5023-T-008

DRAFT

IMPLEMENTATION AND INSTALLATION PLAN FOR WASTE REDUCTION TECHNOLOGIES FOR HARD CHROME PLATING

AT

PLATING SHOP BUILDING 225
MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA

PREPARED FOR
NAVAL ENERGY AND ENVIRONMENTAL
SUPPORT ACTIVITY, CODE 1121
PORT HUENEME, CALIFORNIA 93043

IN ACCORDANCE WITH
CONTRACT NO. N00123-87-D-0306
DELIVERY ORDER NO. J3-03

JANUARY 27, 1988

PREPARED BY
THE EC CORPORATION
10511 HARDIN VALLEY ROAD
KNOXVILLE, TENNESSEE 37932
615/693-9800

LIST OF ACRONYMS

DC	Direct Current
DOD	Department of Defense
HCP	Hard Chrome Plating
IWTP	Industrial Waste Treatment Plant
MINSY	Mare Island Naval Shipyard
MSDS	Material Safety Data Sheets
NCEL	Navy Civil Engineering Laboratory
NEESA	Naval Energy and Environmental Support Activity
PEL	Permissible Exposure Limit
RCRA	Resource Conservation and Recovery Act
ZDR	Zero Discharge Rinse

3.0 Current Practices

3.1 General Layout

The plating shop in Building 225, is located on the northeast side of the shipyard at the intersection of 5th and 6th Streets, one block north of Waterfront Avenue. Exhibit 3.1-1 shows the location of Building 225, while Exhibit 3.1-2 the plating shop layout. The shop has the following process capabilities:

* 1,1,1, Trichloroethylene degreasing,
* Passivation of stainless steels,
* Anodizing of aluminum and aluminum alloys,
* Chemical surface treatment of aluminum and aluminum alloys,
* Chromate chemical conversion coating of cadmium plated parts,
* Cadmium replating,
* Chromium plating (decorative & HCP),
* Nickel plating,
* Copper strike cyanide plating,
* Silver electroplating.
* Lead Plating
* Tin Plating
* Black Oxide Coating
* Buffing and Polishing
* Bright Dipping

3.1.1 Plating Equipment

There are three HCP tanks designated as tanks 3, 4, and 5. All tanks use the three bus bar system in conjunction with stick anodes. Anodes are bought commercially. Tanks are constantly agitated utilizing air spargers to maintain an active plating solution. Tank temperature is maintained at 130 degrees Fahrenheit.

3.1.2 Rectifiers

Three rectifiers totalling 7,500 amps supply power to the three hard chrome and one decorative chrome plating tanks. Tanks 4 and 5 share a 5000 amp rectifier and the decorative chrome tank is powered by a 1500 amp rectifier. Each rectifier has the capability of reversing the polarity by means of a reversing switch. The low amperage output of the rectifiers for tanks 3, 4, and 5 is one of the limiting factors to production time of the plating shop. MINSY has already taken steps to resolve this problem with the purchase and installation of rectifiers (three 5000 amp and one 3000 amp).

per square inch is now used. Typical current density in the industry is 300 amps per square inch. This would require a 4,560 amp rectifier for each tank; only 7,500 amps are available for the four HCP tanks. Thus, the existing power supply is inadequate. (Section 3).

3.7 Parts Rejection Rate

There was no documentation available to EC during the site investigation on percentage of parts rejected. Discussions with the plating shop personnel indicate the rate of rejection is less than 5 percent.

3.8 Bath Impurity Controls and Analysis Practices

There are no existing bath impurity controls. The plating tanks are emptied and cleaned once a year. The plating solution is analyzed once a month to determine the ratio of chromic acid to sulfate and amount of trivalent chromium ions. Iron and copper concentrations are analyzed once a year.

3.9 Ventilation System

3.9.1 Ductwork

Ventilation for the chromium plating tanks is provided by two pull-pull exhaust systems. One system serves the tanks in the southwest corner of the shop and the other serves the tanks in the southeast corner. During the on-site investigation, the duct systems were being modified. The tanks in the southeast corner, with the exception of pit tank 12, were not connected to the system. Hoods had not been installed, but installation of the ducting had been completed. Ductwork for the southwest tanks was completed using 1/8" thick PVC. Ductwork for the southeast tanks is fabricated from 1/4" thick PVC. There is some concern by the facility personnel that the 1/8" PVC is inadequate and may need replacing at some future date.

Each system has a scrubber, mist eliminator, and a fan located on platforms outside the south wall.

The tank hoods, when installed will connect to common ventilation ductwork which joins at a plenum box.

3.9.2 Air Cleaning System

The air cleaning system consists of a wet scrubber which was installed in 1951. The scrubber is a hydrostatic wet baffle type with a

capacity of 16,000 CFM. The scrubber is followed by a pad type mist eliminator. In 1965, the system was estimated to have a 10-year life expectancy.

Fume removal from the plating tanks is impeded by the location of anodes and other plating equipment which interferes with the flow of air across the tanks.

3.10 Wastewater Sources and Generation Rates

The most concentrated contribution to the waste stream from the HCP shop is the discharge from the air scrubbers. Other contributors are those from broken or disconnected steam condensate lines, tank overflows, and miscellaneous water streams. Although these sources other than the scrubber discharge are not highly contaminated, they do add to the quantity of flow to the Industrial Waste Treatment Plant (IWTP).

3.10.1 Rinsing

The MINSY HCP process does not utilize a separate rinse tank. The plated parts are rinsed by direct spraying over the plating tank which eliminates a major wastestream. However, the part is placed on the grating adjacent to the plating tank for a final clean rinse and this water drains to the sump below.

3.10.2 Wet Scrubbers

The discharge from the wet scrubbers was initially routed to an underground holding tank for future disposal. Leaks were discovered in the tank, and the tank and contaminated soil were removed. The scrubber liquid is now discharged to the industrial waste sewer where it is conveyed to the IWTP.

3.11 Environmental Permits

Discussions with the Bay Area Air Quality Management District indicated that the plating shop was issued three discharge operating permits for the hard chrome plating process which required a wet scrubber for the chromic acid emissions.

3.12 Utilities Available

All necessary utilities, for normal operation are available to MINSY. At the time of the on-site investigation, costs of the utilities were not available. For evaluations in Section 5, the utility costs of nearby Alameda Naval Air Station will be assumed as approximating the costs at MINSY. The