

ILLINOIS POLLUTION CONTROL BOARD
June 28, 1977

REVERE COPPER AND BRASS, INC.,)
)
 Petitioner,)
)
 v.) PCB 76-246
)
ENVIRONMENTAL PROTECTION AGENCY,)
)
 Respondent.)

OPINION AND ORDER OF THE BOARD (by Dr. Satchell): ,

Revere Copper and Brass, Incorporated, filed on September 20, 1976 a petition for variance. A variance is sought from Rule 203(f) of the Chapter 3: Water Pollution Regulations (Chapter 3) as applied to copper. An alternative request is that the Board reclassify Revere Ditch, pursuant to Rule 302(k) of Chapter 3 as a secondary contact water. An Agency recommendation was filed on November 29, 1976. After the filing of the recommendation the Petitioner and the Agency entered into negotiations which resulted in an amended recommendation and a stipulation filed on March 31, 1977.

Petitioner's alternative request to reclassify Revere Ditch as secondary contact water must be denied. The Board has previously ruled that in order for a water of the State of Illinois to be so classified the Board's regulatory process with the requisite public notice must be pursued, Olin Corporation v. E.P.A., PCB 73-509, PCB 73-510 (Consolidated) (June 3, 1976).

Petitioner is engaged in the production of seamless copper tube, stainless steel utensils and fabricated metal products in two separate plants both located in Clinton, DeWitt County, Illinois. The Tube Mill Plant produces the seamless copper tubing and the Manufacturing Plant produces the stainless steel utensils and the fabricated metal products.

Operations at the tube mill include:

- (1) Cathode and high quality copper scrap; melt; cast into billets (standby Ajax electric furnace and casting unit available); production, about 4×10^6 pounds per month.
- (2) Oil-fired furnace reheats billets for piercing into seamless shells; quench in water; pickle in 10% H₂SO₄;

rinse; draw, anneal, saw, pack, etc. to customer's specifications.

Copper is put into the water in the following ways:
(Pet. Dwg. #EV-S-201-A).

<u>Operation</u>	<u>Quantity of Water Used</u> (Gals. per day)	<u>Copper Added</u>	
		<u>Suspended</u>	<u>Dissolved</u>
Billet Quench & Piercer	40,000	49.2 ppm	0.17 ppm
		16.4 lbs/day	0.057 lbs/day
Pickle Rinse	2,500	134.8 ppm	613.00 ppm
		2.81 lbs/day	12.76 lbs/day
Continuous Cast Furnace	182,100	0.13 ppm	0.0 ppm
		0.20 lbs/day	0.0 lbs/day
Ajax Electric Furnace (Standby)	20,000	3.99 ppm	0.5 ppm
		0.67 lbs/day	0.08 lbs/day

Two private inter-connected ponds of about 3×10^6 gallon capacity which are fed by field tiles and storm runoff furnish water for all non-contact cooling and contact cooling for static casting, hot piercing and shell quenching. Pond water is also used for rinsing and flushing the pierced and pickled shells.

City water is used for contact cooling of cast billets and for sanitary purposes, these waters are discharged respectively, into the ponds and to the Clinton Sanitary District Sewer. Water usage is about 387,500 gpd from the ponds and 182,100 gpd from the city. The present effluent from the ponds consists of 569,600 gpd of water containing 0.57 ppm (2.71 lbs/day) suspended copper and 0.81 ppm (3.85 lbs/day) dissolved copper (Pet. Dwg. #EV-S-201-A).

The manufacturing plant (Plant) has two separate departments: (1) Stainless steel utensils and (2) Fabricated metal products. The Utensils Department press draws about 4×10^6 lbs. of stainless steel circles per year into various bodies and covers for kitchen utensils. Some of the bodies are copper plated. The Fabricated Products Department fabricates about 2.5×10^6 lbs. of coil and strip stock of various metals into a wide variety of products, including knobs, handles, brackets and studs for the Utensils Department.

Only city water is used in the Plant. The 160,000 gpd usage is divided into about: (1) 35% non-contact cooling, (2) 7% boiler make up, (3) 7% sanitary and (4) process waters for pickling, cleaning and plating operations. All effluents presently are discharged to the city sewer system.

"Revere Ditch" carries the overflow from the aforementioned ponds for a distance of several thousand feet and discharges into Coon Creek. During extended drought periods the upstream sources dry up and the only flow is equal to or less than Revere's city water input of 231,000 gpd.* The seven-day ten year low flow of Coon Creek at the junction with Revere Ditch is understood to be zero (Pet. 18). Since Revere contributes '95% or more to the total ditch flow, essentially their effluent must comply, not with the effluent standards of 1.0 mg/l but with stream standards of 0.02 ppm copper. Petitioner states that this is an unreasonable burden as no practical treatment technology is currently available to achieve this level (Pet. 10). Revere discussed three alternatives to enable them to comply with Illinois stream standards:

