File in WQ

US EPA RECORDS CENTER REGION 5
403992

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES COMMISSION

IN THE MATTER OF

NPDES PERMIT NO. MI 0003[illegible]

BASF Wyandotte Corporation
South Works

WRC NO.: NC-9-77-04-2551

NOTICE OF NONCOMPLIANCE AND ORDER TO COMPLY

TO: BASF Wyandotte Corporation
1609 Biddle Avenue
Wyandotte, Michigan 48192

Attn: Mr. W. J. Leisten, Manager, Environmental Control

PLEASE BE ADVISED that we have sufficient information to believe that your facility has failed to comply with the terms and conditions of your National Pollutant Discharge Elimination System Permit issued on December 19, 1974.

PURSUANT to the terms of the aforementioned permit (Part I, Section A.6), any discharge from your facility is limited to the following for Outfall 003:

Effluent Characteristics	Discharge Limitations lbs/day Daily Average	lbs/day Daily Maximum	mg/l Daily Average	mg/l Daily Maximum
Total Suspended Solids	5921 (net)	10,362 (net)	20 (net)	35 (net)
Total Chlorine Residual	----	---	--	.5
Total Lead	1.63	3.25	--	--
pH	Shall not be less than 6.5 nor greater than 9.5			

The monthly monitoring reports submitted for the months of June and July, 1977, show that your facility exceeded its authorized discharge limits according to the following:

Date Sampled	Effluent Characteristics	Reported Value
6/3/77	Total Suspended Solids	47 mg/l (net)
6/4/77	Total Suspended Solids	58 mg/l (net)
6/5/77	Total Suspended Solids	56 mg/l (net)
6/6/77	Total Suspended Solids	47 mg/l (net)
6/7/77	Total Suspended Solids	58 mg/l (net)
6/9/77	Total Suspended Solids	36 mg/l (net)
6/10/77	Total Suspended Solids	62 mg/l (net)
6/11/77	Total Suspended Solids	55 mg/l (net)
6/14/77	Total Suspended Solids	43 mg/l (net)
6/16/77	Total Suspended Solids	42 mg/l (net)
6/17/77	Total Suspended Solids	49 mg/l (net)
6/18/77	Total Suspended Solids	42 mg/l (net)
6/19/77	Total Suspended Solids	39 mg/l (net)
6/3/77	Total Suspended Solids	12,098 lbs/day (net)
6/4/77	Total Suspended Solids	15,702 lbs/day (net)
6/5/77	Total Suspended Solids	15,860 lbs/day (net)
6/6/77	Total Suspended Solids	12,920 lbs/day (net)
6/7/77	Total Suspended Solids	15,944 lbs/day (net)
6/10/77	Total Suspended Solids	16,527 lbs/day (net)
6/11/77	Total Suspended Solids	14,661 lbs/day (net)
6/14/77	Total Suspended Solids	10,925 lbs/day (net)
6/17/77	Total Suspended Solids	12,694 lbs/day (net)
6/18/77	Total Suspended Solids	10,671 lbs/day (net)
6/19/77	Total Suspended Solids	10,721 lbs/day (net)

