City of American Canyon Wastewater Treatment and Reclamation Facility
2006 NPDES Permit Renewal

Infeasibility Analyses

March 13, 2006
Revision received on May 22, 2006

Introduction

These infeasibility analyses and resulting requests for compliance schedules and interim limits are submitted to the Regional Water Quality Control Board (RWB) by the City of American Canyon (City) to demonstrate the City's inability to comply with the proposed water quality-based effluent limits for copper, nickel, zinc, and cyanide.

Background

The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (SIP, 2000, 2005) establishes statewide policy for NPDES permitting. The SIP provides for the situation where an existing NPDES discharger cannot immediately comply with an effluent limitation derived from a California Toxics Rule (CTR) or Basin Plan objective. The SIP allows for the adoption of interim effluent limits and a schedule to come into compliance with the final limit in such cases. To qualify for interim limits and a compliance schedule, the SIP requires that an existing discharger demonstrate that it is infeasible to achieve immediate compliance with the CTR- or Basin Plan-based limit.

The term "infeasible" is defined in the SIP as "not capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social and technological factors."

The SIP requires that the following information be submitted to the Regional Board to support a finding of infeasibility:

(a) documentation that diligent efforts have been made to quantify pollutant levels in the discharge and sources of the pollutant in the waste stream, including the results of those efforts;
(b) documentation of source control and/or pollution minimization efforts currently under way or completed;
(c) a proposed schedule for additional or future source control measures, pollutant minimization or waste treatment; and
(d) a demonstration that the proposed schedule is as short as practicable.

The following analysis pertains to the water-quality-based effluent limits proposed in the Reasonable Potential Analysis submitted by the RWB to the City in an e-mail dated March 2, 2006.

Pollutants to be Evaluated

The pollutants for which interim limits are being requested by the City are as follows:

- Copper
- Nickel
- Zinc
- Cyanide

Effluent Limit Attainability

The proposed final effluent limits contained in the reasonable potential analysis for these constituents are compared to the maximum observed effluent concentrations in Table 1.

Table 1. Proposed Effluent Limits for American Canyon Wastewater Treatment Facility

Pollutant	Water Quality Based Effluent Limits		City Effluent Quality
	AMEL[a]	MDEL[b]	MEC[c]
Copper	3.2	5.5	7.5
Nickel	6.6	14	15
Zinc	57	95	130
Cyanide	0.50	1.0	8.0

Notes:
All values in µg/L.
[a] AMEL: average monthly effluent limit
[b] MDEL: maximum daily effluent limit
[c] MEC: maximum effluent concentration (11/02 – 11/05)

The final effluent limits shown above are calculated using procedures described in Section 1.4 of the SIP. No dilution was applied and the receiving water was classified as estuarine (i.e., lowest of freshwater and saltwater criteria is used for effluent limit calculation). Hardness, where applicable, was assumed to be 260 mg/L. Other variables in the effluent limit calculation included coefficients of variation for the different pollutants.

Maximum observed effluent concentrations are based on recent plant effluent quality data (November 2002 – November 2005). As shown in the table above, the City will not be able to immediately comply with proposed effluent limits for copper, nickel, zinc, or cyanide. The infeasibility analyses for these constituents are discussed below.

Source Control and Pollution Prevention Efforts

The City's source control program regulates 3 non-categorical significant industrial users, including a water-softener regeneration facility, beverage bottling plant, and food processor. The City has had an active pollution prevention program in place since early 2005, when zinc was identified as a pollutant of concern. In February 2005 the City implemented a source control program targeting zinc. By October 2005, most of the possible sources of zinc had been identified and further pollution prevention activities had begun. These activities are highlighted in Table 2. A Zinc Investigation Status Report was prepared and submitted to the RWB in February 2006.

Table 2. City of American Canyon Pollution Prevention Program Activities

Pollutant of Concern	Source Control Activities
Zinc	• Source identification, February 2005 • Cleaning of backwash process tanks to remove potential zinc buildup from within the treatment plant, April 2005 • Industrial source identification, June 2005 • Notices of violation sent to exceeding industries • Identification and reduction of internal industrial zinc sources • Industrial daily composite sampling, September and October 2005 • Portable composite sampling at major trunk lines, September and October 2005 • Source identification sampling from separate influents (domestic and industrial), October 2005

The City is also an active participant and supporter of several regional pollution prevention groups and programs, including:

- Bay Area Clean Water Agencies (BACWA)
- California Stormwater Quality Association
- Phase II NPDES Pollution Prevention Group
- CWEA Pollution Prevention Focus Group Meeting

The City also conducts general outreach on pollution prevention activities, including:

- Healthy People/Healthy Planet Environmental Fair
- City newsletter
- Brochures at City office
- Environmental Education Coalition of Napa County
- Elementary classroom presentations
- Plant tours for elementary schools
- 4th of July Pollution Prevention Outreach Booth

- Household Hazardous Waste collection

Additional information on pollution prevention activities targeting each of the four constituents requiring interim effluent limits is discussed below.

