

11 11.09

U.S. Environmental Protection Agency
Region V
Surveillance & Analysis Division
Eastern District Office

Compliance Monitoring Field Report

1. Permittee Identification

General Tire & Rubber Company
Middle Road P.O. Box 68
Ashtabula, Ohio 44004
(216) 998-1120

Corporate Office:

The General Tire & Rubber Company
1 General Street
Akron, Ohio 44309
(216) 798-3000

NPDES Permit: OH 0002283

Receiving Stream: Fields Brook to Ashtabula River

Responsible Official:

Gerald E. Brumbaugh
Technical Superintendent, Ashtabula Plant

2. Dates of Inspection and Survey: January 22-23, 1980

3. Participants

Permittee

Gerald E. Brumbaugh, Technical Superintendent

Ohio EPA

Melinda Becker, Environmental Scientist
Mark Baumgardner, Environmental Scientist

U.S. EPA

Mark Moloney, Environmental Engineer, Author
Charles Beier, Engineering Technician
Joseph Good, General Mechanic
Philip Gehring, Chief, Field Section
Roland Hartranft, Engineering Technician

4. Objective

This compliance sampling inspection was conducted pursuant to a December 19, 1979 Enforcement Division request. The purpose of this study was to verify compliance with NPDES permit OH 0002283 and applicable stream standards. In

addition, three special tests were performed at this facility in order to check for the presence of any toxic pollutants in the company discharge. These tests included two static bioassay tests, scans for organic pollutants, and the Ames test.

5. Summary of Findings and Conclusions

a. The sample results from this compliance inspection show General Tire to be achieving the limits contained in the NPDES permit. Self-monitoring data, however, indicates General Tire has had problems in the past meeting the limits contained in the permit. The company achieved all permit requirements in only two of twelve months in 1979. These records indicate that the plant has exceeded the BOD₅, COD, total suspended solids and total dissolved solids limits contained in the permit.

b. The Company was found to be doing the dissolved solids analysis incorrectly. A drying temperature of 105°C was being used instead of the 180°C specified in standard EPA methods. The Ohio EPA mistakenly told the company to use the incorrect temperature. The company was informed during this inspection that the correct drying temperature is 180°C.

c. Based upon the data collected during this study a high concentration of zinc in the General Tire discharge increases the zinc level in Fields Brook above Ohio WQS for a Warmwater Habitat. Zinc is not limited in the NPDES permit and the discharger does not monitor this metal.

d. Eleven volatile and three non-volatile organics were found to be present in the General Tire discharge. These compounds and their reported concentrations are listed below.

Volatile Organics Detected (3 grab samples)

- Priority
Pollutants*
1. chloroform (74 µg/l)
 2. carbon tetrachloride (4.5 µg/l, 5.7 µg/l)
 3. trans-1,3-dichloropropene (5.5 µg/l)
 4. trichloroethylene (290 µg/l, 28 µg/l, 19 µg/l)
 5. 1,1,2,2-tetrachloroethane (1.0 µg/l)
 6. tetrachloroethylene (3.4 µg/l, 1.7 µg/l)
 7. toluene (5.6 µg/l, 0.5 µg/l, 4.0 µg/l)
 8. chlorobenzene (4.0 µg/l)
 9. 1-methoxy-1-propene (670 µg/l, 21 µg/l, 660 µg/l)
 10. 1,1 oxybisethane (5.3 µg/l, 460 µg/l)
 11. 1,1,2-trichloro-1,2,2 trifluoroethane (4.9 µg/l, 1.6 µg/l)

Non-Volatile Organics Detected (one 24-hour composite sample)

1. Bis(2-ethylhexyl)phthalate (2.4 µg/l)
2. phenanthrene (0.5 µg/l)
3. anthracene (0.5 µg/l)

The first eight volatile organics listed and all three non-volatile organic compounds are priority pollutants.

e. The Ames Test performed on the General Tire effluent sample proved to be negative. That is the effluent did not induce a mutagenic/carcinogenic response in the test bacteria.

GENC 004161

f. The static fish bioassay results show no significant toxicity to the fathead minnow, however, the 48 hour acute mortality to daphnia was 100%.

6. Description of Permittee

A. Facility

The General Tire and Rubber Company - Plastics/Chemical Division Plant in Ashtabula Township manufactures a variety of polymers of vinyl chloride and a vinyl acetate-vinyl chloride copolymer. The average daily production is 310,000 lbs. Operations at the facility are on a 24 hours per day, 7 days per week basis. The plant location and the location of its wastewater discharge to Fields Brook are shown on Attachment #1.

