

JOB REPORT

Roy W. Spears  
Marine Chemist.

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Project Name: Pollution Abatement in Regions M-4 through M-9.

Period Covered: May 15, 1958 through February 15, 1959. Job No. F-1

Bio-Assay of the Pontiac Refinery and Final Effluent and its Effects on Aquatic Life in Corpus Christi Harbor.

Abstract: The Pontiac Refinery empties a toxic waste into Corpus Christi harbor. The plant is equipped with API separators which extract the toxic components (oils and settable solids), but at the present they are not capable of handling the waste properly to render it safe for aquatic life.

Objective: To determine the toxicity of Pontiac's effluent and the presence and concentration of toxic components.

Procedure: Stations were established as follows:  
(1) At the outfall;  
(2) 25 feet away from the outfall;  
(3) 50 feet away from the outfall.

Information pertaining to production and handling of the wastes were obtained from plant personnel. Toxicity tests and chemical analysis were determined for each sampling.

Findings: The Pontiac Refinery is located on the west side of the Corpus Christi harbor and produces petroleum products. It uses the bay water as a coolant and as a route of disposal for municipal and industrial wastes. The rate of flow of the wastes is approximately 500 gallons per minute. Prior to entering the bay it goes through an API separator to extract oily wastes and settable solids with scrapers. However, this is not completely successful, and some wastes in emulsion (sulfides, oil and phenols) empty into the bay. This waste has proven to be toxic to aquatic life.

The area of disposal for the Pontiac waste seems to be a catch-all for other refinery wastes since the exchange of water by tidal action is limited by the road-dam at the north end of the harbor. Previously, this end was open and the harbor was flushed out by the water flowing from Nueces Bay through the harbor and into Corpus Christi Bay.

Extreme pollution occurs during the summer months when the temperature is high, and the rains are scarce. The toxic effects are cumulative and the surrounding water is polluted for a longer period. However, during the winter and spring months the harbor is kept void of pollution by the north winds pushing the toxic materials out of the harbor into Corpus Christi Bay and the dilution effects of the rain reduces the toxicity of the waste.

Figure I shows the water has a 48 hour Median Tolerance Limit (48 hour TLM) value of 9.7 during the month of July. This would require a 33 to 1 dilution of the refinery wastes to be safe for aquatic life. Under these conditions the basin water could not successfully handle more than 100 gallons per minute.

Figure II gives a comparison of a 48 hour TLM value during the winter month at 23.1. This would require a 14.1 dilution of the refinery waste. Through dilution by the rains and mixing of the water by wind action, the water was safe for aquatic life; since station three showed a negligible content of oils, sulfides, and phenols, (Figure III).

Figure IV shows the results of toxicity tests of phenols on the marine indices, pin perch. The 48 hour TLM value was 14.5 indicating the water to be safe for aquatic life at this level. None of the samples taken showed a phenol concentration in excess of 7.0 ppm. However, one of the primary effects of phenols on fish is that it imparts an undesirable taste to the flesh. On this basis it is expected that concentrations of 5.0 ppm or higher will be harmful while 1.0 ppm or less will probably be safe.

Comments: Pontiac Refinery is in the process of enlarging its separators to handle the waste sufficiently. This job was set up to determine the before and after effects of the change, and if the toxicity level is reduced. However, the separators were not installed or changed during the job. A continuation should be made to see the results after the change.