Copper

The maximum observed effluent concentration for copper is 7.5 µg/L (measured in October 2003) which would exceed the proposed final AMEL of 3.2 µg/L and the proposed final MDEL of 5.5 µg/L. Fourteen samples taken between March 2003 and November 2004 have copper concentrations that would exceed the proposed final AMEL. Two of the 34 samples have copper concentrations that would exceed the proposed final MDEL. Effluent copper concentrations are shown in Figure 1. The statistical probabilities of compliance with the AMEL and MDEL are 58% and 92%, respectively. Therefore, the City will not be able to immediately comply with the proposed final limits for copper.

The City has not previously identified copper as a problem pollutant and therefore has not initiated source control actions targeting copper, with the exception of additional wastewater collection system monitoring in 2005 to discover the source of high influent concentrations. The data did not identify a single significant source. All 38 copper samples collected in the influent between November 2002 and November 2005 were detected, with values ranging from 1.6 µg/L to 160 µg/L, as shown in Figure 1, with an average of 60 µg/L. The effluent and influent concentrations follow the same general pattern, suggesting that effluent concentrations can be reduced by reducing the influent concentrations.

A full source identification study must be conducted to determine the most likely sources of copper to the treatment plant. The largest source of copper to treatment plants is typically from the corrosion of copper plumbing. Commercial and industrial sources of copper can include radiator repair shops, metal finishers, electroplaters, automotive machine shops or service stations, car washes, and printers. If industries are significant contributors, the City will work with its permitted industries to identify reduction opportunities. If commercial sources are significant contributors, appropriate source control programs such as inspections and incentive programs that reward clean business practices and encourage zero-discharge can be developed. If copper plumbing corrosion is a major source, the City will review corrosion control measures used by its water utility, and distribute plumbing BMPs to pipe fitters and building inspectors in the City's service area.

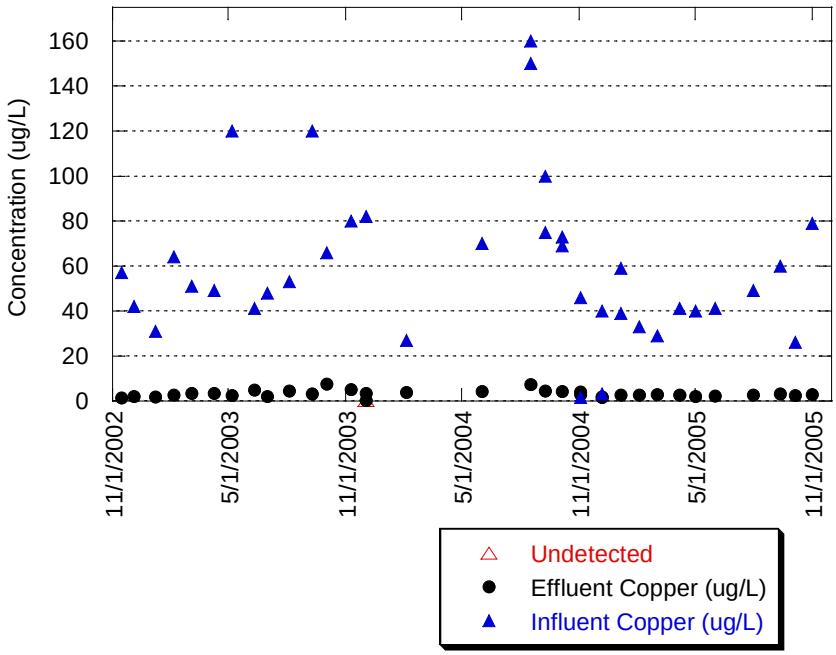

Figure 1. American Canyon Treatment Plant Influent and Effluent Copper Levels (µg/L)

Nickel

The maximum observed effluent concentration for nickel is 15 µg/L (measured in June 2005) which would exceed a proposed final AMEL of 6.6 µg/L. In addition, the five samples collected in June and August 2005 all have zinc concentrations that would exceed the proposed final AMEL. Effluent nickel concentrations are shown in Figure 2. The statistical probabilities of compliance with the AMEL is 84%. Therefore, the City will not be able to immediately comply with the proposed final limits for nickel.