B. Process

Attachment #2 is a schematic of the suspension polymerization process utilized at General Tire. This process begins with a batch reaction of monomer, water and several additives including catalysts, buffers, and emulsifiers in eighteen 4000 gallon reactors. The reaction lasts nine to twelve hours. At this time, polymerization is 93% complete. The unreacted monomer is steam stripped from the polymer slurry and reused. The polymer slurry is centrifuged and dried in a rotary drum drier to a consistency of 1% or less moisture. This polymer cake is then sifted and transferred to storage silos. The finished product is then transferred in bulk from the silos to either rail cars or trucks for shipment.

Besides the main process operations listed above, several support functions are also carried out at this facility. These include:

1. A Boiler House which contains 3 gas fired boilers. The blowdown from this facility is treated at the wastewater treatment facility.

2. Water Treatment - Both the boiler feed water and the processing water are pretreated in a clarifier and filtered through both sand and carbon filters. The water is also passed through an ion exchange column and a zeolite softener. The backwash water from the filters is routed to the wastewater treatment facility along with regenerate wastewater.

C. Wastewater Treatment

An average of 386,500 gallons of water is used per day at the plant. The water usage is tabulated below:

<u>Usage</u>	<u>% Total Volume</u>
Process	58%
Boiler Feed	24%
Cooling Water	11% (recirculated)
Sanitary	2%
Miscellaneous	5%

General Tire obtains their raw water from Ashco Water Supply and the Ashtabula City Water Treatment System.

Attachment #3 contains a flow diagram showing the wastewater treatment system. This system contains a neutralization pit followed by three aeration ponds operated in series. The major wastewater sources to this system include flows from the preneutralization pit discharge, wastewater from the stripper, incinerator scrubber water, cooling water, and miscellaneous storm drain flows.

The preneutralization pit contains several flows which when combined neutralized one another. The flows to this pit include backwashes from the sand and carbon filters and regenerate waste from the ion exchange column. The regenerate wastes from the water softener are discharged directly to the neutralization basin.

Monovinyl chloride (MVC) is recovered from several wastewater streams by steam stripping. These waste streams include: gasholder drainwater, flow from the gasholder knockout pot, and reactor rinse water. All these flows are discharged to the treatment system. The recovered MVC is returned to the reactors for processing to polyvinyl chloride (PVC).

The gases vented from the steam stripping are incinerated in order to reduce the concentration of MVC being discharged to the atmosphere. One of the combustion products is chlorine which combines with the scrubber water to form hydrochloric acid. This waste stream is neutralized at the neutralization pit with a lime slurry.

Sanitary wastewater from the plant flows through a septic tank, is chlorinated and is then discharged to the second aeration pond.

D. Solid Waste Disposal

The sludge collected in the wastewater treatment ponds is dredged three times per year. This material is hauled away and disposed of by Reserve Environmental Services Inc. (RES) of Ashtabula, Ohio, which operates a segregated landfill near the plant on Middle Road. This material may contain a large number of organic priority pollutants and possibly a high concentration of zinc. This is indicated by the sampling results of this inspection.

A complete report on the March 12, 1980 inspection of the Reserve Environmental Services, Inc. facility in Ashtabula written by Willie Harris of EDO has been forwarded to the Compliance Section of the Region V Enforcement Division. The reader is referred to this report for further information on the RES facility.

Other wastes which include trash, paper bags, and reactor cleanings (polymerized vinyl chloride) are sent to Doherty Landfill in Geneva, Ohio. General Tire is currently talking with Reserve Environmental Services Inc., however, about the possibility of accepting the reactor cleanings.

E. Self Monitoring

Currently the General Tire and Rubber Company is collecting samples for self-monitoring in accordance with the NPDES permit. The process discharge (Outfall 601) is sampled manually with a 24 hour composite sample being collected. This sample consists of twelve equal volume aliquots collected every two hours. Two grab samples are also collected upstream and downstream of the plant discharge to Fields Brook. The process discharge is sampled once per week and the instream samples are grabbed once each month. All samples are kept refrigerated prior to being analysed. During periods when the flow from the process discharge (Outfall 601) differs from the plant discharge to Fields Brook (Outfall 001) because of runoff from the plant grounds entering the combined sewer which conveys this water to the creek, an additional 24 hour composited sample is collected at 001.

