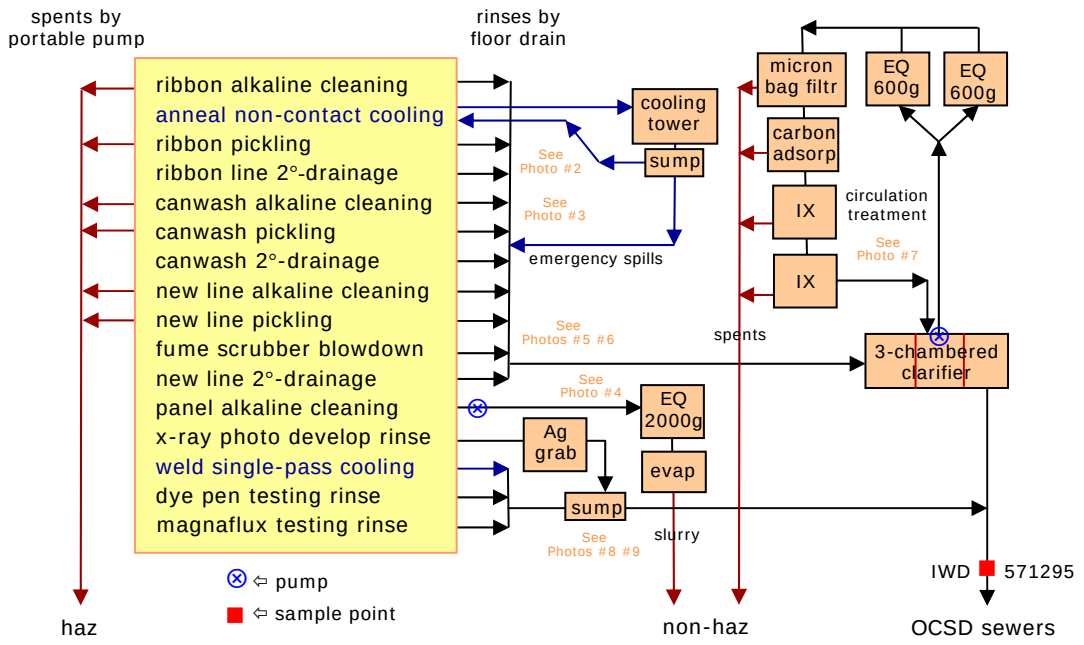
Non-Destructive Testing – Rinses from x-ray developing and from dye penetrant and magnaflux testing drains to a sump into the floor drain system. The photo developing rinses first pass through silver recovery cartridges. See Photos #8 and #9 in Section 1.7 on page 6.

1.4 Facility Process Wastewater Handling

Discharge - Treated and untreated process wastewaters discharge to the sewers through a single connection located in the industrial wastewater treatment area within the facility. The OCSD permit identifies the sewer sampling point as a clean-out stand pipe in the "parking lot

adjacent to the guard shack". This compliance sample point is designated as IWD-571295 for the purposes of this report. The OCSD permit lists the average discharge flow as 26,000 gallons per day. Effluent metering averaged 28,845 gpd since 2005. Domestic sewage discharges through separate connections downstream.

Figure 1.4
ASTECH Bldg 3030 - Configuration and Layout



Composition - The process-related wastewaters listed in section 1.3 above would be expected to contain copper, fluoride, nickel, zinc, and acidity, as well as oily lubrication cleaned off of ribbon and other parts, and the minerals entrained in the water supply.

Delivery – Most cleaning and finishing rinses and blowdowns discharge by gravity to floor drains for delivery to a three-stage clarifier. The weld cooling waters and non-destructive testing rinses discharge by gravity to a sump for delivery to the sewers downstream of the three-stage clarifier. Spents are delivered to off-site hauling is by portable pump and hosing.

Treatment – ASTECH provides limited treatment of most cleaning and finishing related wastewaters through carbon adsorption and ion exchange. The flows are skimmed from and circulated back to the second chamber of the final clarifier. ASTECH also evaporates the cleaning related wastewaters from panel cleaning and provides silver recovery of x-ray film development rinses. See Photos #4 and #7 in Section 1.7 on pages 5 and 6.

1.5 POTW Legal Authorities

Orange County Sanitation Districts - OCSD administers the pretreatment program in sewer districts serviced by the OCSD Fountain Valley wastewater treatment plant. This facility

operates under the requirements of the State of California, Santa Ana RWQCB's Waste Discharge Requirements, R8-2004-0062, issued in 2004. The WDRs, which also function as NPDES permit No. CA0110604, require the implementation of an approved pretreatment program throughout the sewer service area. Under this authority, on June 1, 2008, OCSD issued permit No.57-1-295 authorizing the discharge of non-domestic wastewater the sewers.

1.6 Sampling Record

ASTECH self-monitors for metals quarterly, and cyanide and toxic organics semi-annually as required by the OCSD permit. OCSD also collects its own samples at the same frequency.

1.7 Photo Documentation

Nine of the thirteen photographs taken during this inspection are depicted below and saved as *astech-1.jpg through -09.jpg (*1,2,3a,3b,4a,4b,5,6a,6b,7a,7b,8,9*).*

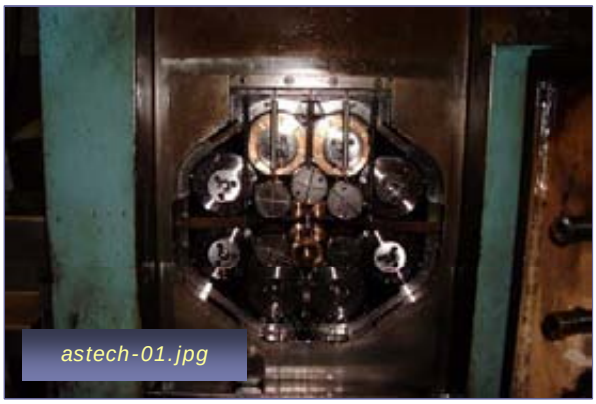


Photo #1: Ribbon Cold Rolling with Neat Oil
Taken By: Greg V. Arthur
Date: 09/12/08

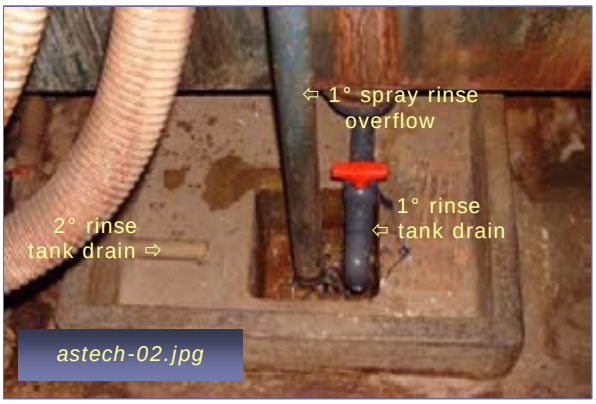


Photo #2: Floor Drain for Ribbon Pickling
Taken By: Greg V. Arthur
Date: 09/12/08

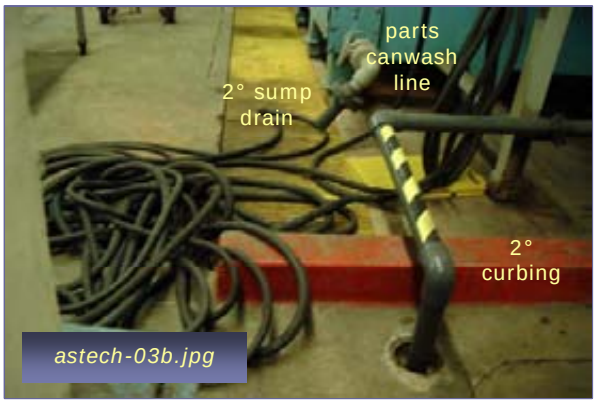


Photo #3: Floor Drain for Parts Canwasher
Taken By: Greg V. Arthur
Date: 09/12/08