WQ

Date Sampled	Effluent Characteristics	Daily Average	High	Low
6/1/77	Total Chlorine Residual	3.1 mg/l	3.7 mg/l	2.7 mg/l
6/2/77	Total Chlorine Residual	1.7 mg/l	2.9 mg/l	.7 mg/l
6/3/77	Total Chlorine Residual	1.5 mg/l	2.5 mg/l	.8 mg/l
6/4/77	Total Chlorine Residual	3.7 mg/l	5.0 mg/l	2.0 mg/l
6/5/77	Total Chlorine Residual	2.6 mg/l	3.4 mg/l	1.2 mg/l
6/6/77	Total Chlorine Residual	2.1 mg/l	2.7 mg/l	1.2 mg/l
6/7/77	Total Chlorine Residual	4.8 mg/l	7.7 mg/l	3.2 mg/l
6/8/77	Total Chlorine Residual	4.2 mg/l	8.9 mg/l	1.6 mg/l
6/9/77	Total Chlorine Residual	1.0 mg/l	1.2 mg/l	.8 mg/l
6/10/77	Total Chlorine Residual	1.3 mg/l	1.5 mg/l	1.0 mg/l
6/11/77	Total Chlorine Residual	4.4 mg/l	8.0 mg/l	2.3 mg/l
6/12/77	Total Chlorine Residual	3.8 mg/l	4.6 mg/l	2.9 mg/l
6/13/77	Total Chlorine Residual	7.1 mg/l	8.8 mg/l	5.3 mg/l
6/14/77	Total Chlorine Residual	5.0 mg/l	5.1 mg/l	4.9 mg/l
6/15/77	Total Chlorine Residual	5.4 mg/l	5.8 mg/l	4.9 mg/l
6/16/77	Total Chlorine Residual	4.9 mg/l	5.3 mg/l	4.9 mg/l
6/17/77	Total Chlorine Residual	5.2 mg/l	7.6 mg/l	3.5 mg/l
6/18/77	Total Chlorine Residual	3.9 mg/l	4.1 mg/l	3.8 mg/l
6/19/77	Total Chlorine Residual	4.9 mg/l	5.6 mg/l	4.4 mg/l
6/20/77	Total Chlorine Residual	3.9 mg/l	5.8 mg/l	2.8 mg/l
6/21/77	Total Chlorine Residual	2.9 mg/l	3.7 mg/l	2.0 mg/l
6/22/77	Total Chlorine Residual	1.2 mg/l	2.8 mg/l	*
6/23/77	Total Chlorine Residual	*	.6 mg/l	*
6/24/77	Total Chlorine Residual	.57 mg/l	1.1 mg/l	*
6/25/77	Total Chlorine Residual	*	.9 mg/l	*
6/26/77	Total Chlorine Residual	.6 mg/l	1.0 mg/l	*
6/27/77	Total Chlorine Residual	.63 mg/l	1.0 mg/l	*
6/28/77	Total Chlorine Residual	.6 mg/l	*	*
6/29/77	Total Chlorine Residual	1.0 mg/l	2.0 mg/l	*

* = within limitation

Date Sampled	Effluent Characteristics	Reported Value
6/1/77	Total Lead	6 lbs/day
6/2/77	Total Lead	5 lbs/day
6/4/77	Total Lead	4 lbs/day
6/5/77	Total Lead	4 lbs/day
6/7/77	Total Lead	9 lbs/day
6/9/77	Total Lead	7 lbs/day
6/10/77	Total Lead	4 lbs/day
6/13/77	Total Lead	7 lbs/day
6/14/77	Total Lead	4 lbs/day
6/17/77	Total Lead	12 lbs/day
6/18/77	Total Lead	5 lbs/day
6/21/77	Total Lead	4 lbs/day
6/24/77	Total Lead	4 lbs/day
6/25/77	Total Lead	4 lbs/day
6/26/77	Total Lead	4 lbs/day
6/27/77	Total Lead	4 lbs/day
6/28/77	Total Lead	4 lbs/day
6/1/77	pH	11.5
6/2/77	pH	11.7
6/3/77	pH	11.8
6/4/77	pH	11.9
6/4/77	pH	10.5
6/5/77	pH	12.0
6/5/77	pH	11.0
6/6/77	pH	12.1
6/6/77	pH	10.8
6/7/77	pH	12.0
6/8/77	pH	12.0
6/8/77	pH	11.0
6/9/77	pH	11.8
6/10/77	pH	10.8
6/11/77	pH	11.2
6/12/77	pH	10.8
6/13/77	pH	12.1
6/13/77	pH	10.1

WQ

Date Sampled (Con't.)	Effluent Characteristics	Reported Value
6/14/77	pH	12.0
6/14/77	pH	10.1
6/15/77	pH	11.5
6/16/77	pH	10.0
6/16/77	pH	9.6
6/21/77	pH	10.4
6/22/77	pH	10.2
6/24/77	pH	11.2
6/25/77	pH	12.2
6/25/77	pH	10.5
6/26/77	pH	11.8
6/26/77	pH	10.1
6/27/77	pH	11.0
6/27/77	pH	10.1
6/28/77	pH	11.7
6/29/77	pH	10.2
6/30/77	pH	10.4
6/30/77	pH	4.8
7/1/77	pH	10.6
7/1/77	pH	2.9
7/2/77	pH	10.9
7/3/77	pH	11.2
7/3/77	pH	3.0
7/4/77	pH	6.3
7/5/77	pH	10.3
7/6/77	pH	11.7
7/7/77	pH	6.4
7/8/77	pH	10.5
7/8/77	pH	4.1
7/9/77	pH	9.6
7/10/77	pH	6.1
7/11/77	pH	10.6
7/11/77	pH	6.3
7/12/77	pH	10.3
7/12/77	pH	6.2
7/13/77	pH	12.0
7/14/77	pH	10.6
7/14/77	pH	6.0
7/15/77	pH	10.5
7/15/77	pH	6.0
7/16/77	pH	6.0
7/17/77	pH	10.3
7/17/77	pH	6.0
7/18/77	pH	10.0
7/19/77	pH	9.8
7/20/77	pH	10.7
7/20/77	pH	6.0
7/21/77	pH	10.6
7/21/77	pH	6.0
7/22/77	pH	10.5
7/22/77	pH	6.0
7/23/77	pH	6.3
7/24/77	pH	11.0
7/25/77	pH	10.3
7/25/77	pH	6.0
7/26/77	pH	11.4
7/26/77	pH	6.0
7/27/77	pH	11.2
7/27/77	pH	6.0
7/28/77	pH	10.4
7/29/77	pH	10.0
7/30/77	pH	9.7
7/31/77	pH	10.8
7/31/77	pH	6.0