All the samples collected are analysed by the company in a laboratory on the plant site, reportedly, within specified holding times. The samples from Outfalls 001 and 601 are analysed for BOD₅, COD, suspended solids, and monovinyl chloride. Temperature, pH and flow measurements are also made at these sampling points. The two grab samples collected in the stream are checked for dissolved solids, pH and temperature. It should be noted that the sonic flow meter used to measure the process wastewater flow (601) was not operational during this inspection. The plant discharge to the creek (001) is equipped with a parshall flume and a recorder which was working properly.

All the analyses done in the plant laboratory are done in accordance with the procedures outlined in Methods for Chemical Analysis of Water and Wastes EPA 600/4-79-020, with the exception of dissolved solids. At the request of Melinda Becker of the Ohio EPA Northeast District Office a drying temperature of 105°C was being used by the company instead of the 180°C outlined in Standard Methods. Melinda Becker of Ohio EPA, who was present during this inspection, explained that she had told company officials to use the 105°C temperature. This temperature is listed on the computer printed Ohio EPA discharge monitoring report sheets sent to the company by OEPA. The NPDES permit for this facility, however, calls for the analysis of pollutants to conform to 40 CFR 136 "Test Procedures for the Analysis of Pollutants". These procedures call for a 180°C drying temperature in the analyses for dissolved solids.

During the discussion at the plant the company expressed its willingness to conduct the analyses in the proper manner. It was explained during the inspection that the correct drying temperature is 180°C and this temperature should be used.

7. Description of Compliance Monitoring Field Survey

A. USEPA Sampling Methods and Locations

Sample Sites

Samples were collected at three sites during the survey. Attachment #1 shows the locations of these sampling points. The company's process discharge sample point at the overflow weir on pond #3 designated (601) was not suitable for automatic samplers and so a manhole immediately downstream (75-80 feet) was employed. In addition to the company discharge two grab samples were also collected approximately 75 feet upstream and downstream of Outfall 001. Since there was no runoff from the plant grounds the flows at 601 and 001 were identical and a sample was not collected at 001. Flows were measured at this point using the company's flume. An Ashco water supply sample was collected at the SCM Corporation Plant down the road from General Tire. Since two sampling inspections besides General Tire were being conducted in the area and all the plants used the same water supply, a single raw water sample was collected for the three studies.

Sample Collection

The composited samples taken at Outfall 001 were collected with ISCO automatic samplers. These samples were kept iced during the compositing period. Grab samples were collected upstream and downstream of the plant discharge (001). These included general chemistry, nutrient, metals, and phenol samples. In addition a non-volatile organic scan sample (24 hour composite) and three volatile organic scan samples (grabs) were collected at Outfall 001. Additional sample water was also collected to conduct the static Bioassay Tests and the Ames test. The samples were preserved during collection and transport and all the samples were analysed within specified holding times.

Flow Measurement

The company discharge flow was measured using the company's flume located at Outfall 001. Flow measurements were also made upstream and downstream of the plant using an AA Gurley Meter. The upstream flow value, however, is believed to be in error in that it does not agree with the downstream value and further data taken upstream.

B. Permittee Participation

General Tire and Rubber Company personnel were cooperative during this inspection. Company representatives observed portions of the sampling program and were provided split samples.

C. State Participation

Ms. Melinda Becker of the Ohio EPA participated in this inspection. The State was provided split samples.

D. General Conditions

The air temperature during the survey was in the teens. Several inches of snow fell during the survey with no appreciable effect on flows. Plant production during the survey was 309,000 lbs. This is very close to the average daily production of 310,000 lbs.

8. Discussion

Attachment #4 contains the results of the sampling survey and the NPDES permit limits. The company was in compliance with NPDES permit limits on the survey date. However, the self-monitoring reports for 1979 indicate the discharge exceeds permit limits. A list of these instances in 1979 is included in Attachment #5. The company in the past year had problems meeting the limits for BOD₅, COD, total suspended solids, and total dissolved solids.

Discharge monitoring by the company was found to be satisfactory with the exception of the lab analyses done for dissolved solids. The company was using the wrong drying temperature in doing this test because they were mistakenly told by Ohio EPA to use a drying temperature of 105°C. The company was notified during this inspection to use a drying temperature of 180°C. This error does make the past dissolved solids data suspect.

The results of the volatile and non-volatile organics samples collected at the General Tire discharge are also contained in Attachment #4. These samples were analysed for volatile and non-volatile organics of significant concentrations using gas chromatographs (FID) and computerized gas chromatography-mass spectrometry.