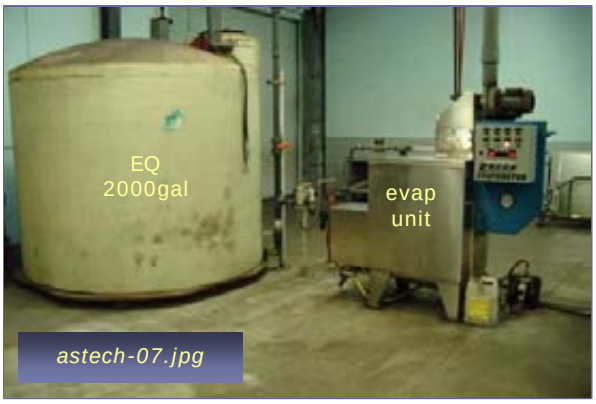


Photo #4: Panel Cleaning Wastewater Evap Unit
Taken By: Greg V. Arthur
Date: 09/12/08

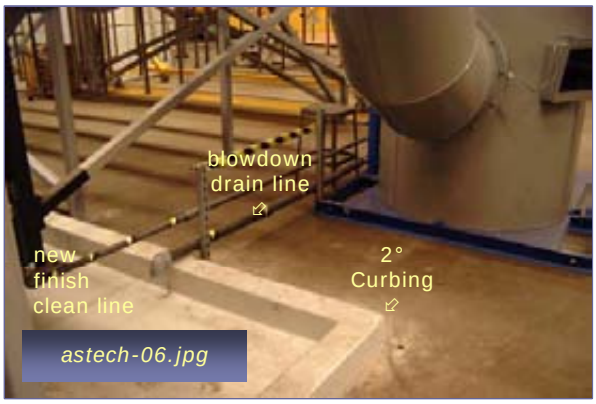


Photo #5: Fume Scrubber Blowdown
Taken By: Greg V. Arthur
Date: 09/12/08

Photo #6: Floor Drain for New Finish Clean Line
Taken By: Greg V. Arthur
Date: 09/12/08

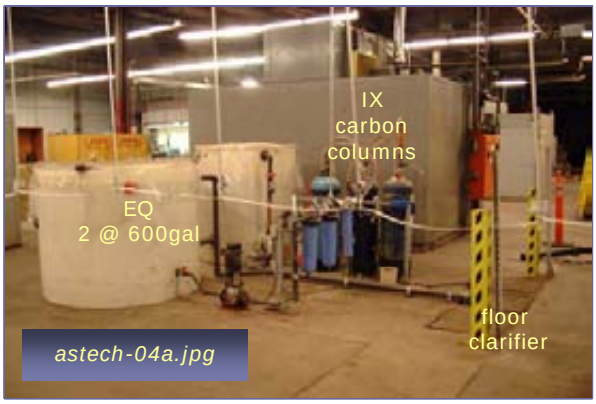


Photo #7: Skimming Pretreatment Plant
Taken By: Greg V. Arthur
Date: 09/12/08

Photo #8: Dye Penetrant Rinses into Sump
Taken By: Greg V. Arthur
Date: 09/12/08

Photo #9: X-ray Developer Rinses into Sump
Taken By: Greg V. Arthur
Date: 09/12/08

2.0 Sewer Discharge Standards and Limits

Federal categorical pretreatment standards (where they exist), national prohibitions, State groundwater reclaim and 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 new source standards in 40 CFR 433 for metal finishers and in 40 CFR 471 subpart F for titanium formers apply to all contact process wastewater discharges from ASTECH Bldg 3030 through IWD-571295. The standards advanced in this report differ somewhat from the permit limits. However, for the most part, the OCSD permit correctly advances the application of the Federal standards and local limits. The application of Federal standards, national prohibitions, and local limits was determined through visual inspection. See Appendix 1 on page 20-23 of this report for the permit limits and example calculations.

Requirements

- The combined Federal standards must be re-calculated.

Recommendations

- The OCSD permit should refer to an approved toxic organics management plan in order to exempt or partially exempt ASTECH Bldg 3030 from toxic organics self-monitoring.

2.1 Classification by Federal Point Source Category

ASTECH Bldg 3030 qualifies as a new source metal finisher and titanium former subject to the Federal standards in 40 CFR 433 and 40 CFR 471 Subpart F.

Table 2.1
ASTECH Bldg 3030 Waste Streams by Federal Point Source Category

✓	ribbon alkaline cleaning rinse	471F/433	✓	new line alk cleaning rinse	433
	ribbon alkaline cleaning spent	471F/433		new line alk cleaning spent	433
✓	anneal non-contact cool spills	unreg	✓	new line pickling rinse	433
✓	ribbon pickling rinse	471F/433		new line pickling spent	433
	ribbon pickling spent	471F/433	✓	new line fume scrub blowdown	433
✓	ribbon canwash drainage	471F/433	✓	new line drainage	433
✓	parts canwash alk cleaning rinse	433	✓	weld single-pass cooling	unreg
	parts canwash alk clean spent	433		panel cleaning station slurry	433
✓	parts canwash pickling rinses	433	✓	x-ray developer rinse	433
	parts canwash pickling spent	433	✓	dye penetrant testing rinse	433
✓	parts canwash drainage	433	✓	magnaflux testing rinse	433

✓ Waste streams that discharge to the sewers through IWD-571295

New or Existing Sources – ASTECH Bldg 3030 is subject to Federal standards for new sources. Under the definitions in 40 CFR 403.3(k), a metal finishing process after August 31, 1982 and a titanium forming process after August 23, 1985 are new sources (1) if they entirely replace processes which caused a discharge from existing sources or (2) if they are substantially independent of the existing sources on-site. This means that after the 1982 and 1985 deadlines, new source standards apply to the original installations of metal finishing and titanium forming lines, rebuilt or moved lines, or existing lines converted to do new operations. The preamble to the final 1988 Federal rule states that the new source standards apply when "an existing source undertakes major construction that legitimately provides it with the opportunity to install the best and most efficient production process and wastewater treatment technologies" (*Fed Register, Vol.53, No.200, October 17, 1988, p.40601*). The metal finishing and titanium forming operations at ASTECH Bldg 3030 qualify as new sources because operations began in 2000.

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 its service area.

2.3 Federal Categorical Pretreatment Standards New Source Titanium Forming - 40 CFR 471.65

Production-based Standards (mg/off-kg)		CN	Pb	Zn	NH_4	F	TTO
40 CFR 471.65(n) surface treatment rinses	daily-maximum	0.847	1.23	4.27	389	174	-
	month-average	0.351	0.584	1.78	171	77.1	-
40 CFR 471.65(q) alkaline cleaning rinses	daily-maximum	0.080	0.116	0.403	36.8	16.4	-
	month-average	0.033	0.055	0.169	16.2	7.29	-
40 CFR 471.65(x) miscellaneous wastewaters	daily-maximum	0.010	0.014	0.048	4.32	1.93	-
	month-average	0.004	0.007	0.020	1.90	0.856	-
40 CFR 471.65(a) rolling spent lubricant	narrative prohibition	No discharge of process wastewater pollutants.					