Report Date	Effluent Characteristics	Reported Average
June, 1977	Total Suspended Solids	28 mg/l (net)
June, 1977	Total Suspended Solids	7,356 lbs/day (net)
June, 1977	Total Lead	4 lbs/day

Table 1 Fathead minnow mortality after exposure to various concentrations of BASF Wyandotte effluent from outfall 820180 (001).

Nominal Effluent Concentration %	Percent Mortality/Exposure Period								
	2 hours	7 hours	18 hours	24 hours	31 hours	41 hours	48 hours	72 hours	96 hours
100	100	--	--	--	--	--	--	--	100
88	100	--	--	--	--	--	--	--	100
75	70	85	85	100	--	--	--	--	100
66	80	80	80	100	--	--	--	--	100
50	0	5	5	10	10	20	20	30	35
33	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0

96 hour LC50 = 53% effluent
approximate 95% confidence limits = 48 and 59% effluent

Table 2 Results of a 48-hour static *D. magna* toxicity test conducted with effluent from outfall 820180 (001) at BASF Wyandotte - 6/23-25/81.

a. Biological Data

Nominal % Effluent	% immobilized at 24 hours	% immobilized at 48 hours
100	0	0
88	0	10
75	0	10
66	0	0
50	0	0
33	0	0
25	0	0
12	0	0
0 (control)	0	10

48-hour ECSO: Cannot be determined - insufficient immobilization.

b. Chemical/Physical Data

Parameter	6/23/81 Control	6/23/81 50%	6/23/81 100%	6/25/81 Control	6/25/81 50%	6/25/81 100%
Dissolved oxygen (mg/l)	8.2	7.2	6.1	8.2	7.5	7.3
Oxygen saturation (%)	99	87	74	95	87	85
pH (S.U.)	8.1	8.0	7.9	8.2	8.0	7.9
Temperature (°C)	24	24	25	22	22	22
Conductivity (umhos)	226	240	247	226	239	246
Alkalinity (mg/l)	--	--	--	88	--	88
Hardness (mg/l)	--	--	--	100	--	100

Table 3 Results of a 48-hour static *D. magna* toxicity test conducted with effluent from outfall 820178 (003) at BASF Wyandotte - 6/23-25/81.

a. Biological Data

Nominal % Effluent	% immobilization at 24 hours	% immobilization at 48 hours
100	0	10
75	0	0
50	0	0
25	0	0
10	0	0
0 (control)	0	0

48 hour EC50: Cannot be determined - insufficient immobilization.

b. Chemical/Physical Data

Parameter	6/23/81 Control	6/23/81 50%	6/23/81 100%	6/25/81 Control	6/25/81 50%	6/25/81 100%
Dissolved oxygen (mg/l)	8.4	8.5	8.6	8.5	8.3	8.2
Oxygen Saturation (%)	98	99	98	94	92	91
pH (S.U.)	7.8	7.8	7.8	8.2	8.2	8.2
Temperature (°C)	22	22	21	20	20	20
Conductivity (umhos)	234	796	1360	231	787	1330
Alkalinity (mg/l)	84		140	--		
Hardness (mg/l)	100		180	--		

Table 4 On-site analyses of effluent grab samples collected at BASF Wyandotte Corporation, outfall 820180 (C[illegible]) during 6/22-26/81.