The City has not previously identified nickel as a problem pollutant and therefore has not initiated source control actions targeting nickel, with the exception of additional wastewater collection system monitoring in 2005 to discover the source of high influent concentrations. The data did not identify a single significant source. All 44 nickel samples collected in the influent between November 2002 and November 2005 were detected, with values ranging from 5.3 µg/L to 42 µg/L, as shown in Figure 2, and an average of 9.7 µg/L. The effluent and influent concentrations follow the same general pattern, suggesting that effluent concentrations can be reduced by reducing the influent concentrations.

A full source identification study must be conducted to determine the most likely sources of nickel to the treatment plant. Commercial and industrial sources of nickel can include radiator repair shops, metal finishers, electroplaters, automotive machine shops or service stations, car washes, and printers. A study performed by Petaluma found that food processors and bottlers (1 of each in American Canyon) may discharge nickel from their food processing machine cleaning operations. If industries are significant contributors, the City will work with its permitted industries to identify reduction opportunities. If commercial sources are significant contributors, appropriate source

control programs such as inspections and incentive programs that reward clean business practices and encourage zero-discharge can be developed.

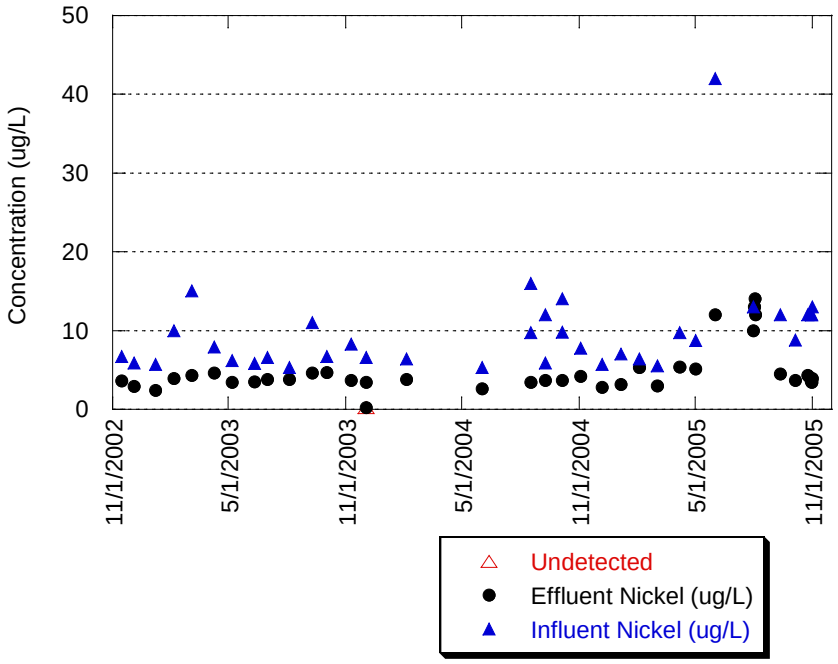

Figure 2. American Canyon Treatment Plant Influent and Effluent Nickel Levels (µg/L)

Zinc

The maximum observed effluent concentration for zinc is 130 µg/L (measured in June 2005) which would exceed a proposed final AMEL of 57 µg/L and the proposed final MDEL of 95 µg/L. In addition, 24 of the 51 samples collected between November 2002 and November 2005 have zinc concentrations that would exceed the proposed final AMEL. Effluent zinc concentrations are shown in Figure 3. The statistical probabilities of compliance with the AMEL and MDEL are 60% and 87%, respectively. Therefore, the City will not be able to immediately comply with the proposed final limits for zinc.

The City has previously identified zinc as a pollutant of concern and has submitted an *Effluent Zn Concentration Exceedance Investigation Status Report*. All samples collected between November 2002 and November 2005 were detected in the effluent (51 samples) and the influent (44 samples), with average values of 56 µg/L (effluent) and 162 µg/L (influent).

Commercial and industrial sources of zinc can include machine shops, metal finishers, cooling towers, carpet cleaners, electroplaters, and automotive service stations. Zinc pollution prevention activities began in February 2005, as follows:

- A source identification study was conducted in February 2005 to determine the most likely sources of zinc to the treatment plant. This study did not identify a single significant source. Two of the regulated industries, the food processor and beverage bottler, were thought to be

contributors of zinc to the treatment plant, but they did not exceed their permitted limit of 3200 µg/L.

- In case the source was internal accumulation, the four backwash process tanks were super-chlorinated and rinsed in the month of April 2005. This action did not reduce the measured effluent zinc concentrations in May 2005.