Applicability - Under 40 CFR 471.60, titanium forming standards in 40 CFR 471.65 for new source titanium forming apply to specific waste streams from certain titanium forming process operations. The specific regulated waste streams are (a) rolling spent neat oils, (b) rolling contact cooling water, (c) drawing spent neat oils, (d) extrusion spent neat oils, (e) extrusion spent emulsions, (f) extrusion press hydraulic fluid leakage, (g) forging spent

lubricants, (h) forging contact cooling water, (i) forging equipment cleaning wastewater, (j) forging press hydraulic fluid leakage, (k) tube reducing spent lubricants, (l) heat treatment contact cooling water, (m) surface treatment spent baths, (n) surface treatment rinse, (o) wet air pollution control scrubber blowdown, (p) alkaline cleaning spent baths, (q) alkaline cleaning rinse, (r) molten salt rinse, (s) tumbling wastewater, (t) sawing or grinding neat oils, (u) sawing or grinding spent emulsions, (v) sawing or grinding contact cooling water, (w) dye penetrant test waters, (x) miscellaneous wastewaters, and (y) degreasing spent solvents.

For ASTECH Bldg 3030, the rolling process to thin ribbon qualifies for Federal regulation those waste streams that are (1) generated and discharged on-site, (2) associated with titanium rolling, and (3) specifically listed as regulated in 40 CFR 471.65. The waste streams at ASTECH associated with titanium forming are those generated by the rolling process and the associated ribbon can washing, but only when involving titanium. All subsequent steps use the formed strips of titanium and other metals in the fabrication of the honeycomb panels and structures and thus are not be considered part of titanium forming. As a result, the titanium forming rules apply to the discharges of ribbon can wash alkaline rinses, can wash pickling rinses, and miscellaneous ribbon forming drainages, but not to the wastewaters which are not discharged (rolling spent lubricants, can wash spents).

Production Rate - The March 31, 2008 OCSD permit application technical review listed the average production rate for titanium forming, as submitted by ASTECH, to be 60 lbs/day. During this inspection, ASTECH confirmed this rate as <100 lbs/day of formed titanium.

Regulated Flow Rate – The March 31, 2008 OCSD permit application technical review listed the average flow rate from titanium forming to be 3,120 gpd and from metal finishing to be 2,080 gpd. However, the titanium forming flows are limited to the portion of wastewater generated by the ribbon can washing steps when processing titanium. EPA proposes that a defensible estimate based on production rates, would be 936 gpd, or ~30% of the total ribbon can washing flows since titanium accounts for 30% of the metals undergoing ribbon forming.

Basis of the Standards - The new source titanium forming standards were based on (1) model best-available-technology treatment comprising ammonia steam stripping, lime precipitation, and settling, and (2) model flow reductions using two-stage counter current cascade rinsing resulting in 66.3 gal/ton alkaline cleaning rinses, 700 gal/ton surface treatment rinses, and 7.8 gal/ton for miscellaneous flows. Model rinsing, servicing 60 lbs/day of formed titanium, would be expected to generate a discharge flow rate of 23.2 gal/day, far less than listed in the permit application technical review. The Federal standards were set where titanium formers with model treatment and model flow reductions operated at a long-term average and variability that achieved a compliance rate of 99% (1 in 100 chance of violation).

Adjustments – There are no adjustments specific to the titanium forming rule. Under 40 CFR 403.6(e), combined standards must be calculated since the metal finishing discharges are combined with both other Federally-regulated flows and unregulated non-contact dilution waters. See Section 2.6 on page 11 for adjustments to the combined standards.

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

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

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

Applicability – Under 40 CFR 433.10(a), the metal finishing standards apply because the operations involve acid pickling, which is a form of etching. The metal finishing standards "... apply to plants that perform ..." the core operations of electroplating, electroless plating, etching, chemical coating, anodizing, or printed circuit board manufacturing, and they extend to other on-site operations associated with metal finishing listed in 40 CFR 433.10(a), such as cleaning, machining, polishing, heat treating, welding, shearing, assembly, deburring, calibration, and testing. If any of the core operations are performed, new source metal finishing standards apply to discharges from the core and associated operations. However, under 40 CFR 433.10(b), the metal finishing standards do not apply to wastewaters that qualify for regulation under any other Federal standards. As a result, the metal finishing standards apply to all process wastewater discharges through IWD-571295, except titanium forming wastewaters regulated under 40 CFR 471.65, and non-contact cooling water unregulated under any Federal regulation.

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 – Under 40 CFR 433.12(c), cyanide standards, by default, do not need adjustment to account for dilution since there are no cyanide-bearing waste streams. Under 40 CFR 433.12, facilities with an approved toxic organics management plan may certify instead of sample. The OCSD permit requires self-monitoring for EPA 624 volatile organics but does not refer to an approved toxic organics management plan that exempts self-monitoring for all of the other toxic organics listed in 40 CFR 433.11(e). Under 40 CFR 403.6(e), combined standards must be calculated since the metal finishing discharges are combined with both other Federally-regulated flows and unregulated non-contact dilution waters. See Section 2.6 on page 11 for adjustments to the combined standards.

Regulated Flow Rate – The March 31, 2008 OCSD permit application technical review listed the average flow rate from titanium forming to be 3,120 gpd and from metal finishing to be 2,080 gpd. However, the titanium forming flows are limited to the portion of wastewater generated by ribbon can washing when processing titanium. EPA proposes that a defensible estimate for metal finishing, based on titanium production rates, would be 4,264 gpd – based on 2,184 gpd which is ~70% of 3,120 gpd since steel and inconel account for 70% of the ribbon forming, plus 2,080 gpd from the subsequent steps.

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

2.5 Point(s) of Compliance

The permit identifies the clean out / stand pipe in the parking lot adjacent to the guard shack as the location of the secured sampling point, designated in this report as IWD-571295.

Federal Standards - Federal categorical pretreatment standards for metals, ammonia, fluoride, and cyanide apply end-of-process-after-treatment to all Federally-regulated discharges to the sewers. The sample point IWD-571295 is a suitable end-of-process-after-treatment sample point representative of the day-to-day discharge of Federally-regulated wastewaters from ASTECH Bldg 3030 for all Federally-regulated parameters.

Local Limits - Local limits and the national prohibitions apply end-of-pipe to non-domestic flows. The sample point designated as IWD-571295 is a suitable end-of-pipe sample point representative of the day-to-day non-domestic discharges from ASTECH Bldg 3030.

2.6 Combined Federal Standards

The Federal standards for metal finishing and titanium are combined following treatment to apply to IWD-571295 using the combined wastestream formula for alternate mass limits in 40 CFR 403.6(e). See the example calculations in Appendix 1 on pages 21-23.

Titanium Forming - For the pollutants regulated under 40 CFR 471.65, mass allocations based on a 60 lbs/day production rate, are applied to just three discharging operations associated with ribbon forming operations: (1) alkaline cleaning rinses for ribbon cleaning, (2) surface treatment rinses for ribbon pickling, and (3) miscellaneous wastewaters. Non-discharging operations, not calculated into the mass allocations, include alkaline cleaning spents, surface treatment spents, panel cleaning slurry, and sawing and grinding spents. Non-associated operations, also not calculated into the mass allocations, include the parts can washing alkaline cleaning spents and rinses, parts can washing pickling spents and rinses, dye penetrant testing wash down, and fume scrubber blowdown.

Metal Finishing – For the pollutants regulated under 40 CFR 433, mass-based loadings were applied to all process-related wastewaters except non-contact dilution streams (annealing cooling bleed and welding single-pass cooling). The mass-based loadings were derived by multiplying the standards in 40 CFR 433.17 times the regulated flow rate.