Date	Time	Temp.* (°C)	pH (S.U.)	Conductivity (umhos)	D.O. (mg/l)	Chlorine (mg/l)	Alkalinity (mg/l)	Hardness (mg/l)
6-22-81	1400	23	7.6	597	4.8	Trace①	--	--
	1740	22	7.8	270	5.4	--	--	--
	2140	22	7.8	262	4.8	U②	88	110
6-23-81	0800	21	7.7	277	5.3	--	96	110
	1125	23	7.6	260	3.9	U	--	--
	1550	24	7.7	306	4.1	--	--	--
	2140	21	7.8	249	6.0	U	--	--
6-24-81	0740	22	7.7	251	4.9	U	--	--
	1140	22	7.7	251	5.5	--	100③	110③
	1540	23	7.7	309	3.7	--	--	--
	2130	22	7.2	301	3.2	--	--	--
6-25-81	0840	21	7.6	303	4.2	U	--	--
	1120	23	7.6	287	3.9	U	--	--
	1515	25	7.0	260	1.6	--	96	110
	2125	22	7.5	288	3.4	--	--	--
6-26-81	0840	22	7.6	321	2.9	U	88	100
	1140	23	7.8	240	4.4	--	--	--
	1405	23	7.9	250	4.5	--	--	--

* - After the heat exchanger
① - Trace: present in quantity << detection limit of 0.2 mg/l
② - U = undetected
③ - Actual analyses performed at 1040

Table 5 On-site analyses of diluent (Detroit River) grab samples collected during 6/22-26/81.

Date	Time	Temp.* (°C)	pH (S.U.)	Conductivity (umhos)	D.O. (mg/l)	Chlorine (mg/l)	Alkalinity (mg/l)	Hardness (mg/l)
6-22-81	1400	22	7.9	244	7.4	Trace①	--	--
	1740	21	7.9	240	7.4	--	--	--
	2140	21	7.9	234	7.6	U②	84	110
6-23-81	0800	21	7.9	241	8.0	--	88	100
	1125	22	7.9	231	8.2	U	--	--
	1550	22	8.1	225	8.5	--	--	--
	2140	20	7.9	237	8.5	U	--	--
6-24-81	0740	20	7.7	238	8.4	Trace	--	--
	1140	21	7.9	231	8.5	--	84③	100③
	1540	21	7.9	229	8.4	--	--	--
	2130	20	7.9	233	8.6	--	--	--
6-25-81	0840	22	7.8	231	8.4	Trace	--	--
	1120	21	7.8	228	8.4	U	--	--
	1515	22	8.0	220	8.4	--	88	100
	2125	21	7.8	227	8.4	--	--	--
6-26-81	0840	20	7.9	226	8.4	U	88	100
	1140	21	8.0	225	8.3	--	--	--
	1405	21	7.9	225	8.3	--	--	--

* - After the heat exchanger
① - Trace = present in quantity << detection limit of 0.2 mg/l
② - U = undetected
③ - Actual analyses performed at 1040

Table 6 Laboratory analyses of effluent composite samples collected from outfall 820180 (001) at BASF Wyandotte Corporation.

Sample Period	From	6-22-81 - 1600		6-24-81 - 0815	
	To	6-23-81 - 1600		6-25-81 - 0815	
Computed flow rate① (M^3/day)		23,000		25,000	
		mg/l	kg/day	mg/l	kg/day
Suspended solids		13	300	20	500
Dissolved solids		150	3,400	170	4,200
COD		97	2,200	180	4,500
TOC		31	710	34	850
Cyanide (Total)		0.009	0.2	--	--
Cyanide (Free)		< 0.009	--	--	--
Sulfide		< 0.02②	--	--	--
BOD_5		24	550	15	380
Nitrite & nitrate nitrogen-N		0.31	7.1	--	--
Ammonia nitrogen-N		0.32	7.4	0.43	11.
Kjeldahl nitrogen-N		1.3	30.	1.0	25
Total phosphorus-P		0.09	2	0.06	2
Chlorides		18.2	419	19.3	482
MBAS		0.02③	0.5	--	--
		ug/l		ug/l	
Phenol		17④	0.39	8④	0.2
Total cadmium (Cd)		< 20	--	< 20	--
Total chromium (Cr)		< 50	--	< 50	--
Hexavalent chromium (Cr^{+6})		< 2	--	--	--
Total copper (Cu)		< 20	--	< 20	--
Total nickel (Ni)		< 50	--	< 50	--
Total lead (Pb)		< 50	--	< 50	--
Total zinc (Zn)		< 50	--	< 50	--
Total iron (Fe)		580	13	--	--
Total mercury (Hg)		< 1	--	--	--
Polynuclear aromatic hydrocarbons		< 1	--	--	--
PCB 1242		< 0.1	--	--	--
PCB 1254		< 0.1	--	--	--
PCB 1260		< 0.1	--	--	--
Other PCB's & organochlorine pesticides		U⑤	--	--	--