Eleven different volatile organic compounds were detected in one or more of the three grab samples of the General Tire effluent. The eleven compounds were:

	Priority Pollutants	M.F.	A.E.
1. chloroform (74 µg/l)*	X	120 µg/l	120 µg/l
2. carbon tetrachloride (4.5 µg/l, 5.7 µg/l)*	X	1400 µg/l	620 µg/l
3. trans-1,3-dichloropropene (5.5 µg/l)	X	220 µg/l	18 µg/l
4. trichloroethylene (290 µg/l, 28 µg/l, 19 µg/l)*	X	340 µg/l	120 µg/l
5. 1,1,2,2-tetrachlorethane (1.0 µg/l)	X	90 µg/l	50 µg/l
6. tetrachloroethylene (3.4 µg/l, 1.7 µg/l)*	X	700 µg/l	50 µg/l
7. toluene (5.6 µg/l, 0.5 µg/l, 4.0 µg/l)	X	520 µg/l	230 µg/l
8. chlorobenzene (4.0 µg/l)*	X	10 µg/l	10 µg/l
9. 1-methoxy-1-propene (670 µg/l, 21 µg/l, 660 µg/l)			
10. 1,1 oxybisethane (5.3 µg/l, 460 µg/l)			
11. 1,1,2-trichloro-1,2,2-trifluoroethane (4.9 µg/l, 1.6 µg/l)			

The first eight of the compounds listed above are priority pollutants and the five compounds with an asterisk are known or suspected carcinogens.

It should be noted that the reagent blank run as a quality control check was contaminated with 5 µg/l toluene. Thus, the presence of this compound in the G.T. discharge is suspect.

Three compounds were detected in the 24 hour composited non-volatile organic sample of the General Tire effluent. These three compounds were: Bis(2-ethylhexyl)phthalate (2.4 µg/l), Phenanthrene (0.5 µg/l), and Anthracene (0.5 µg/l). All three are priority pollutants. Bis(2-ethylhexyl)phthalate is a phthalate ester and can be detrimental to aquatic organisms at low water concentrations. A freshwater criterion of 3 µg/l is recommended in Quality Criteria for Water. This concentration is also the Ohio Water Quality standard for a warmwater habitat. Although the level detected in the plant discharge is below this criteria its presence still may be of some concern.

In addition to the organic scans done on the General Tire discharge sample, the Ames Test and a bioassay were also conducted.

The Ames Test is used to indicate the presence of mutagenic/carcinogenic compounds. It involves the exposing special strains of bacteria to concentrated portions of the sample in question. Changes in genetic structures in the strain of bacteria used are relatively common and occur at a predictable rate under normal conditions. These changes are detectable by differences in colony growth rate (size of colony) or other variations which develop when these bacteria are exposed to various growth media. Changes in genetic structures for this test are called revertants. When revertants occur at a rate greater than 2.5X the normal or background rate, there is an indication of the presence of mutagenic or carcinogenic compounds in the sample being tested. Toxicity is detected by the absence of bacteria, and may occur without an indication of mutagens/carcinogens. Dose response is reported as positive when a pattern of revertant counts develops with several different concentrations of the sample in question. The results of the Ames Test conducted with a General Tire composited effluent sample was negative. These results are contained in Attachment 4.

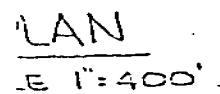
The bioassays were done using fathead minnows (*Pimephales promelas*) and daphnia magna. The tests were again done with a composited wastewater sample of the company's effluent and the results of these tests are also included in Attachment 4. The fish and daphnia bioassays were static tests using undiluted effluent samples and are reported as percent mortality with > 50% being an unacceptable level. The static fish bioassay results show no significant toxicity to the fathead minnow, however, the 48 hour acute mortality to daphnia is 100%. A possible cause of the daphnia mortality may be the high level of zinc in the discharge or the synergistic effect of several pollutants possibly including several of the organic pollutants identified in the organic scans.

