



## ZINC PLATING, MICHIGAN

### THE CHALLENGE

The zinc plating wastewater is a combination of waste steams from alkaline cleaning, acid pickling, rinse water, and occasional batch dumping. The wastewater flows at about 100 gpm for 12 to 16 hours daily. The wastewater was previously treated by conventional hydroxide precipitation technique using Magnesium hydroxide-caustic combination. The Mg(OH)<sub>2</sub> slurry required continuous mixing even during down times to prevent caking. The system required frequent servicing due to poor performance of the clarifier and inefficient dewatering of generated sludge. The treatment demanded continuous adjustments of polymer dose to minimize solid carry over in the effluent.

### THE SOLUTION

The conventional treatment was replaced with AQUASIL®. The current treatment eliminated magnesium hydroxide and reduced the use of caustic to occasional neutralization of acid cleaner dumping. Conversion from the conventional hydroxide precipitation to the current treatment made use of existing equipment and without any system reconfiguration. The product is slurried (18% w/v) using the existing magnesium hydroxide slurry tank and fed to the reactor chamber using a diaphragm pump. Test results on the effluent shown in the TABLE indicate that the treated water is of high quality and can be reused.

| Parameter              | PSES Daily Max. (mg/L) | Max. Daily Average for 4 consecutive days (mg/L) | Influent (mg/L) | Effluent (mg/L) |
|------------------------|------------------------|--|-----------------|-----------------|
| Total Cadmium          | 1.2                    | 0.7  | ND              | ND              |
| Total Chromium         | 7.0                    | 4.0  | 4.37            | 0.11            |
| Total Copper           | 4.5                    | 2.7  | 1.08            | 0.44            |
| Total Iron             | N/A                    | N/A  | 73.2            | 0.83            |
| Total Lead             | 0.6                    | 0.4  | ND              | ND              |
| Total Nickel           | 4.1                    | 2.6  | 3.35            | 0.07            |
| Total Silver**         | 1.2                    | 0.7  | ND              | ND              |
| Total Zinc             | 4.2                    | 2.6  | 221             | 1.86            |
| Total Cyanide          | 1.9                    | 1.0  | ND              | ND              |
| Total Suspended Solids | 20.0                   | 13.4   | 710             | 13              |
| BOD                    | N/A                    | N/A  | 99              | 27              |
| Total Phosphorus       | N/A                    | N/A  | 2.0             | ND              |
| Total oil & Grease     | N/A                    | N/A  | 110             | 6.0             |
| pH                     | 6.5 – 9.5              | 6.5 – 9.5  | 8               | 9.2             |

At present, the system runs unattended, except for the occasional feeding of the dry agent into the slurry tank and clarifier performance has improved, resulting in reduced labor demand and maintenance cost. In addition, the facility has realized at least a 10% reduction in chemical cost alone.

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