① - Flow rates used in the computation of kg/day-obtained from company MOR.
② - Possible interference
③ - Maximum holding time was exceeded
④ - *Analytical method not yet approved by laboratory*
⑤ - U = undetected
To obtain MGD multiply M3/day by 0.0002642
To obtain lbs/day multiply kg/day by 2.205

Table 7 Laboratory analyses of effluent grab samples collected from outfall 820180 (001) at BASF-Wyandotte Corporation.

Date Time	6-22-81 1610	6-22-81 2315	6-23-81 0850	6-23-81 ① 1135	6-24-81 2150	6-25-81 0805
	mg/l*	mg/l	mg/l	mg/l*	mg/l	mg/l
Suspended solids	15	8	16	--	--	--
Dissolved solids	140	140	180	--	--	--
COD	58	42	420	--	--	--
TOC	14	14	110	--	--	--
BOD_5	8.0	12.	78.	--	--	--
Chlorine Residual	U ②	U	U	U	--	--
Nitrite & nitrate nitrogen-N	0.37	0.33	0.28	--	--	--
Ammonia nitrogen-N	0.29	0.27	0.43	--	--	--
Kjeldahl nitrogen-N	1.3	0.87	1.8	--	--	--
Total phosphorus-P	0.09	0.06	0.11	--	--	--
Chlorides	21.	16.	33.	--	--	--
Oil & Grease (Grav.)	6	< 2	15	--	--	--
Oil & Grease (I.R.)	14	1	11	--	--	--
Petroleum hydrocarbons	11	< 1	4	--	--	--
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Phenol	6 ③	11 ③	30 ③	--	--	--
Total aromatic amines	< 100	< 100	< 100	< 100	< 100	< 100
Total aliphatic amines	220	130	240	160	280	200
Chloroform	< 10	< 10	< 10	< 10	< 1	< 1
1,2-dichloroethane	< 10	< 10	< 10	--	--	--
1,2-dichloropropane	< 10	< 10	< 10	--	--	--
Benzene	< 10	< 10	< 10	55	< 10	< 10
Toluene	< 10	< 10	< 10	15	23	< 10
Xylene	< 10	< 10	< 10	--	--	--
Styrene	< 10	< 10	< 10	< 10	20	< 10
Ethylbenzene	< 10	< 10	< 10	< 10	< 10	< 10
Acrylonitrile	<1000	<1000	<1000	U	--	--
Trichloroethylene	--	--	--	--	--	2
Other purgeable hydrocarbons	U	U	U	U	U	U

* - Collected during a period of fish stress and turnover.
① - Collected inside mobile laboratory rather than at the outfall sampling site.
② - U = undetected
③ - Analytical method not yet approved by laboratory.

Table 8 Laboratory analyses of diluent composite samples collected from the Detroit River at BASF Wyandotte's north intake.

Sample Period	From	6-22-81 - 1630	6-24-81 - 0755
	To	6-23-81 - 1630	6-25-81 - 0755
		mg/l	mg/l
Suspended solids		11	17
Dissolved solids		160	140
COD		8	14
TOC		3.0	3.7
Cyanide (Total)		< 0.005	--
Sulfide		< 0.02	--
BOD_5		2.9	2.3
Nitrite & nitrate nitrogen-N		0.31	--
Ammonia nitrogen-N		0.33	0.35
Kjeldahl nitrogen-N		0.63	0.61
Total phosphorus-P		0.06	0.03
Chlorides		13.5	12.3
MBAS		0.02 (1)	--
		ug/l	ug/l
Phenol		5 (2)	3 (2)
Total cadmium (Cd)		< 20	< 20
Total chromium (Cr)		< 50	< 50
Hexavalent chromium (Cr^{+6})		< 2	--
Total copper (Cu)		< 20	< 20
Total nickel (Ni)		< 50	< 50
Total lead (Pb)		< 50	< 50
Total zinc (Zn)		< 50	< 50
Total iron (Fe)		270	--
Polynuclear aromatic hydrocarbons		< 1	--
PCB 1242		< 0.1	--
PCB 1254		< 0.1	--
PCB 1260		< 0.1	--
Other PCB's & organochlorine pesticides		U (3)	--

(1) - Maximum holding time exceeded.
(2) - Analytical method not yet approved by laboratory.
(3) - U = undetected

Table 9 Laboratory analyses of diluent grab samples collected from the Detroit River at BASF Wyandotte Corporation.

