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US EPA RECORDS CENTER REGION 5
454416

PROPOSAL #707-01

# EVALUATION OF WASTEWATER TREATMENT SYSTEM

for

HOBART BROTHERS CO.
600 West Main Street
Troy, Ohio 45373

by

POLLUTION CONTROL SCIENCE, INC.
6015 Manning Road
Miamisburg, Ohio 45342
(513) 866-5908

Prepared and Submitted By:

Phillip L. Hayden, Ph.D., P.E.

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## 1.0 INTRODUCTION

The Hobart Brothers Company operates a manufacturing facility in Troy, Ohio. In the process of manufacturing welding wire, the wire is passed through a bath of concentrated hydrochloric acid and then through a bath of copper sulfate. After each bath, the wire is passed through a rinse which is discharged to a sewer leading to the wastewater treatment plant (WWTP).

The WWTP consists of a neutralization basin followed by three settling basins. In the neutralization basin, the acidic waste is neutralized by the addition by ammonia,activated by a dual pH electrode-controller system. Mixing in the neutralization basin is accomplished by diffused air which also serves to oxidize ferrous iron to ferric, which forms a more insoluble precipitate. The neutralized wastewater then flows to a series of three settling basins where the suspended solids consisting primarily of iron and copper precipitates are removed. The clarified effluent then flows to the municipal sewerage system leading to the City of Troy WWTP.

The sludge from the settling basin is periodically removed from the settling basin with dredge equipment and disposed of in a landfill on company property north of the plant.

Over Christmas, a malfunction occurred in the pH control system whereby approximately 2000 gallons of ammonia was released into the municipal sewers. Because of the toxicity of ammonia at high pH, the Troy WWTP was wiped out with the ammonia passing into the Miami River. As a result, a fish kill occurred.

The balance of this proposal outlines the methodology employed by PCS to evaluate the Hobart Brothers Company WWTP. At the conclusion of th evaluation phase, recommendations will be submitted to improve both reliability and performance of the WWTP. If engineering is required PCS will submit an appropriate proposal.

## 2.0 DEFINITION OF PROBLEM

a. There is no analytical data available on the character of raw wastewater.

b. There is no analytical data on the treatment process.

c. The WWTP settling basins are ineffective and inefficient with regard to removing suspended solids. However, without knowing the background or criteria used to design this plant, it is difficult to comment on the plant.

d. Ammonia, which is used for neutralization, forms a soluble complex with copper which may interfer with precipitation of copper hydroxide. If the purpose of the WWTP is to remove Copper, efficiency may not be too good. High levels of ammonia in the effluent may not be acceptable in the future because nitrogen is a nutrient and must be prevented from reaching the Miami River.

e. The disposal method of sludge from the WWTP may be not acceptable in the future. Regulatory agencies across the country are becoming more concerned about disposing of liquid sludges on the land or in landfills because of the problems associated with leachate contaminating the ground water.

## 3.0 EXPERIMANTAL PLAN - Phase I - Data Accumulation

PCS proposes to evaluate the Hobart Brothers WWTP and to define the problems in the following manner:

1. Sample the wastewater at the following locations:

   a. Rinse for HCl Tank (2)
   b. Rinse for Copper SUlfate Tank (2)
   c. HCl Tank (2)
   d. Influent to Neutralization Tank
   e. Effluent From Neutralization Tank
   f. Plant Effluent
   g. Sludge From Settling Basins

2. Analyze for the following parameters:

   a. $BOD_5$, COD
   b. $NH_3$-N, Total P
   c. pH, alkalinity, acidity
   d. Oil & Grease
   e. Copper, Iron
   f. TSS, TDS, TS
   g. Analyze sludge for all metals (22)

3. Determine flow if possible through WWTP - May have to use Lithium Chloride dilution method.

4. Conduct treatability studies to determine effect of Ammonia on the precipitation of copper hydroxide.

5. Screen various polyelectrolytes to determine whether solids separation can be improved.

6. Determine filtration properties of sludge.

## 4.0 DATA ANALYSIS AND REPORT PREPARATION - Phase 2

At the conclusion of Phase 1, the data will be analyzed and a report will be prepared. The topics to be discussed are:

a. Wastewater Characteristics.
b. Performance of WWTP.
c. Review of Ohio EPA regulation which may impact the City of Troy and Hobart Brothers.
d. Review Ohio EPA regulation on sludge disposal.
e. Recommend modifications to WWTP and Operating Procedures.
f. Economic Evaluation.