- In June 2005, another industrial source identification study was conducted, and two regulated industries, the food processor and beverage bottler, had exceeded their permitted limit for zinc. Notices of Violation were immediately issued to the violating industries, and the City successfully helped them identify sources and reduce their zinc discharge concentrations by 84 percent.

- During September and October 2005, the City required industrial users to collect daily composite samples, and portable composite sampling was conducted at major trunk lines.

- By October 2005, the Domestic and Industrial influent were separated to accommodate recycled water re-use. The City was able to take samples from the two separate influents and identify that, while the industrial influent concentrations were higher than the domestic concentrations, the domestic flow contributes about 58 percent of the zinc influent load, while industrial discharge contributes about 29 percent of the zinc loading to the plant.

In conclusion, the discharge from industrial sources has consistently improved since June 2005, but plant effluent zinc concentrations remain mainly above the proposed final limits. As industrial concentrations have already been decreased by 84% and only contribute 29% of the total influent zinc loading to the plant, it is unlikely that further significant decreases can be achieved by industrial sources.

The City intends to continue zinc source control activities, including ongoing aeration basin cleaning, exploring the feasibility of alternative treatments for metal reduction, launching a long-term daily sampling event (one to two months) for source identification in early 2006, and a local limits study. The source identification study will examine the mass loads of zinc discharged from significant sources, not only the concentrations.

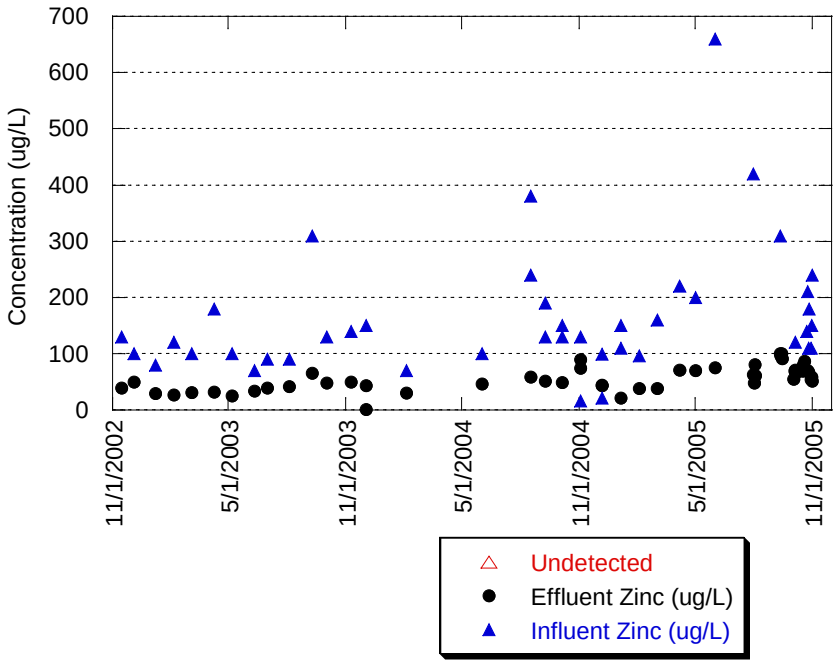

Figure 3. American Canyon Treatment Plant Influent and Effluent Zinc Levels (µg/L)

Cyanide

The maximum observed effluent concentration for cyanide is 8.0 µg/L (measured in October 2004) which would exceed the proposed final AMEL of 0.50 µg/L and the proposed final MDEL of 1.0 µg/L. In addition, the proposed AMEL is less than the method detection limits (MDLs) of 0.8 and 0.9 µg/L. All of the detected or estimated data are greater than the proposed final MDEL. Effluent cyanide concentrations are shown in Figure 4. The statistical probabilities of compliance with the AMEL and MDEL are 6.6% and 29%, respectively. Therefore, the City will not be able to consistently comply with the proposed final limits for cyanide.

As the Regional Water Board has noted previously, "Cyanide is a regional problem associated with the analytical protocol for cyanide analysis due to matrix interferences. A body of evidence exists to show that cyanide measurements in effluent may be an artifact of the analytical method. This question is being explored in a national research study sponsored by the Water Environment Research Foundation (WERF)," (recent POTW permits).

The City supports current efforts to develop a site-specific objective for cyanide in the Bay, given that cyanide does not persist in the environment and that the current water quality objective was based on testing with East Coast species. A cyanide site specific objective for Puget Sound, Washington, using West Coast species has been approved by EPA Region X. The City is participating in a regional permittee-funded effort to conduct a study for the development of a site-specific objective through its BACWA affiliation. The cyanide study plan was submitted on October 29, 2001. A final report was submitted to the Board on June 29, 2003. The Basin Plan Amendment is currently being developed.