Sample Location	North Intake①				At the Diluent Pump
Date	6-22-81	6-23-81	6-24-81	6-25-81	6-23-81
Time	2330	0915	2155	0750	0910
	mg/l	mg/l			mg/l
COD	6	8			15
TOC	3.5	3.5			3.4
Chlorides	12.8	13.0			12.9
Oil & Grease (Grav.)	< 2	< 2			--
Oil & Grease (I.R.)	< 1	< 1			--
Petroleum hydrocarbons	< 1	< 1			--
	ug/l	ug/l	ug/l	ug/l	ug/l
Total aliphatic amines	< 100	< 100	< 100	< 100	< 100
Total aromatic amines	< 100	< 100	< 100	< 100	< 100
Toluene	< 10	< 10	< 10	< 10	< 10
Xylene	< 10	< 10	--	--	--
Styrene	< 10	< 10	< 10	< 10	< 10
Benzene	< 10	< 10	< 10	< 10	< 10
Ethylbenzene	< 10	< 10	< 10	< 10	< 10
Chloroform	< 10	< 10	< 1	< 1	< 10
Trichloroethylene	--	--	Trace②	3	--
1,2-dichloroethane	< 10	< 10	--	--	--
1,2-dichloropropane	< 10	< 10	--	--	--
Acrylonitrile	< 1,000	< 1,000	--	--	U
Other purgeable hydrocarbons	U③	U	U	U	U

① - Additional intake data are available in a 1981 report by Rock and Browne.
② - Present in quantity less than detection limit.
③ - U = undetected

Table 10 Laboratory analyses of selected effluent grab samples collected at outfall 820178 (003).①

Date	6/23/81	6/23/81
Time	0815	1215
	mg/l	mg/l
Suspended solids	23	10
Dissolved solids	1,200	780
COD	300	120
TOC	83	37
BOD_5	11.	16.
Nitrite & nitrate nitrogen-N	0.46	0.40
Ammonia nitrogen-N	0.95	0.84
Kjeldahl nitrogen-N	2.6	2.1
Total phosphorus-P	0.23	0.24
Chlorides	510	320
Oil & Grease (I.R.)	38	13
Oil & Grease (Gravimetric)	68	28
Petroleum hydrocarbons	25	9
	ug/l	ug/l
Phenol	29②	22②
Total aliphatic amines	460	130
Total aromatic amines	< 100	< 100
Benzene	< 10	< 10
Toluene	< 10	< 10
Xylene	< 10	< 10
Styrene	< 10	< 10
Ethylbenzene	< 10	< 10
Acrylonitrile	< 1,000	< 1,000
Chloroform	< 10	< 10
1,2-Dichloroethane	120	39
1,2-Dichloropropane	1,400	1,200
Other purgeable hydrocarbons	U③	U

① - Addition grab and composite sample data available in Rock and Browne (1981).
② - Analytical method not yet approved by laboratory.
③ - U = undetected.

Table 11 Comparison of study results with BASF Wyandotte Corporation's NPDES Permit (MI0000540).

Parameter (Unit)	NPDES Permit Final Limitations		Study Results①	
	Average	Maximum	6/22-23/81	6/24-25/81
820180 (001)				
Flow (M^3/day)	--	--		
BOD_5 (mg/l)	--	--	24 (8.0, 12., 78.)	15
Suspended solids (mg/l)	20 net②	60 net	2	3
Suspended solids (kg/day)	811 net	2434 net	46	75
Total phosphorus (mg/l)	1.0	2.0	0.09 (0.09, 0.06, 0.11)	0.06
Total phosphorus (kg/day)	41	81	2	2
Chlorides (mg/l)	--	--	18.2 (21., 16., 33.)	19.3
Chlorine (mg/l)	--	0.5	(U, U, U③ - See also Table 4)	
COD (mg/l)	--	--	97 (58, 42, 420)	180
Petroleum hydrocarbons④ (mg/l)	--	10	(11, <1, 4)	
Phenol (ug/l)	--	--	17 (6, 11, 30)	8
pH (S.U.)	not <6.5 nor >9.5		Study Maximum = 8.4 @ 1115 6/26/81⑤	
			Study Minimum = 6.8 @ 1730 6/25/81	
Intake⑥				
Suspended solids (mg/l)	--	--	11	17