Regulated Flow Rates – For titanium forming, the regulated flows were set at 936 gpd, which is 30% of the 3,120 gpd listed in the OCSD permit application technical review, based on an estimate that ribbon production is 30% titanium. For metal finishing, the regulated flows were set at 4,264 gpd, which is the remaining 70% of the 3,120 gpd plus the 2,080 gpd listed in the OCSD permit application technical review for subsequent steps. Non-contact dilution waters were listed as 15,500 gpd in the OCSD permit application technical review. The combined standards are most sensitive to the proportion of dilution waters. The combined standards at IWD-571295 would rise significantly in concentration with decreases in the amount of single-pass cooling water. The standards for ammonia and fluoride would rise in concentration with decreases in amount of ribbon cleaning and pickling waters.

2.7 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 OCSD permit prohibits bypassing (Permit Part 2.II.A.2), and references a provision against dilution as a substitute for treatment (Permit Part 3.I.B).

2.8 Compliance Sampling

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 replaced with single grabs or manually-composited grabs that are representative of the sampling day's discharge. The OCSD permit establishes these sampling protocols by specifying the type of sampling required by parameter (Permit Attachment A). See Section 5.0 of this report on page 19 and Appendix 1 on page 20.

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).

Sample results from ASTECH Bldg 3030 nearly always exceeded Federal standards for ammonia, fluoride, and silver. On-site treatment and flow reductions are less than equivalent in performance to the BAT models used in setting the standards. Sampling is also dominated by single-pass cooling waters which make the sample results less useful for determining compliance. For these and other reasons, the current treatment and flow reductions would not be expected to result in consistent compliance with Federal standards. See Appendices 2 and 3 on pages 24 and 25 for summaries of the sampling record and permit violations.

Requirements

- The discharge of ammonia, fluoride, and silver to the sewers must be reduced.

Recommendations

- Separate Federal sampling points should be established for ammonia and fluoride following treatment, and for metals and cyanide from all remaining regulated wastewaters.

- The principle silver-bearing wastewaters from x-ray film development should be directed through evaporation or hauled off-site in order to eliminate its discharge to the sewer.

3.1 Sampling Results

The 2005-2009 sample record for ASTECH Bldg 3030 consists of both self-monitoring and OCSD sampling, collected quarterly for ammonia, fluoride and metals, and semi-annually for cyanide and toxic organics. All fluoride and metals samples, and ammonia self-monitoring were 24-hour composites. All cyanide and toxic organics samples, and OCSD ammonia samples were grabs. See Appendix 2 on page 24 for a summary of the compliance sampling.

3.2 Best-Available-Technology Treatment and Flow Reductions

For three principle reasons, the design and operation of the treatment on-site and the flow reductions involved in the operations would not be expected to result in consistent compliance with the Federal standards. First, although ASTECH employs ion exchange treatment that may be equivalent in performance to the BAT models, the removal of metals, fluoride,

and ammonia is likely to be less than equivalent (1) because the treatment is operated to skim and circulate to and from the final clarifier, and (2) not all regulated wastewaters discharge through the final clarifier to the sewers. Second, ASTECH generates more titanium forming wastewaters than the 23 gpd model baseline expected from rolling 60 lbs/day of titanium. Third, the sample results for IWD-571295 are dominated by unregulated single-pass cooling water, rendering them less useful in determining compliance. Significant improvements (+) and deficiencies (-) on the BAT model treatment and flow reductions are listed below.

+ Evaporation of panel cleaning wastewaters eliminates discharge.
+ The cascading rinses produce wastewaters consistent in quantity and quality.
+ Good equalization prior to the ion exchange treatment.
+ Good secondary containment of tanks, hard-piping, delivery sumps, and treatment.
- Skimming treatment may not ensure treatment of all flows through the final clarifier.
- Sampling for Federal standards is of highly diluted wastewaters.
- Skimming treatment does not specifically treat for ammonia or fluoride.
- Silver cementation removal is not as efficient as model metals precipitation and settling.

As a result, over the past four fiscal years beginning in July 2005, ASTECH Bldg 3030 has not achieved consistent compliance with all Federal standards. The samples nearly always exceeded standards for ammonia, fluoride, and silver, resulting in calculated average and 99th% peak concentrations of 3.22 and 10.18 mg/l ammonia, 7.68 and 29.11 mg/l fluoride, and 0.116 and 0.460 mg/l silver. A single sample exceeded the chromium standards, resulting in average and 99th% peaks of 0.109 and 0.501 mg/l. Samples for the other regulated pollutants always met standards with average and 99th% peaks of <0.007 mg/l cadmium, 0.059 and 0.196 mg/l copper, <0.020 mg/l lead, 0.080 and 0.304 mg/l nickel, 0.042 and 0.088 mg/l zinc, <0.020 mg/l total cyanide, and <0.010 mg/l total toxic organics.

- Ammonia and Fluoride – The statistical probability of violating Federal ammonia and fluoride standards was ~100% per sampling month and sampling event. There are many reasons. First, the mass allocations based on production rate are both small and diluted by higher than model flows, resulting in very low concentration limits. Second, the final sample point includes unregulated single-pass cooling waters which further reduce the concentration limits. Third, the titanium forming wastewaters do not undergo model treatment through stream stripping and lime precipitation, although they may be indirectly treated through activated carbon and ion exchange to an undetermined degree.

- Total Cyanide and Toxic Organics – The statistical probabilities of violating the Federal standards for toxic organics and total cyanide are essentially 0% per sample.

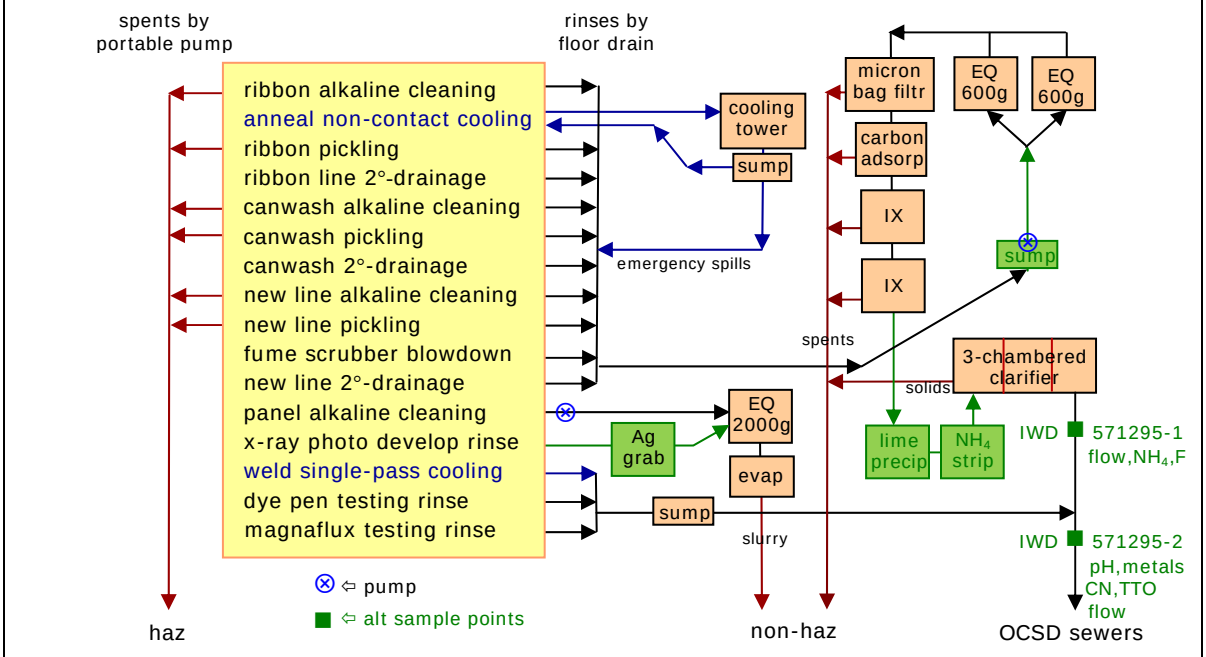
- Silver – The statistical probability of violating the Federal silver standards for ammonia is greater than 50% per sampling month and sampling event. The only obvious source of silver would be wash waters from x-ray film development.