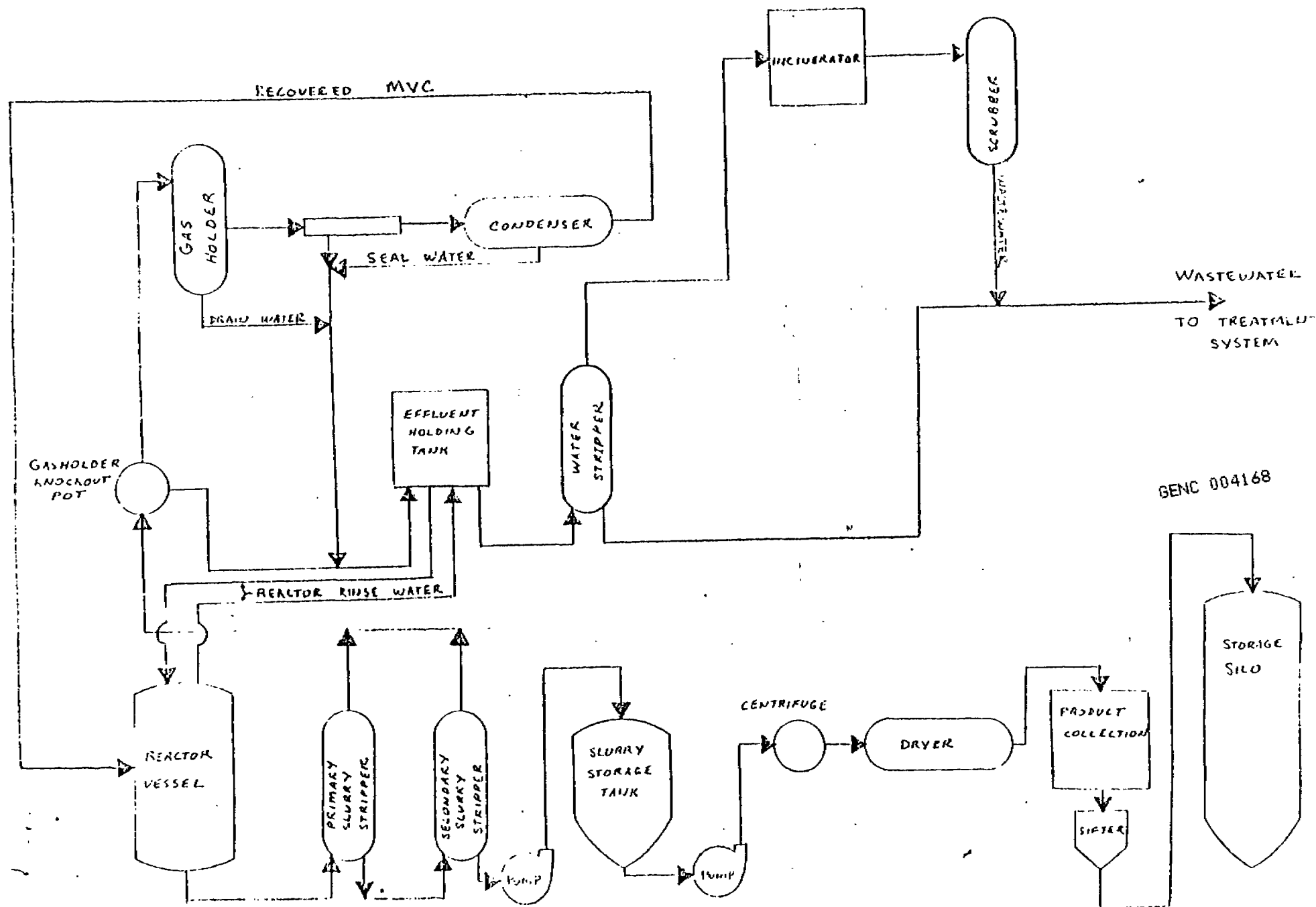
Attachment 6 is a comparison of the upstream, downstream and plant discharge data with the Ohio Water Quality Standards for a Warmwater Habitat. A total of five chemical characteristics exceeded these limits downstream of General Tire. These were dissolved solids, iron, mercury, phenols and zinc. In the case of dissolved solids and iron, the standards were exceeded upstream of the plant as well as downstream. The concentrations of both dissolved solids and iron in the General Tire effluent was low and appears to have had a diluting effect on the water quality of Fields Brook during this study. The concentration of mercury and phenols rises between the upstream and downstream sampling points, however, the General Tire discharge concentrations are not great enough to explain this increase. In the case of zinc, the General Tire discharge obviously had an adverse effect on the quality of Fields Brook during the study. The upstream zinc value was below detection limits while the discharge (0.171 mg/l) and the downstream concentration (0.114 mg/l) were above the 0.095 mg/l warmwater quality limit. Zinc is not monitored by the company and the NPDES permit contains no total zinc limits.