Typically, cyanide is not present in wastewater influent but is generated in the treatment plant disinfection process when chlorination is used. The WERF study also indicated that effluent cyanide levels are due to chlorination. The City's effluent data were detected more frequently than the influent data, at 68% detection in the effluent, and 23% detection in the influent. Influent cyanide data is shown in Figure 4. As the City's treatment plant mainly uses ultraviolet disinfection, not chlorine disinfection, the treatment process should not cause an increase in cyanide levels.

The City has not previously identified cyanide as a pollutant of concern and, therefore, has not conducted pollution prevention activities that directly target this constituent. The City will continue to perform influent and effluent monitoring to determine if there are potential influent cyanide sources. High effluent cyanide levels, when they have occurred, may be due to analytical interferences. If cyanide is detected consistently in the City's influent, the City will conduct cyanide source identification.

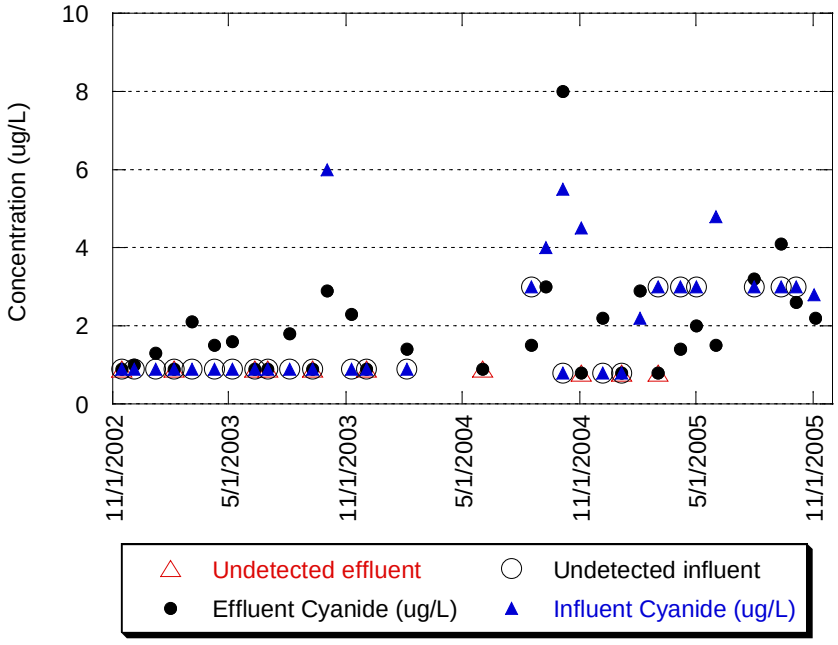

Figure 4. American Canyon Treatment Plant Influent and Effluent Cyanide Levels (µg/L)

Summary

This evaluation indicates that immediate compliance with projected final effluent limits for copper, nickel, zinc, and cyanide is not feasible for the City. In accordance with the requirements of the SIP, the City requests that the RWB refrain from the adoption of final effluent limits for these constituents. In lieu of final limits, the NPDES permit should include interim performance based limits with which the City can comply.

In the course of the new permit the city will implement the following source control actions to identify and reduce the source of metals with interim limits as follow;

- Develop a new source control and pollution prevention plan using the P2 Guidance and Tools document dated April 2005.

- Join the Bay Area Pollution Prevention Group (BAPPG). The city will develop similar outreach materials developed by BAPPG, to reduce copper, nickel and zinc sources.

- Compile a list of present industrial users. Review the list and identify possible sources for metals of interest.

- Develop a sampling plan to target all possible sources such as industrial and domestic influent, the city's raw water sources, potable water, permitted and non permitted industries that are identified as possible contributors from the survey list.

- Based on the sampling results from each category, the city will take specific actions such as inspections, BMPs, follow up sampling, alternative chemical usage in the water treatment plant, usage of alternative plumbing material, educating, and enforcements to reduce the sources.

- Table 3 summarizes the tentative schedule for the actions mentioned above.

Table 3. Source Control Action Schedule

Constituent	Proposed Measures	Estimated Time to Complete
Copper/ Nickel/ Zinc	1. Perform source identification 2. Implement control strategies identified in the Source Control and Pollution Prevention Plan 3. Conduct Local Limit Study	1. 15 months after permit adoption 2. 1 year after completion of source identification 3. 1 year after completion of source identification
Cyanide	1. Monitor influent and effluent 2. Anticipate Site-Specific Objective for San Francisco Bay	1. Ongoing 2. Ongoing