- Other Metals – The statistical probability of violating the Federal standards for the metals other than silver falls between 0 and 2% per sampling event and sampling month. One sample out of 25 resulted in violations for chromium. These sampling results indicate nearly consistent compliance with the Federal standards for the metals other than silver.

3.3 Alternate Sample Points and Federal Standards

An alternate Federal sampling point for ammonia and fluoride would allow compliance (1) to be reached through a combination of treatment and reduced flows from the ribbon forming and can washing steps, and (2) to be determined through sampling. The ammonia and fluoride standards advanced in this inspection report to apply after treatment at IWD-571295-1 are based on titanium forming flow rates of 936 gpd. A 50% drop to 468 gpd would double the concentration limits making it more possible to comply through treatment. A drop to the 100 gpd baseline would increase the concentration limits by a factor of 10.

Figure 3.3
ASTECH Bldg 3030 – Alternate Sample Points, Treatment, and Standards



Alt Sample Points	@ IWD-571295-1		@ IWD-571295-2			
Federal standards (mg/l)	Fed stds d-max	Fed stds mo-avg	Fed stds d-max	Fed stds mo-avg	monitoring frequency discharger	district
flow (gpd)	n/s	-	n/s	-	quarterly	quarterly
ammonia	3.311	1.457	-	-	quarterly	quarterly
cadmium	-	-	0.028	0.018	1/six-mos	1/year
chromium	-	-	0.696	0.430	quarterly	quarterly
copper	-	-	0.849	0.520	1/six-mos	1/year
fluoride	1.481	0.657	-	-	quarterly	quarterly
lead	-	-	0.143	0.089	1/six-mos	1/year
nickel	-	-	0.999	0.598	1/six-mos	1/year
silver	-	-	0.108	0.060	quarterly	quarterly
zinc	-	-	0.539	0.306	1/six-mos	1/year
cyanide - total	-	-	0.248	0.134	1/year	1/six-mos
total toxic organics	-	-	0.535	-	1/year	1/six-mos

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. This prohibition applies when sample results for a diluted waste stream are below the Federal standards and the apparent compliance is used to justify untreated discharge. Two conditions need to be established in order to make a determination of non-compliance. First, some or all of the Federally-regulated wastewaters must discharge without undergoing BAT model treatment or its equivalent. Second, there must be excess water usage within the regulated process.

There is no evidence of dilution as a substitute for treatment since ASTECH Bldg 3030 does not meet both conditions of non-compliance. The first condition is met since all Federal regulated waters do not discharge through BAT model treatment. However, the second condition is not met since there were no excess Federally-regulated discharges observed (*for example, rinses discharging irrespective to parts processing*). Dilution from unregulated single-pass cooling waters and cooling tower bleeds does not constitute dilution as a substitute for treatment since the combined Federal standards, calculated with the combined wastestream formula, are thereby proportionally reduced to account for this dilution. See Section 2.6 on page 11 of this report.

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.

There were no observed methods of bypassing at ASTECH Bldg 3030. In particular, the delivery of all waste streams was observed to lead treatment and discharge through the permitted sample point.

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 ASTECH Bldg 3030 has always complied with its local limits for metals, cyanide, and organics. There were no sample results reported for pH, and oil and grease, although given the high volume of unregulated dilution waters, both would be expected to also result in consistent compliance at IWD-571295. All Federal standards are more stringent than the local limits. As a result, the efforts to establish consistent compliance with the Federal standards would further ensure consistent compliance with the local limits. See Appendices 2 and 3 on pages 24 and 25 for summaries of the sample record and permit violations.

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

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 – There were no violations of any local limit and thus no evidence that any discharge resulted in or contributed to any interference in the operations of the OCSD sewer system 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 – There were no violations of any local limits and thus no evidence that any discharge resulted in or contributed to any pass-through of pollutants from the OCSD wastewater treatment plants into the Pacific ocean or into the treatment plant sludge in violation of its NPDES permit.

Toxic Organics – There were no violations of the local limits for toxic organics.

Oil and Grease – There were no sample results reported for oil and grease. The low levels of oil and grease expected would be expected to result in consistent compliance with oil and grease limits.

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 nor acidic in nature. However, the wastewaters feeding into the final clarifiers comprise both acidic and alkaline waste streams and can vary in pH. As a result, compliance with the pH limits depends on the successful treatment and continued discharges of unregulated singl-pass cooling waters. For this reason, it remains appropriate to require the continuous self-monitoring and reporting of 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 – ASTECH has successfully fulfilled the self-monitoring requirements for Bldg 3030 set forth in the OCSD permit. Over the past four fiscal years, the sample record shows that ASTECH (1) submitted sample results for all permit listed parameters at the required frequency, (2) collected all samples from the designated compliance sampling point, (3) correctly obtained 24-hour composites for metals and fluoride and grabs for the other pollutants, and (4) followed appropriate chain-of-custody procedures.

Representativeness - The sample record also appears representative of the discharge to the sewers over the sampling day and the six-month reporting period. Quarterly sampling for the Federally-regulated pollutants ensures that the sample record accounts for the consistent contributions from the can washing and NDI testing steps, as well as the intermittent contributions from blowdowns and spills. Some pollutants always present at concentrations well below the Federal standards and local limits do not need to be sampled as frequently as currently required by the permit. However, the self-monitoring for pH should be continuous given the variable and nature of the wastewaters entering the final clarifier.

Requirements

- See Appendix 1 on page 20 for the self-monitoring and OCSD monitoring requirements for IWD-571295 that would be considered to be representative of the discharge.

Recommendations

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

- The analytical non-detection limit for cyanide should always be below 100 µg/l.