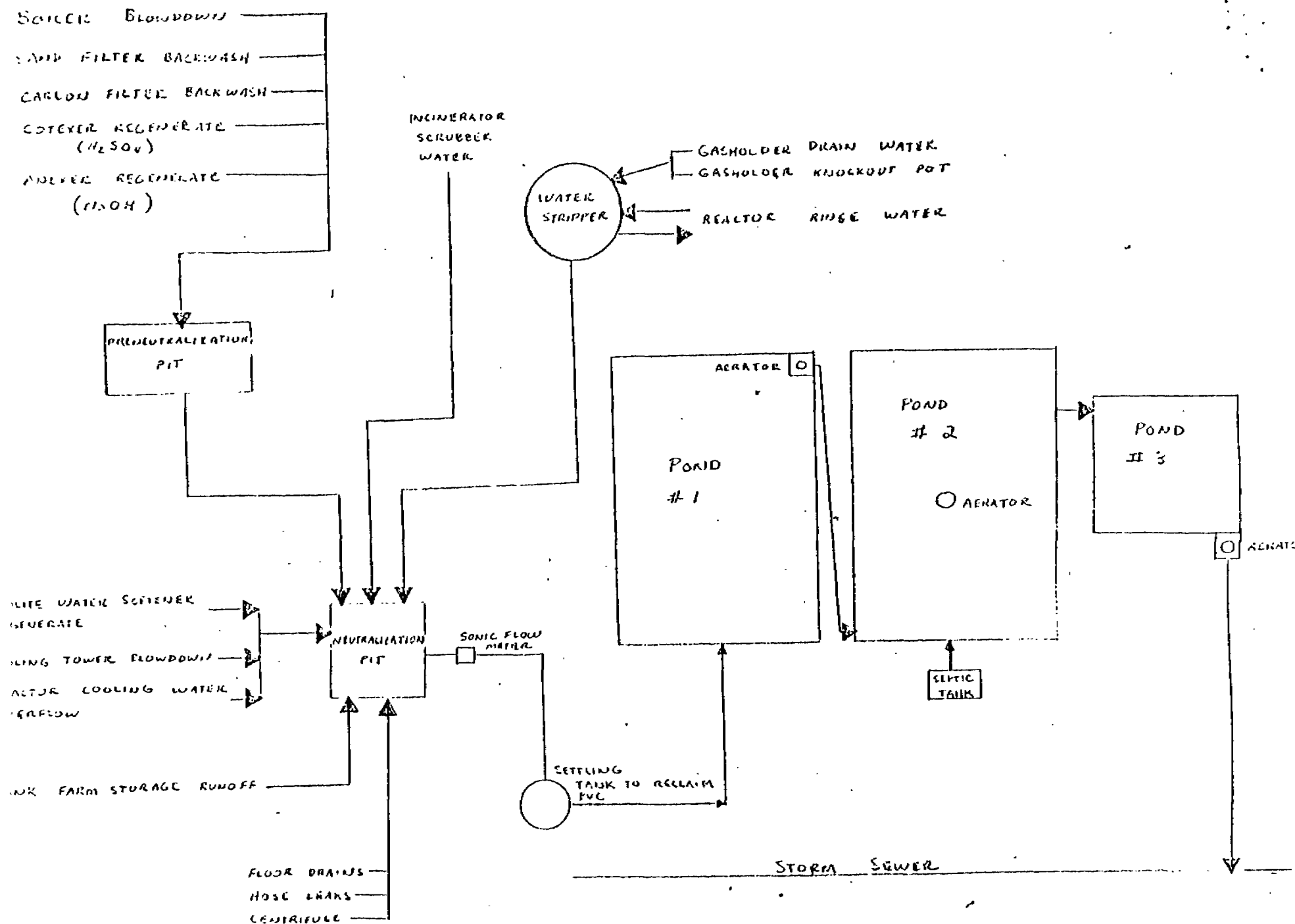
GENC 004166

1. Hiatt, H.H., J.D. Watson, and J.A. Winsten: Origins of Human Cancer, Cold Springs Harbor Laboratory, Cold Springs Harbor, New York, 1977.

A hand-drawn map of an industrial area near Lake Erie. The map shows several roads and streets: 'Lave Road' running diagonally from the top right, 'E. 5th St' on the left, 'E. 15th St' in the middle left, 'E. 1st St' at the bottom, and 'Middle Road' running horizontally. A vertical road is labeled 'CHIO ROAD II'. 'Fields Brook' is shown flowing from the bottom left towards the center. 'LAKE ERIE' is at the top. Industrial sites are marked: 'GENERAL TIRE AND RUBBER COMPANY' with an arrow pointing to a building, 'Oline Corp.' in a box, and 'SCM CORPORATION' in a large building. Near the SCM building are labels '001 (GT)' and '001 (GT)'. A north arrow points upwards in the lower left. The text 'GENC 004167' is in the bottom right corner.