- A. Use of Water Recirculation and Treatment System. Dissolved and suspended solids must be controlled so as not to leave deposits - 100% recirculation would not work. The minimum required 10% bleed-off would be 200,000 gpd which when lowered by best practical treatment would contain 0.5 ppm of copper (Pet. 11) and when mixed with an average of 387,500 gpd of upstream water would contain 0.17 ppm of copper. To reach the 0.02 ppm required only 0.8% (16,146 gpd) bleed-off would be permitted. About 294,100 gpd of process and contact water is required which if placed in a closed loop with 10% bleed-off would yield 82% more treated water (29,410 gpd) than permitted (16,146 gpd) to achieve compliance. Estimated costs: \$1,965,600 capital; \$106,000 per year operational.
- B. Eliminate All Effluent by Recirculation and Evaporation. As in "A" except evaporate bleed-off from contact and process waters. Estimated costs: Capital \$2,035,600; \$351,091 per year operational. The 98,111,800 ft³ of natural gas per year is not available; the #2 fuel oil (170,884 gallons per year) is on allocation. Petitioner concludes this expensive and energy intensive process would yield a highly unfavorable cost/benefit ratio (Pet. 15).

*This listed as 231,000 gpm (Pet. 9).

- C. Dilute Tube Mill Pond Water to Achieve Stream Standards. The pond outfall (001) after treatment (See "A") is expected to have a flow rate of 618,600 gpd containing 0.43 ppm copper. Copper free water required to dilute to stream standards would be 12,681,300 gpd. This water is proposed to be drawn by nine six-inch diameter wells drilled into the same water aquifer that serves the city of Clinton. This amount of water is about ten times greater than that used by Clinton (Pet. 17) and would be expected to affect Clinton's water supply. The stream bed below the dam does not have the capacity to carry this additional water and it is extremely questionable whether sufficient ground water is available (Pet. 17). Estimated Costs: Capital, \$1,443,400; \$553,164 per year operational.

The Agency recommendation filed November 29, 1976 confirms most of Revere's general facts as stated in their petition. In addition, analysis of ten grab samples of the pond effluent taken almost monthly from 11/17/75 to 9/21/76 shows an average copper content of 1.95 mg/l (Range 0.11 to 4.79) and TSS average 19 mg/l (Range 1 to 53). Analysis of samples of wastewater from the plant to the Clinton Sanitary Sewer System (six samples) show the following:

Copper, Ave. 17.6 (Range 1.81 to 66) mg/l
Cr⁺³, Ave. 2.23 (Range 0.7 to 4.7) mg/l
Cr⁺⁶, Ave. 0.73 (Range 0.0 to 2.9) mg/l and
Zinc, Ave. 2.1 (Range 0.9 to 6.0) mg/l (Ag. Rec. ¶11).

The Agency states Revere proposes to isolate and collect the mill's pickle rinse water and the plant's copper plating rinses, the pickle and bright dip rinses, and the chrome plating rinses and to treat these waters in an acid neutralizing and metal hydrate removal system (Ag. Rec. ¶12). Petitioner predicts the average copper concentration in waters so treated will be 0.5 mg/l. On September 27, 1976 Petitioner submitted a permit application for the construction of a removal system. The design maximum flow in the proposed system is 144,000 gpd. The aforementioned wastes would be subjected to chromium reduction, brought to a pH of about 8.5, passed through a Lamella Gravity Settler and centrifuged to de-water the sludge. This treatment is expected to effect the following changes: (Ag. Rec. ¶13).

<u>Parameter</u>	<u>Raw Waste (mg/l)</u>	<u>Treated Effluent (mg/l)</u>	
		<u>Avg.</u>	<u>Max.</u>
Chromium (total hexavalent)	5.34	0.5	1.0
Copper	126.0	0.5	1.0
Iron (total)	5.0	1.0	2.0
pH	2.5 to 6.0	8.0	8.5
TSS	14.5	5.0	6.0
Zinc	5.0	0.5	1.0

Petitioner predicts that the above system would give a pond effluent of 618,000 gpd containing 0.43 mg/l copper or a daily discharge of 2.22 lbs. copper per day. During periods of extended drought (only city water discharged) Petitioner states the decrease in flow would theoretically produce 0.97 mg/l suspended copper and 0.19 mg/l dissolved copper; however, the increased pond retention time is stated to increase settling of suspended copper so that Petitioner could still meet its NPDES point source limitation of 1.0 ppm.

Petitioner states construction of the system could be completed in eleven months after receipt of the Agency permit. The Agency is prohibited from granting the permit by Rule 962(a) of Chapter 3: in that the proposed construction will not achieve compliance.

The Agency concurs that meeting the 0.02 mg/l copper stream standard places a hardship on Revere, but believes Petitioner had not presented adequate data as to why a lower concentration of copper could not be achieved in the Tube Mill pond effluent. Petitioner's proposed plan did not include treating the 40,000 gpd effluent from the billet piercer and quenching operation (49.37 mg/l copper; 16.47 lbs. copper per day), as well as the Ajax Furnace (only used during emergency periods) effluent (20,000 gpd, 4.49 mg/l copper, 0.7 lbs. copper/day). The system as proposed would treat only 81,600 gpd. Addition of both of the above streams would cause the system to operate at 144,100 gpd--only 100 gallons per day over the present design maximum. About 17 pounds of copper per day would be eliminated from the Tube Mill pond (Ag. Rec. ¶21).