Appendix 1
Sewer Discharge Standards and Limits for ASTECH Bldg 3030 @ IWD-571295

Federal Categorical Standards and OCSD Local Limits						
pollutants of concern (mg/l)	Fed stds d-max	Fed stds mo-avg	loc limits instant	loc limits d-max ④	monitoring frequency ⑤ discharger	district
flow (gpd)	-	-	-	-	quarterly	-
arsenic	-	-	2.00	0.347	-	⑦
ammonia	0.832 ①	0.366 ①	-	0.143	quarterly	quarterly
cadmium	0.028 ③	0.018 ③	1.00	0.217	1/six-mos	1/year
chromium	0.696 ③	0.430 ③	2.00	0.434	quarterly	quarterly
copper	0.849 ③	0.520 ③	3.00	0.651	1/six-mos	1/year
fluoride	0.372 ①	0.165 ①	-	0.064	quarterly	quarterly
lead	0.143 ②	0.089 ②	2.00	0.025	1/six-mos	1/year
mercury	-	-	0.030	0.005	-	⑦
nickel	0.999 ③	0.598 ③	10.00	2.168	1/six-mos	1/year
silver	0.108 ③	0.060 ③	5.00	1.084	quarterly	quarterly
zinc	0.539 ②	0.306 ②	10.00	0.093	1/six-mos	1/year
cyanide - total	0.248 ②	0.134 ②	5.00	0.043	1/year	1/six-months
cyanide - amenable	-	-	1.00	0.173	-	-
total toxic organics	0.535 ③	-	0.58	-	1/year	1/six-months
oil+grease - mineral	-	-	100	-	-	⑦
pH (s.u.)	-	-	6.0-12.0	-	continuous	-
biochem oxy demand	-	-	-	15000	-	⑦
total sulfides	-	-	5.00	-	-	⑦
dissolved sulfides	-	-	0.50	-	-	⑦
PCBs	-	-	0.010	-	-	⑦
pesticides	-	-	0.010	-	-	⑦
explosivity	-	-	⑥	-	-	⑦

① Federal standards based on 40 CFR 471F only. See page 21 for example calculations.
② Federal standards based on 40 CFR 433 and 471F. See page 22 for example calculations.
③ Federal standards based on 40 CFR 433 only. See page 23 for example calculations.
④ Loading limits in lbs/day, based on baseline minimum flow rate of 26,000 gpd.
⑤ Recommended reductions in green. Recommended increases in red.
⑥ Narrative prohibition against the introduction of flammable or explosive substances
⑦ As part of periodic priority pollutant scans in order to identify changes in discharge quality

Appendix 1 (continued)
Example Calculations for Pollutants Regulated Under 40 CFR 471F Only

Step 1 – Calculate the daily-maximum titanium forming mass allocations for ammonia

$M_{471F\text{-}NH} = P_{Ti} \times (NH_{471.65(n)} + NH_{471.65(q)} + NH_{471.65(x)})$

$= \frac{60 \text{ lbs-Ti}}{\text{day}} \times \frac{1 \text{kg}}{2.2 \text{ lbs}} \times \frac{(389 + 36.8 + 4.32) \text{ mg-NH}_4}{\text{kg-Ti}}$

$= 11731 \text{ mg-NH}_4\text{/day}$

$M_{471F\text{-}NH}$	=	Ti Forming Stds (mg/day)
P_{Ti}	=	Ti Forming Prodxn Rate (lbs/d)
$NH_{471.65(n)}$	=	D-max NH_4 for SurfTreatRinse
$NH_{471.65(q)}$	=	D-max NH_4 for AlkCleanRinse
$NH_{471.65(x)}$	=	D-max NH_4 for MiscWwaters

Step 2 – Calculate the daily-maximum metal finishing mass-loadings for ammonia

Ammonia is unregulated under the metal finishing rule in 40 CFR 433

$M_{433\text{-}NH4}$	=	Metal Finishing Stds (mg/day)
	=	n/a

Step 3 – Calculate the daily-maximum combined standard for ammonia

40 CFR 403.6(e)(ii)
Alternate Mass Limits at IWD-571295

$M_{571295} = (M_{471F}) \left(\frac{Q_{571295} - Q_{dilution}}{Q_{471F}} \right)$

$= 11731 \text{ mg/day} \times \left(\frac{20700 - 15500}{936} \right)$

$= 65170 \text{ mg-NH}_4\text{/day}$

M_{571295}	=	Combined Fed Limit (mg/day)
M_{471F}	=	Ti Forming Stds (mg/day)
Q_{571295}	=	Combined Flow (gpd)
Q_{471F}	=	Titanium Forming Flow (gpd)
$Q_{dilution}$	=	Dilution Flow (gpd)

Step 4 – Convert to concentration limits for ammonia applied to IWD-571295

$C_{571295} = M_{571295} / Q_{571295}$

$= \frac{65170 \text{ mg}}{\text{day}} \times \frac{\text{day}}{20700 \text{ gal}} \times \frac{\text{gal}}{3.785 \text{ L}}$

$= 0.832 \text{ mg/l-NH}_4$

C_{571295}	=	Combined Fed Limit (mg/l)
M_{571295}	=	Combined Fed Limit (mg/day)
Q_{571295}	=	Combined Flow (gpd)

Appendix 1 (continued)
Example Calculations for Pollutants Regulated Under 40 CFR 471F and 40 CFR 433

Step 1 – Calculate the daily-maximum titanium forming mass allocations for lead

$$M_{471F\text{-}Pb} = P_{Ti} \times (Pb_{471.65(n)} + Pb_{471.65(q)} + Pb_{471.65(x)})$$

$$= \frac{60 \text{ lbs-Ti}}{\text{day}} \times \frac{1 \text{kg}}{2.2 \text{ lbs}} \times \frac{(1.23 + 0.116 + 0.014) \text{ mg-Pg}}{\text{kg-Ti}}$$

$$= 37.1 \text{ mg-Pb/day}$$

$M_{471F\text{-}Pb}$	=	Ti Forming Stds (mg/day)
P_{Ti}	=	Ti Forming Prodxn Rate (lbs/d)
$Pb_{471.65(n)}$	=	D-max Pb for SurfTreatRinse
$Pb_{471.65(q)}$	=	D-max Pb for AlkCleanRinse
$Pb_{471.65(x)}$	=	D-max Pb for MiscWwaters

Step 2 – Calculate the daily-maximum metal finishing mass-loadings for lead

$$M_{433\text{-}Pb} = Pb_{433.17} \times Q_{433}$$

$$= \frac{0.69 \text{ mg}}{\text{L}} \times \frac{4264 \text{ gal}}{\text{day}} \times \frac{3.785 \text{L}}{\text{gal}}$$

$$= 11136.1 \text{ mg-Pb/day}$$

$M_{433\text{-}Pb}$	=	Metal Finishing Stds (mg/day)
$Pb_{433.17}$	=	D-max Pb for Metal Finishing
Q_{433}	=	Metal Finishing Flow (gpd)

Step 3 – Calculate the daily-maximum combined standard for lead

40 CFR 403.6(e)(ii)
Alternate Mass Limits at IWD-571295

$$M_{571295} = (M_{433} + M_{471F}) \left(\frac{Q_{571295} - Q_{dilution}}{Q_{433} + Q_{471F}} \right)$$

$$= \frac{(11136 + 37) \text{ mg}}{\text{day}} \times \left(\frac{20700 - 15500}{4264 + 936} \right)$$

$$= 11173 \text{ mg-Pb/day}$$

M_{571295}	=	Combined Fed Limit (mg/day)
M_{433}	=	Metal Finishing Stds (mg/day)
M_{471F}	=	Ti Forming Stds (mg/day)
Q_{571295}	=	Combined Flow (gpd)
Q_{433}	=	Metal Finishing Flow (gpd)
Q_{471F}	=	Titanium Forming Flow (gpd)
$Q_{dilution}$	=	Dilution Flow (gpd)

Step 4 – Convert to concentration limits for lead applied to IWD-571295

$$C_{571295} = M_{571295} / Q_{571295}$$

$$= \frac{11173 \text{ mg}}{\text{day}} \times \frac{\text{day}}{20700 \text{ gal}} \times \frac{\text{gal}}{3.785 \text{ L}}$$

$$= 0.143 \text{ mg/l-Pb}$$

C_{571295}	=	Combined Fed Limit (mg/l)
M_{571295}	=	Combined Fed Limit (mg/day)
Q_{571295}	=	Combined Flow (gpd)

Appendix 1 (continued)
Example Calculations for Pollutants Regulated Under 40 CFR 433 Only

Step 1 – Calculate the daily-maximum titanium forming mass allocations for copper

Copper is unregulated under the titanium forming rule in 40 CFR 471F.