Volatile Organic Analysis of Effluent from
General Tire Corporation, Ashtabula - January 22-23, 1980
(3 grab samples)

(Continued)

Date/Time of Collection	1-22-80/0950	1-22-80/2215	1-23-80/0915	
	Sample Number and Concentration (ppb)			
	VOA #1 EDO473	VOA #2 EDO473	VOA #3 EDO473	Reagent Blank EDO473
<u>Compounds Detected</u>	<u>80-EM04S04</u>	<u>80-EM04S05</u>	<u>80-EM04S06</u>	<u>80-EM04R07</u>
1,1-Dichloroethane	<1.1	<1.1	<1.1	11.8
1,2-Dichloroethylene	<1.1	<1.1	<1.1	<1.1
Chloroform	<1.5	74	<1.5	<1.5
1,2-Dichloroethane	<1.1	<1.1	<1.1	<1.1
1,1,1-Trichloroethane	<1.7	<1.7	<1.7	<1.7
Carbon Tetrachloride	4.5	5.7	<1.8	<1.8
Bromodichloromethane	<3.8	<3.8	<3.8	<3.8
1-Bromo-2-Chloroethane	<4.6	<4.6	<4.6	<4.6
1,2-Dichloropropane	<0.7	<0.7	<0.7	<0.7
Trans-1,3-Dichloropropene	<1.7	<1.1	5.5	<0.7
Benzene	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	290	28	19	<6.0
Chlorodibromomethane	<1.5	<1.5	<1.5	<1.5
1,1,2, Trichloroethane	<1.5	<1.5	<1.5	<1.5
Cis-1,3-Dichloropropene	<1.5	<1.5	<1.5	<1.5
Bromoform	<1.4	<1.4	<1.4	<1.4
1,1,2,2-Tetrachloroethane	1.0	<1.0	<1.0	<1.0
Tetrachloroethylene	3.4	1.7	<0.5	<0.5
Toluene	5.6	0.5	4.0	5.0
Chlorobenzene	<0.5	4.0	<0.5	<0.5
1-methoxy-1-propene*	670	21	660	<0.5
1,1 Oxybisethane*	5.3	460	<0.1	<0.5
1,1,2-Trichloro -	4.9	1.6	<0.1	<0.5
1,2,2-Trifluoroethane*				

GENC 004170

from General Tire Corporation, Ashtabula - January 22-23, 1980
(One 24-hour Composited Sample)

(Continued)

Date Collection Time Period	1/22-23/80 0945-0915 Sample Number and Concentration (ppb)
<u>Compounds Detected</u>	<u>EDO473 80-EM104S01</u>
1,2-Dichlorobenzene	< 0.1
1,4-Dichlorobenzene	< 0.1
Trichlorobenzene	< 0.1
Naphthalene	< 0.1
Diethyl Phthalate	< 0.1
Fluoranthene	< 0.2
Pyrene	< 0.2
Bis(2-ethylhexyl)phthalate	2.4
Isophorone	< 0.7
Phenanthrene	0.5
Anthracene	0.5
1-(2-Butoxyethoxy)ethanol*	< 0.1
Tetrachlorobenzene	< 0.1
Dimethyl Naphthalene*	< 0.1
Phenol*	< 0.1
Benzonitrile*	< 0.1
1-Methyl-4-Ethenyl Benzene*	< 0.1
Phenyl Ethanone*	< 0.1
Methyl Phenol*	< 0.1
Dimethyl Phenol*	< 0.1
1,1-2-ethyl biphenyl*	< 0.1
Unknown Silyl Compounds*	< 0.1
Di-n-Butyl Phthalate*	< 0.1
Total Aliphatic Hydrocarbons*	< 0.1
Other Unidentified Compounds	< 0.1

GENC 004171

Ames and Bioassay Results
General Tire Effluent

Ames Test Results

	<u>Date Sampled</u>	<u>CRL Data Set No.</u>	<u>Sample Number</u>	<u>Concentration</u>	<u>Revertant Counts X Background Counts</u>	<u>Toxicity</u>	<u>Dose Response</u>
General Tire	1/22-23/80	473	80EM04S01	100X	1+	None	None
		473	80EM04S01	200X	1	None	None