① - Study results are taken from Tables 6 - 8. Results in parentheses ( ) are for grab samples. Others are composite sample data. To obtain MGD multiply M^3/day by 0.0002642 - to obtain lbs/day, multiply kg/day x 2.205.
② - Net = difference between discharge and intake values.
③ - U = undetected.
④ - As defined by Environmental Monitoring & Support Laboratory, U.S.EPA, Cincinnati, OH (7/75).
⑤ - From a continuous pH recording of the 96-hour study period.
⑥ - Data presented here are from the north (polyols) intake. The south intake (820407) was monitored by BWC for permit reporting purposes at the time of the study.

Survey Procedure

The flows and samples were obtained as follows:

Outfall	Flow Measurement	Sampling Methods
820407 South Intake	None	Submergible sampler, 4 aliquot grab composite + individual grabs.
North Intake	None	Submergible sampler, 4 aliquot grab composite + individual grabs.
820180 (001)	Company split sheet.	4 aliquot grab composite + individual grabs.
820178 (003)	Instantaneous measurements. Manning's Pipe Flow Formula.	Automatic air activated sampler, 4 aliquot grab composite + individual grabs.
Ash Pond Discharge	None	Individual grabs.
Wyandotte Water Plant Raw + Finished Water	None	Individual grabs.

An automatic sampler composites samples at timed intervals. Samples may be proportional to the instantaneous flow over the weir or through the flume.

A submergible sampler obtains samples at a continuous rate.

Extractable organic and sulfide composite samples are collected by the grab composite method.

A grab composite consists of a series of individual grabs composited into one sample.

An individual grab is a single instantaneous sample.

Samples were analyzed by the Environmental Protection Bureau Laboratories located in Lansing.

Samples were preserved according to Table 6. The results of the physical, chemical and bacteriological analyses are presented in Tables 1 & 2. Letter codes for laboratory results are defined in Table 6.

BASF Wyandotte - North Works

Table 1 Analyses of composite samples.

Outfalls	820407 - South Intake	North Intake
Survey Period From	6-22-81 - 1420	6-22-81 - 1630
To	6-23-81 - 1420	6-23-81 - 1630
	mg/l	mg/l
COD	6	8
TOC	3.1	3.0
Phenol	0.005 NA	0.005 NA
Cyanide (Total)	< 0.005	< 0.005
Cyanide (Free)	< 0.005	< 0.005
Sulfide	< 0.02	< 0.02
BOD_5	4.2	2.9
Nitrite & nitrate nitrogen-N	0.33	0.31
Ammonia nitrogen-N	0.30	0.33
Kjeldahl nitrogen-N	0.66	0.63
Total phosphorus-P	0.07	0.06
Hexavalent chromium (Cr^{+6})	< 0.002	< 0.002
Chlorides	13.1	13.5
MBAS	0.02 HT	0.02 HT
Suspended solids	12	11
Dissolved solids	160	160
	ug/l	ug/l
Total cadmium (Cd)	< 20	< 20
Total chromium (Cr)	< 50	< 50
Total copper (Cu)	< 20	< 20
Total nickel (Ni)	< 50	< 50
Total lead (Pb)	< 50	< 50
Total zinc (Zn)	< 50	< 50
Total iron (Fe)	600	270
Total mercury (Hg)	< 1	< 1
PCB 1242	< 0.1	--
PCB 1254	< 0.1	
PCB 1260	< 0.1	
Other Polychlorinated Biphenols	U	

BASF Wyandotte - North Works

Table 1 (continued)