$M_{471F\text{-}Cu}$ = Ti Forming Stds (mg/day)
= n/a

Step 2 – Calculate the daily-maximum metal finishing mass-loadings for copper

$$M_{433\text{-}Cu} = Cu_{433.17} \times Q_{433}$$

$$= \frac{3.38\ mg}{L} \times \frac{4264\ gal}{day} \times \frac{3.785 L}{gal}$$

$$= 54551\ mg\text{-}Cu/day$$

$M_{433\text{-}Cu}$ = Metal Finishing Stds (mg/day)
$Cu_{433.17}$ = D-max Cu for Metal Finishing
Q_{433} = Metal Finishing Flow (gpd)

Step 3 – Calculate the daily-maximum combined standard for copper

40 CFR 403.6(e)(ii)
Alternate Mass Limits at IWD-571295

$$M_{571295} = (M_{433}) \left(\frac{Q_{571295} - Q_{dilution}}{Q_{433}} \right)$$

$$= \frac{(54551)\ mg}{day} \times \left(\frac{20700 - 15500}{4264} \right)$$

$$= 66525\ mg\text{-}Cu/day$$

M_{571295} = Combined Fed Limit (mg/day)
M_{433} = Metal Finishing Stds (mg/day)
Q_{571295} = Combined Flow (gpd)
Q_{433} = Metal Finishing Flow (gpd)
$Q_{dilution}$ = Dilution Flow (gpd)

Step 4 – Convert to concentration limits for copper applied to IWD-571295

$$C_{571295} = M_{571295} / Q_{571295}$$

$$= \frac{66525\ mg}{day} \times \frac{day}{20700\ gal} \times \frac{gal}{3.785\ L}$$

$$= 0.849\ mg/l\text{-}Cu$$

C_{571295} = Combined Fed Limit (mg/l)
M_{571295} = Combined Fed Limit (mg/day)
Q_{571295} = Combined Flow (gpd)

Appendix 2
Wastewater Discharge Quality for ASTECH Bldg 3030 from July 2005 - March 2009

Sample Record Summary

pollutants (µg/l)	effluent sampling results				violation rate		sample count
	mean	99th%	min	max	sample	period ③	
ammonia	3223	10182	<100	12500	**17/20**	**18/18**	20
cadmium	<7	<7	<7	<8	0/25	0/21	25
chromium	109.2	500.5	<10	760	**1/24**	**1/20**	24
copper	59.4	195.7	10	310	0/24	0/20	24
fluoride	7675	29110	1100	38000	**19/19**	**18/18**	19
lead	<2	<20	<2	<20	0/26	0/23	26
nickel	79.8	303.6	<10	410	0/24	0/21	24
silver	115.5	460.3	<10	660	**9/24**	**11/22**	24
zinc	41.5	87.9	<2	80	0/26	0/23	26
total cyanide	<20	<130	<20	<130	0/13	0/11	13
total toxic organics	<10	<10	<10	<10	0/11	-	11
oil+grease – min (mg/l)	-	-	-	-	②	-	0
flow (gpd)	28845	62515	6700	53500	-	-	11
pH (s.u.)	④	-	-	-	②	-	0

① Continuous flow self-monitoring results reported for the day of sampling
② No sample results for these pollutants of concern - pH, oil and grease.
③ Monthly averages calculated by calendar month of both self-monitoring and OCSD sampling
④ pH median

Statistical Probability of Future Violations

violation probability by parameter	mean (µg/l)	std dev (µg/l)	statistical probability		percent
Fed d-max – ammonia	µ = 3223	σ = 2987	*a(832)*	= 0.9890	~99%
Fed mo-avg – ammonia	µ = 3387	σ = 3014	*a(366)*	= 0.9994	~100%
Fed d-max – chromium	µ = 109.2	σ = 167.9	*a(696)*	= 0.0002	~0%
Fed mo-avg – chromium	µ = 103.4	σ = 165.9	*a(430)*	= 0.0245	~2%
Fed d-max – fluoride	µ = 7675	σ = 9198	*a(372)*	= 0.9999	~100%
Fed mo-avg – fluoride	µ = 6930	σ = 6693	*a(165)*	= 0.9986	~100%
Fed d-max – silver	µ = 115.5	σ = 148.0	*a(108)*	= 0.5202	~52%
Fed mo-avg – silver	µ = 122.0	σ = 156.3	*a(60)*	= 0.6542	~65%

Appendix 3
ASTECH Bldg 3030 Violations from July 2005 – March 2009

Federal standard violations for ammonia

sample dates	type	Sampler	Fed standards / local limits ①		violations	days
11/20/08	24-hr	IU	ammonia - Fed d-max	0.832 mg/l	4.5	1
Nov 2008	24-hr	IU + POTW	ammonia - Fed mo-avg	0.366 mg/l	2.43	30
09/25/08	24-hr	POTW	ammonia - Fed d-max	0.832 mg/l	5.06	1
Sep 2008	24-hr	POTW	ammonia - Fed mo-avg	0.366 mg/l	5.06	30
08/18/08	24-hr	IU	ammonia - Fed d-max	0.832 mg/l	3.2	1
Aug 2008	24-hr	IU	ammonia - Fed mo-avg	0.366 mg/l	3.2	31
06/25/08	24-hr	POTW	ammonia - Fed d-max	0.832 mg/l	2.26	1
Jun 2008	24-hr	POTW	ammonia - Fed mo-avg	0.366 mg/l	2.26	30
05/19/08	24-hr	IU	ammonia - Fed d-max	0.832 mg/l	1.8	1
May 2008	24-hr	IU	ammonia - Fed mo-avg	0.366 mg/l	1.8	31
03/13/08	24-hr	POTW	ammonia - Fed d-max	0.832 mg/l	12.5	1
Mar 2008	24-hr	POTW	ammonia - Fed mo-avg	0.366 mg/l	12.5	31
02/14/08	24-hr	IU	ammonia - Fed d-max	0.832 mg/l	2.8	1
Feb 2008	24-hr	IU	ammonia - Fed mo-avg	0.366 mg/l	2.8	29
12/05/07	24-hr	IU	ammonia - Fed d-max	0.832 mg/l	7.7	1
Dec 2007	24-hr	IU	ammonia - Fed mo-avg	0.366 mg/l	7.7	31
10/26/07	24-hr	POTW	ammonia - Fed d-max	0.832 mg/l	2.61	1
Oct 2007	24-hr	POTW	ammonia - Fed mo-avg	0.366 mg/l	2.61	31
08/22/07	24-hr	POTW	ammonia - Fed d-max	0.832 mg/l	1.44	1
Aug 2007	24-hr	IU + POTW	ammonia - Fed mo-avg	0.366 mg/l	0.75	31
05/21/07	24-hr	IU	ammonia - Fed d-max	0.832 mg/l	4.4	1
May 2007	24-hr	IU	ammonia - Fed mo-avg	0.366 mg/l	4.4	31
03/26/07	24-hr	POTW	ammonia - Fed d-max	0.832 mg/l	6.54	1
Mar 2007	24-hr	POTW	ammonia - Fed mo-avg	0.366 mg/l	6.54	31
02/21/07	24-hr	IU	ammonia - Fed d-max	0.832 mg/l	1.1	1
Feb 2007	24-hr	IU	ammonia - Fed mo-avg	0.366 mg/l	1.1	28
11/16/06	24-hr	IU	ammonia - Fed d-max	0.832 mg/l	1.9	1
Nov 2006	24-hr	IU	ammonia - Fed mo-avg	0.366 mg/l	1.9	30
10/26/06	24-hr	POTW	ammonia - Fed d-max	0.832 mg/l	3.27	1
Oct 2006	24-hr	POTW	ammonia - Fed mo-avg	0.366 mg/l	3.27	31
Aug 2006	24-hr	IU	ammonia - Fed mo-avg	0.366 mg/l	0.65	31
05/22/06	24-hr	IU	ammonia - Fed d-max	0.832 mg/l	0.9	1
May 2006	24-hr	IU	ammonia - Fed mo-avg	0.366 mg/l	0.9	31
02/13/06	24-hr	IU	ammonia - Fed d-max	0.832 mg/l	1.1	1
Feb 2006	24-hr	IU	ammonia - Fed mo-avg	0.366 mg/l	1.1	28
					total days of violation	**563**

① Monthly averages calculated by calendar month of all self-monitoring and OCSD sampling.