The Agency discusses copper removal technology stating at least four major types of treatment are available: (a) precipitation, (b) evaporative recovery, (c) ion exchange and (d) electrolytic recovery. Processes b, c, and d appear economically feasible only when conditions are favorable for recovery.

Mention of a promising copper removal research program is incorporated in the record of Olin Corporation v. EPA, PCB 75-369, regarding Dr. R. E. Wing's Agriculture Research Service, United States Department of Agriculture investigation of the use of starch xanthate with a polyelectrolyte. The Agency contacted Dr. Wing who was of the opinion that addition of an anionic polyelectrolyte following lime addition could reduce copper concentrations to about 0.2 to 0.3 mg/l. Starch xanthate is not yet economically available (Ag. Rec. ¶23).

The Agency cited several sources on the effect of copper on aquatic life showing again the sensitivity of phyto-and zooplankton to micrograms/l concentrations of copper.

The Agency's amended recommendation filed March 31, 1977 recommended the grant of the variance subject to certain conditions. These conditions became the basis for a stipulation entered into by and between the Petitioner and Respondent.

The Board finds Petitioner, Revere Copper and Brass, Inc., would be subject to an unreasonable hardship if compelled to meet the stream quality standards of Rule 203(f) of Chapter 3 as it pertains to copper in the effluent from its facilities. The conditions imposed and accepted by stipulation represent an equitable balance between protection of the subject receiving stream and reasonable effort and good faith of the Petitioner.

The Board will grant the requested variance subject to the conditions set forth in the Board's order.

This opinion constitutes the Board's findings of fact and conclusions of law in this matter.

ORDER

It is the Order of the Pollution Control Board that Petitioner, Revere Copper and Brass, Inc., be granted variance from Rule 203(f) of Chapter 3: Water Pollution as it pertains to copper in the effluents from their works located near the city of Clinton, DeWitt County, Illinois for the period of five (5) years subject to the following conditions:

1. Petitioner will construct its wastewater treatment system as set forth in its Petition for Variance with modifications listed below. Petitioner will construct said system pursuant to the schedule as set forth in its Petition for Variance, Part V.

2. Petitioner shall tie in the discharge from the Tube Mill plant's billet piercing and quenching operation to the proposed acid neutralization and metal hydrate system; the tie-in of the discharge for the Ajax Furnace is unnecessary as it is used only on a stand-by or emergency basis and the tie-in would have a minimal effect on the ultimate effluent quality.
3. Petitioner shall add the necessary equipment to its proposed treatment system to enable the addition of a polyelectrolyte to the waste water for copper removal, conduct tests regarding the results of such addition and report the findings to Respondent.
4. Petitioner shall continue to investigate means of controlling its effluent discharge of copper; Petitioner's investigation shall consist of monitoring the state of the art of copper removal from industrial waste-waters as disclosed in literature which is generally available and other information which may be available to Petitioner by reason of its copper fabricating activities, and evaluating the technical and economic feasibility of the application of any developments which may occur to Petitioner's facility.
5. Petitioner shall submit quarterly progress reports regarding its investigation to the Manager of Respondent's Variance Section - Division of Water Pollution Control. Such progress reports shall describe any developments which have occurred during the reporting period and the results of Petitioner's evaluation thereof.
6. Within ninety (90) days after starch xanthate becomes commercially available, Petitioner shall report in writing to the Board and Respondent on the technical and economic feasibility of using starch xanthate at its facility.
7. In the event of the discovery of a technically and economically feasible method of treatment to reduce the copper content of Petitioner's discharges to the limit of .02 mg/l, Respondent shall determine whether, under all of the facts and circumstances in effect and the law and regulations existing at the time of such discovery, Petitioner shall be required to initiate and complete a program to implement such discovery. If Respondent determines that the implementation of such discovery is required, it shall so notify Petitioner and Petitioner shall immediately initiate and promptly

complete a program to upgrade effluent quality in accordance with such discovery, provided, however, that Respondent's determination may be contested in good faith by Petitioner on such grounds and by such judicial or administrative proceedings, legal or equitable, as may exist at the time of such determination.

- 8. Within twenty-eight days after the date of the Board's order granting said variance, Petitioner shall execute and forward to Respondent a Certificate of Acceptance and Agreement in the following form:

CERTIFICATE

I (We), _____ having read and fully understanding the Order of the Illinois Pollution Control Board in PCB 76-246, hereby accept said Order and agree to be bound by all of the terms and conditions thereof.

Signed _____

Title _____

Date _____

- 9. Petitioner's request for reclassification pursuant to Rule 302(k) of Chapter 3 is dismissed.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board hereby certify the above Opinion and Order were adopted on the 28th day of June, 1977 by a vote of 4-0.

Christan L. Moffett sk
Christan L. Moffett, Clerk
Illinois Pollution Control Board