Bioassay Test Results

	<u>Date Sampled</u>	<u>CRL Data Set No.</u>	<u>Sample Number</u>	<u>Aliquot</u>	<u>Fish % Mortality</u>			<u>Daphnia % Mortality</u>	
					<u>24 hrs</u>	<u>48 hrs</u>	<u>96 hrs</u>	<u>24 hrs</u>	<u>48 hrs</u>
General Tire	1/22-23/80	473	80EM04S01	#1	0	--	5	100	100
		473	80EM04S01	#2	0	--	0	90	100
			Control Sample	#1	0	--	0	0	0
			Control Sample	#2	0	--	0	0	0

Excursions from January 1979, through December 1979,
as Reported in Entity's Self-Monitoring Reports

<u>Date</u>	<u>Outfall</u>	<u>Parameter</u>	<u>Reported Value</u>	<u>Permit Limit</u>	
				<u>Monthly Avg.</u>	<u>Daily Max.</u>
1/79	601	BOD ₅	48 mg/l	20 mg/l	
1/79	601	BOD ₅	63 kg/day	32 kg/day	
1/79	601	COD	195 mg/l	150 mg/l	
1/25/79	601	BOD ₅	155 mg/l		33 mg/l
1/25/79	601	BOD ₅	183 kg/day		54 kg/day
1/25/79	601	COD	333 mg/l		290 mg/l

2/79 - In Compliance

3/79	601	BOD ₅	62 mg/l	20 mg/l	
3/79	601	BOD ₅	78 kg/day	32 kg/day	
3/79	601	COD	208 mg/l	150 mg/l	
3/1/79	601	BOD ₅	141 mg/l		33 mg/l
3/1/79	601	BOD ₅	166 kg/day		54 kg/day
3/15/79	601	BOD ₅	144 mg/l		33 mg/l
3/15/79	601	BOD ₅	192 kg/day		54 kg/day

4/79 - In compliance

5/79	601	TDS	942 mg/l	900 mg/l	
6/79	601	TSS	22 mg/l	20 mg/l	
7/79	601	TDS	956 mg/l	900 mg/l	
8/79	601	TDS	1276 mg/l	900 mg/l	
9/79	601	TDS	1089 mg/l	900 mg/l	
10/79	601	COD	186 mg/l	150 mg/l	
11/79	601	TDS	1147 mg/l	900 mg/l	
12/79	601	TDS	933 mg/l	900 mg/l	

GENC 004173

Comparison of USEPA Survey Results
and Ohio Water Quality Standards

<u>Parameter</u>	<u>Upstream</u>	<u>Plant Discharge</u>	<u>Downstream</u>	<u>Ohio WQS Warmwater Habitat</u>
Flow (MGD)	4.29* (mg/l)	0.378 (mg/l)	3.73 (mg/l)	-- (mg/l)
Ammonia-N	0.76	0.67	0.78	10.1
Beryllium	<0.001	<0.001	<0.001	1.100
Cadmium	<0.002	<0.002	<0.002	0.012
T. Residual Chlorine	--	0.0	--	0.002
Chromium	<0.005	0.009	0.007	0.100
Copper	0.008	0.023	0.015	0.20 **
Cyanide	--	--	--	0.025
Dissolved Oxygen	10.1	--	9.9	5.0
Dissolved Solids	2474	768	2214	1500
Iron	1.740	0.666	1.930	1.000
Lead	<0.030	<0.030	<0.030	0.030
MBAS	--	--	--	0.500
Mercury	0.0002	0.0002	0.0004	0.0002
Nickel	<0.030	<0.030	<0.030	0.025
Oil and Grease	--	--	--	5.0
Pesticides	--	None detected	--	Various limits for the different pesticides
pH	7.3	7.40-7.55	7.6	6.5-9.0
Phenolic Compounds	0.003	0.006	0.014	0.010
Phosphorus	--	--	--	1.0
Phthalate esters	--	0.0024 in the form of Bis(2 ethylhexyl) phthalate	--	0.003
PCB's	--	None detected	--	0.000001
Selenium	--	--	--	0.01 x 96 hours LC ₅₀
Silver	<0.003	<0.003	<0.003	0.01 x 96 hours LC ₅₀
Zinc	<0.050	0.171	0.114	0.095 **
Temperature, °C	2.0	17.0-17.5	5.0	6.7 monthly avg. 9.4 daily max.

*Flow suspected to be in error.

**Based on a calculated hardness downstream of 165 mg/l as CaCO₃.

GENC 004174