Appendix 3 (continued)
ASTECH Bldg 3030 Violations from July 2005 – March 2009

Federal standard violations for fluoride

sample dates	type	sampler	Fed standards / local limits ①		violations	days
11/20/08	24-hr	IU	fluoride - Fed d-max	0.372 mg/l	19.0	1
Nov 2008	24-hr	IU	fluoride - Fed mo-avg	0.165 mg/l	19.0	30
08/18/08	24-hr	IU	fluoride - Fed d-max	0.372 mg/l	4.1	1
Aug 2008	24-hr	IU	fluoride - Fed mo-avg	0.165 mg/l	4.1	31
06/25/08	24-hr	POTW	fluoride - Fed d-max	0.372 mg/l	2.37	1
Jun 2008	24-hr	POTW	fluoride - Fed mo-avg	0.165 mg/l	2.37	30
05/19/08	24-hr	IU	fluoride - Fed d-max	0.372 mg/l	21.0	1
May 2008	24-hr	IU	fluoride - Fed mo-avg	0.165 mg/l	21.0	31
03/13/08	24-hr	POTW	fluoride - Fed d-max	0.372 mg/l	7.7	1
Mar 2008	24-hr	POTW	fluoride - Fed mo-avg	0.165 mg/l	7.7	31
02/14/08	24-hr	IU	fluoride - Fed d-max	0.372 mg/l	3.7	1
Feb 2008	24-hr	IU	fluoride - Fed mo-avg	0.165 mg/l	3.7	29
12/11/07	24-hr	POTW	fluoride - Fed d-max	0.372 mg/l	5.02	1
12/05/07	24-hr	IU	fluoride - Fed d-max	0.372 mg/l	10.0	1
Dec 2007	24-hr	IU + POTW	fluoride - Fed mo-avg	0.165 mg/l	7.5	31
10/26/07	24-hr	POTW	fluoride - Fed d-max	0.372 mg/l	2.07	1
Oct 2007	24-hr	POTW	fluoride - Fed mo-avg	0.165 mg/l	2.07	31
08/22/07	24-hr	POTW	fluoride - Fed d-max	0.372 mg/l	38.0	1
Aug 2007	24-hr	IU + POTW	fluoride - Fed mo-avg	0.165 mg/l	38.0	31
05/21/07	24-hr	IU	fluoride - Fed d-max	0.372 mg/l	6.6	1
May 2007	24-hr	IU	fluoride - Fed mo-avg	0.165 mg/l	6.6	31
02/21/07	24-hr	IU	fluoride - Fed d-max	0.372 mg/l	3.4	1
Feb 2007	24-hr	IU	fluoride - Fed mo-avg	0.165 mg/l	3.4	28
12/20/06	24-hr	IU	fluoride - Fed d-max	0.372 mg/l	8.63	1
Dec 2006	24-hr	IU	fluoride - Fed mo-avg	0.165 mg/l	8.63	31
10/26/06	24-hr	POTW	fluoride - Fed d-max	0.372 mg/l	1.3	1
Oct 2006	24-hr	POTW	fluoride - Fed mo-avg	0.165 mg/l	1.3	31
08/14/06	24-hr	IU	fluoride - Fed d-max	0.372 mg/l	2.1	1
Aug 2006	24-hr	IU	fluoride - Fed mo-avg	0.165 mg/l	2.1	31
05/22/06	24-hr	IU	fluoride - Fed d-max	0.372 mg/l	4.7	1
May 2006	24-hr	IU	fluoride - Fed mo-avg	0.165 mg/l	4.7	31
02/13/06	24-hr	IU	fluoride - Fed d-max	0.372 mg/l	1.1	1
Feb 2006	24-hr	IU	fluoride - Fed mo-avg	0.165 mg/l	1.1	28
				total days of violation		**502**

① Monthly averages calculated by calendar month of all self-monitoring and OCSD sampling.

Appendix 3 (continued)
ASTECH Bldg 3030 Violations from July 2005 – March 2009

Federal standard violations for silver

sample dates	type	sampler	Fed standards / local limits ①		violations	days
11/20/08	24-hr	IU	silver - Fed d-max	0.108 mg/l	0.199	1
Nov 2008	24-hr	IU + POTW	silver - Fed mo-avg	0.060 mg/l	0.129	30
08/18/08	24-hr	IU	silver - Fed d-max	0.108 mg/l	0.110	1
Aug 2008	24-hr	IU	silver - Fed mo-avg	0.060 mg/l	0.110	31
06/25/08	24-hr	POTW	silver - Fed d-max	0.108 mg/l	0.137	1
Jun 2008	24-hr	POTW	silver - Fed mo-avg	0.060 mg/l	0.137	30
03/13/08	24-hr	POTW	silver - Fed d-max	0.108 mg/l	0.342	1
Mar 2008	24-hr	POTW	silver - Fed mo-avg	0.060 mg/l	0.342	31
Feb 2008	24-hr	IU	silver - Fed mo-avg	0.060 mg/l	0.100	29
12/05/07	24-hr	IU	silver - Fed d-max	0.108 mg/l	0.220	1
Dec 2007	24-hr	IU	silver - Fed mo-avg	0.060 mg/l	0.220	31
10/26/07	24-hr	POTW	silver - Fed d-max	0.108 mg/l	0.216	1
Oct 2007	24-hr	POTW	silver - Fed mo-avg	0.060 mg/l	0.216	31
08/22/07	24-hr	POTW	silver - Fed d-max	0.108 mg/l	0.154	1
Aug 2007	24-hr	IU + POTW	silver - Fed mo-avg	0.060 mg/l	0.083	31
May 2007	24-hr	IU	silver - Fed mo-avg	0.060 mg/l	0.098	31
09/25/06	24-hr	POTW	silver - Fed d-max	0.108 mg/l	0.660	1
Sep 2006	24-hr	POTW	silver - Fed mo-avg	0.060 mg/l	0.660	30
09/20/05	24-hr	POTW	silver - Fed d-max	0.108 mg/l	0.230	1
Sep 2006	24-hr	POTW	silver - Fed mo-avg	0.060 mg/l	0.230	30
					total days of violation	**344**

Federal standard violations for chromium

sample dates	type	sampler	Fed standards / local limits ①		violations	days
03/26/07	24-hr	POTW	chromium - Fed d-max	0.696 mg/l	0.760	1
Mar 2007	24-hr	POTW	chromium - Fed mo-avg	0.430 mg/l	0.760	31
					total days of violation	**32**

① Monthly averages calculated by calendar month of all self-monitoring and OCSD sampling.