Prepared by: Roy W. Spears  
Marine Chemist

Approved by: Howard T. Lee  
Howard T. Lee  
Date Approved November 19, 1959

FIGURE I

Median Toxicity Threshold Value of Pontiac Refinery in July at Station 3

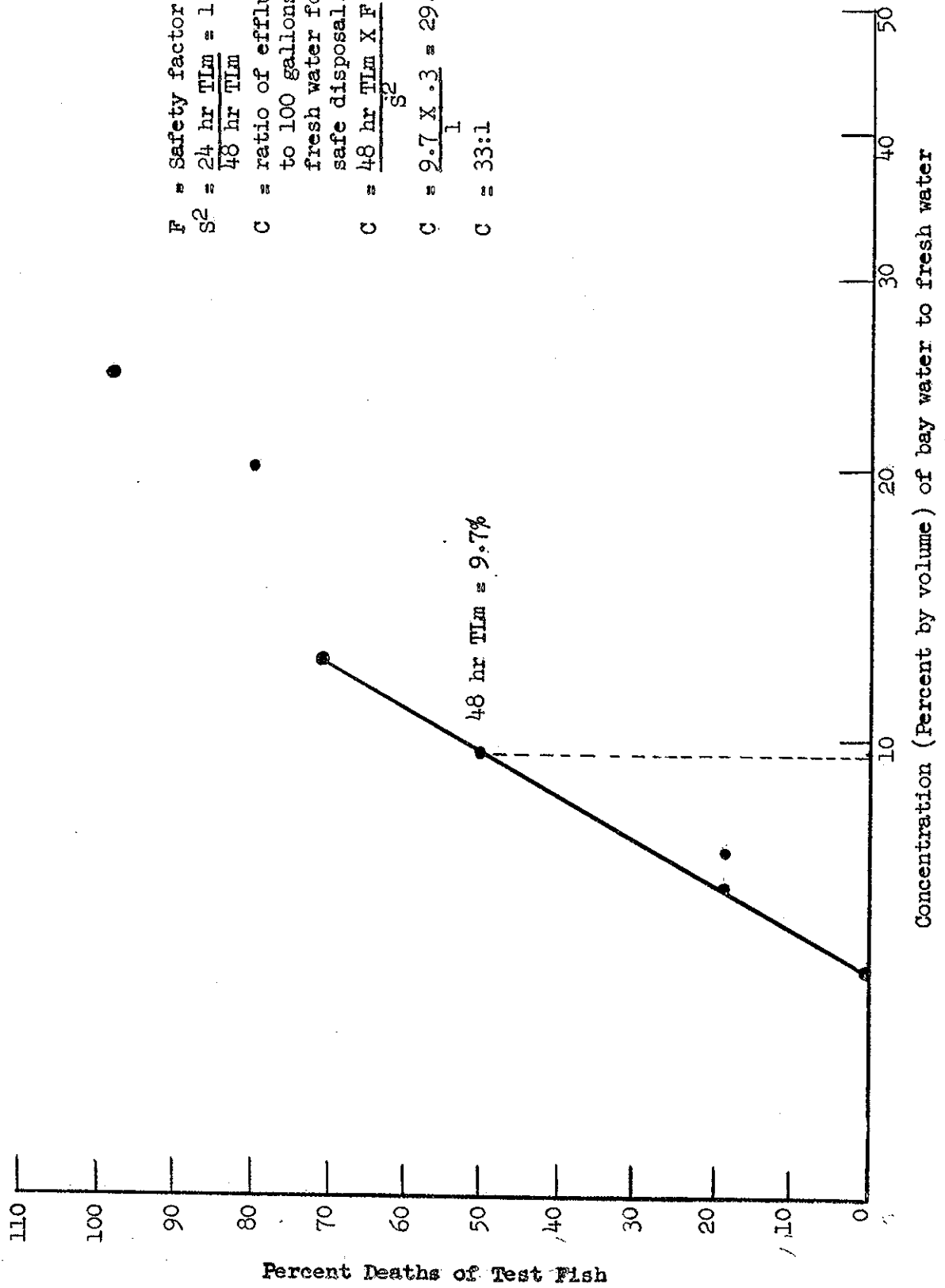


FIGURE II

Median Toxicity Threshold Value of Pontiac Refinery in January at Station 3

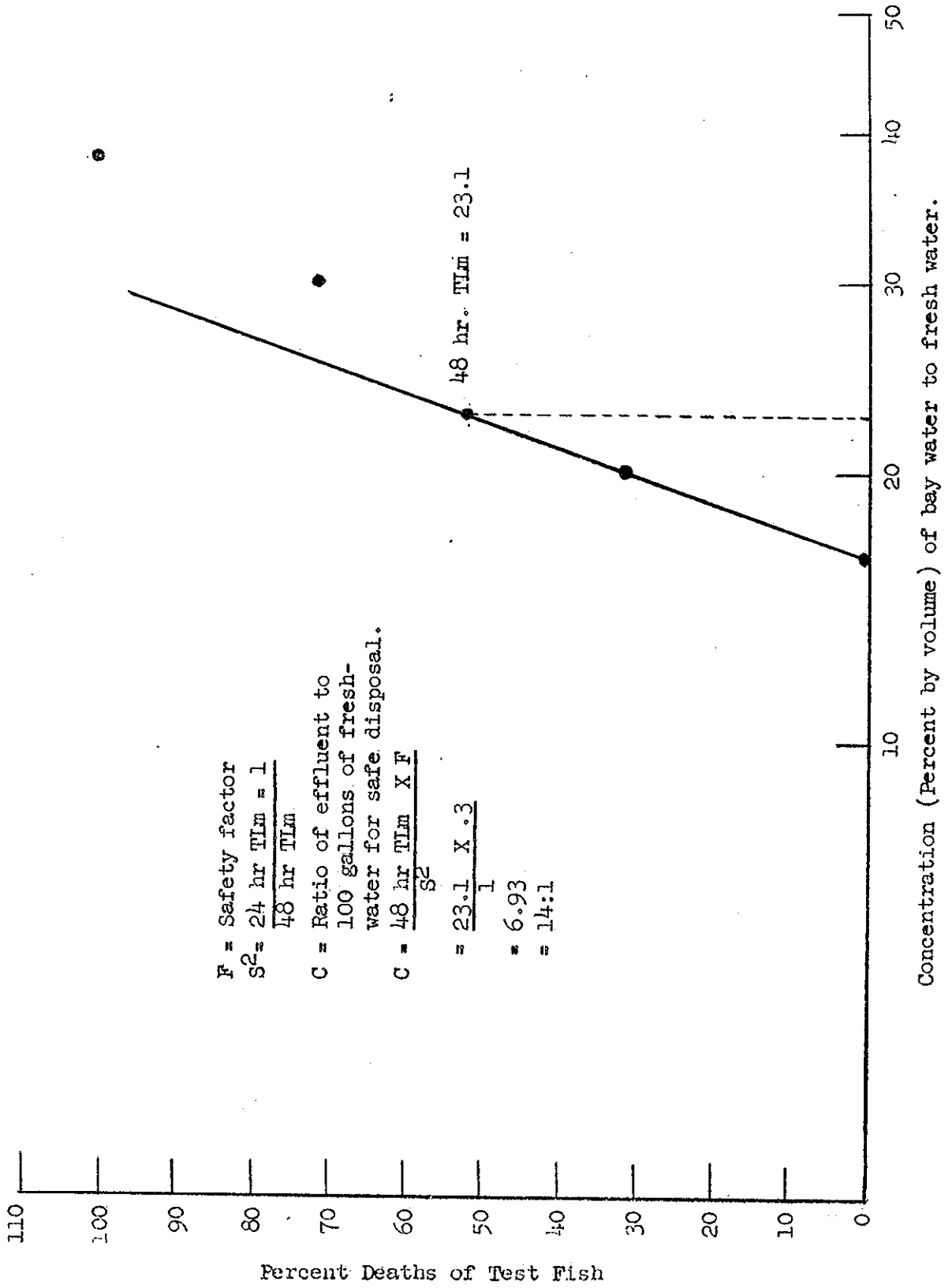


FIGURE III

CHEMICAL ANALYSIS OF PONTIAC EFFLUENT DISPOSAL AREA

Station	Sulfides (ppm)	Phenols (ppm)	Oil (ppm)	Month
I	10.0	4.0	38.0	July, 1958.
II	8.0	3.0	27.0	
III	4.0	3.0	20.0	
I	15.0	7.0	31.0	August, 1958.
II	12.0	6.0	28.0	
III	8.0	3.0	26.0	
I	12.0	---	8.0	January, 1959.
II	2.0	Negligible	----	
III	0.0	Negligible	Negligible	

FIGURE IV

Bio-Assay Results of Pin Perch in A Phenol Solution

