

JOB REPORT

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Project No. MP-1-R-1 Date: July 29, 1959

Name of Project: Industrial Waste Control in Region MP-1.

Period Covered: April 10, 1958 through April 10, 1959. Job No: F-3-d

Bio-assay and Chemical Analysis of Rhom and Haas Chemical Company's Waste Waters

Abstract: Waste waters were found to be highly toxic to mosquito fish, mollies, shrimp and croakers. Corrective measures are now being taken to correct the waste problem by building a series of waste treaters.

Objectives: To determine some of the highly toxic compounds present. To determine its effects on marine life by using bio-assay methods. To encourage company officials to install facilities as quickly as possible to treat their wastes before discharging into public waters.

Procedure: Collected waste waters from the plant periodically and examined for chemical compounds present. Marine life was exposed to various concentrations of the waste waters and the physiological responses of the test animals was noted.

Findings: Rhom and Haas Company produces the following chemicals and compounds:

ammonium sulfate	amines
ammonia	methyl methacrylate
acetone cyanhydrin	methanol
acetylene	hydrogen cyanide
acryloids	higher alcohols
acrylates	

In the production of the above chemicals, toxic substances are lost to the waste stream in spills or as waste by-products. These wastes proved to be highly toxic to marine animals in concentrations as low as 2%. (SEE ATTACHED CHEMICAL AND BIO-ASSAY DATA SHEETS).

The waste waters were dark amber in color with a strong acrylate odor.

Test animals became extremely violent even in low concentrations of the waste.

Results: Rhom and Haas Chemical Company approved a budget of over \$1,000,000.00 for waste treatment facilities. Construction on the facilities was started the latter part of 1958 and should be completed sometime in 1959, depending on strikes and availability of materials.

The waste treatment system will consist of an A.P.I. separator to remove waste oils, a trickling filter to biologically break down toxic materials and a lagooning system for further biological oxidation.

Comments: Installation of the above treatment system probably will not completely eliminate the plant's pollution problems but it will greatly reduce the polluttional load to the receiving waters.

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Date Approved:

7 August 1959

Table I

Chemical Analysis on Rhom and Haas' Pasadena Plant, May 14, 1958

Cyanides-----	20 ppm
Phenols-----	25 ppm
pH-----	5.4
Oil-----	687 ppm

Biological Assay Results

<u>Species</u>	<u>Concentration</u>	<u>Physiological Observations</u>
5 sailfin mollies (<u>Mollienensia latepinna</u>)	Control	All shrimp, gambusia, mollies and croakers alive and okay after 48 hours.
5 common mosquito fish <u>Gambusia affinis</u>		
5 shrimp <u>Paleomonete</u> sp.		
10 spot croakers <u>Leiostomous xanthurus</u>		
5 sailfin mollies <u>Mollienensia latepinna</u>	1%	Slight discomfort noted in all gambusia, shrimp and mollies but all alive and well after 48 hours.
5 common mosquito fish <u>Gambusia affinis</u>		
5 shrimp <u>Paleomonete</u>		
5 sailfin mollies <u>Mollienensia latepinna</u>	2%	Irritation noted after 1 hour in all test animals. 1 molly dead in 20 hours. Other mollies alive after 48 hours but very sluggish. 2 gambusia dead within 24 hours. Other gambusia alive after 48 hours. Gambusia appeared very weak after 48 hours. All shrimp dead within 20 hours.
5 common mosquito fish <u>Gambusia affinis</u>		
5 shrimp <u>Paleomonete</u>		

Continuation of Table I

Species	Concentration	Physiological Observations
5 sailfin mollies <u>Mollienensia latepinna</u>	3%	Extreme irritation of mollies noted within 30 minutes. 2 mollies dead within 8 hours. All dead within 24 hours. All gambusia (normally a top water fish) stayed on bottom of test jar. 4 gambusia dead within 24 hours. 1 alive after 48 hours. Shrimp kept trying to jump out of test jars. All shrimp dead within 20 hours.
5 common mosquito fish <u>Gambusia affinis</u>		
5 shrimp <u>Paleomonete</u>		
5 sailfin mollies <u>Mollienensia latepinna</u>	4%	Extreme irritation of mollies noted within 30 minutes. Tried to jump out of tanks. All dead within 20 hours.
5 common mosquito fish <u>Gambusia affinis</u>		
5 shrimp <u>Paleomonete</u>		
10 small spot croakers <u>Leistomous xanthenus</u>	3% conc. of waste in one large battery jar (30 liter capacity).	All croakers showed signs of extreme irritation immediately after waste water was added. All swam vigorously to the surface then to the bottom again. Some jumped out of the battery jar and onto the floor. Loss of equilibrium after 2 minutes. All croakers dead within 8 minutes.

Note: All above chemical determinations according to Standard Methods for the Examination of Water Sewage and Waste.

Table II

Chemical Analysis of Rhom and Haas' Pasadena Plant Effluent - April 10, 1958

Chlorides -----	1061 ppm
Cyanides-----	25.0 ppm
pH-----	8.7
Phenols -----	47.5 ppm
C.O.D. -----	0.0 ppm

Biological Assay Results

<u>Species</u>	<u>Concentration</u>	<u>Physiological Observations</u>
3 silver sides	Control	No deaths in 48 hours
3 silver sides	0.1%	No deaths in 48 hours
3 silver sides	0.3%	No deaths in 48 hours
3 silver sides	1.0%	No deaths in 48 hours
3 silver sides	2.0%	2 dead in 30 hours. All dead in 48 hours.
3 silver sides	3.0%	All dead in 8 hours