Outfalls	820180 (001)		820178 (003)	
Survey Period From	6-22-81 - 1600		6-22-81 - 1525	
To	6-23-81 - 1600		6-23-81 - 1525	
Computed flow rate[1] (M^3/day)	(23,000)		9,770	
	mg/l	kg/day	mg/l	kg/day
COD	97	2,200	180	1,760
TOC	31	710	54	530
Phenol	0.017 NA	0.39	0.045 NA	0.44
Cyanide (Total)	0.009	0.2	0.048	0.47
Cyanide (Free)	< 0.009	--	< 0.048	--
Sulfide	< 0.02 PS	--	< 0.02 PS	--
BOD_5	24	550	32.	310
Nitrite & nitrate nitrogen-N	0.31	7.1	0.45	4.4
Ammonia nitrogen-N	0.32	7.4	1.2	12
Kjeldahl nitrogen-N	1.3	30	7.7	75
Total phosphorus-P	0.09	2	0.19	1.9
Hexavalent chromium (Cr^{+6})	< 0.002	--	0.002	0.02
Chlorides	18.2	419	270	2,600
MBAS	0.02 HT	0.5	0.08 HT	0.8
Suspended solids	13	300	10	100
Dissolved solids	150	3,400	680	6,600
	ug/l		ug/l	
Total cadmium (Cd)	< 20	--	< 20	--
Total chromium (Cr)	< 50	--	< 50	--
Total copper (Cu)	< 20	--	< 20	--
Total nickel (Ni)	< 50	--	< 50	--
Total lead (Pb)	< 50	--	< 50	--
Total zinc (Zn)	< 50	--	< 50	--
Total iron (Fe)	580	13	990	9.7
Total mercury (Hg)	< 1	--	1	0.01

1 - Flow rates used in the computation of kg/day (obtained from company split sheet).
To obtain MGD multiply M^3/day by 0.0002642
To obtain lbs/day multiply kg/day by 2.205

BASF Wyandotte - North Works

Table 2 Analyses of grab samples.

Date	Time	Flow[1] M3/day	Temp.[1] °C	pH[1] S.U.	Residual[1] Chlorine mg/l	COD mg/l	TOC mg/l	Phenol mg/l	BOD_5 mg/l	Nitrite & nitrate nitrogen mg/l	Ammonia nitrogen mg/l	Kjeldahl nitrogen mg/l
820407 South Intake												
6-22-81	2200	--	19.5	7.6	U	7	3.0	0.005 NA	3.3	0.34	0.25	0.62
6-23-81	0745	--	19.5	7.5	U	7	3.0	0.005 NA	3.2	0.29	0.34	0.77
North Intake												
6-22-81	2330	--	19.5	7.8	U	6	3.5	0.004 NA	2.7	0.30	0.31	0.62
6-23-81	0915	--	19.5	7.2	U	8	3.5	0.005 NA	3.2	0.28	0.34	0.73
820180 (001)												
6-22-81	1610	--	22.0	7.4	U	58	14	0.006 NA	8 0	0.37	0.29	1.3
6-22-81	2315	--	23.0	7.5	U	42	14	0.011 NA	12.	0.33	0.27	0.87
6-23-81	0850	--	24.0	7.2	U	420	110	0.03 NA	78.	0.28	0.43	1.8
820178 (003)												
6-22-81	2240	5,300	23.0	7.3	U	290	76	0.16 NA	51.	0.46	1.3	9.5
6-23-81	0815	10,000	21.0	7.1	U	300	83	0.029 NA	11.	0.46	0.95	2.6
6-23-81	1215	12,000	25.5	7.0	U	120	37	0.022 NA	16.	0.40	0.84	2.1
Ash Pond Discharge												
6-23-81	1245	--	24.0	7.6	U	6	3.8	0.005 NA	3.0	0.36	0.26	0.58
6-23-81	1650	--	25.0	7.8	U	12	4.3	0.005 NA	2.1	0.36	0.24	0.53
Wyandotte Water Plant - Raw Water												
6-23-81	0945	--	19.5	7.8	U	9	4.7	0.002 NA	2.4	0.28	0.08	0.33
6-23-81	1400	--	20.0	8.0	U	4	3.1	0.003 NA	2.1	0.28	0.06	0.30
Wyandotte Water Plant - Finished Water												
6-23-81	0945	--	20.0	7.5	0.75	< 3	2.4	0.002 NA	2.0	0.29	0.02	0.13
6-23-81	1400	--	20.0	7.6	0.70	< 3	2.4	0.002 NA	2.0	0.30	0.02	0.13

1 - Values determined in the field at time of sampling.

BASF Wyandotte - North Works

Table 2 (continued)

Date	Time	Total phosphorus-P mg/l	Chloride mg/l	MBAS mg/l	Susp. solids mg/l	Diss. solids mg/l	O&G I.R. mg/l	O&G Grav. mg/l	Petroleum Hydrocarbons (silica gel) mg/l	Total[2] Aliphatic Amines ug/l	(as [illegible]) ug/l
820407 South Intake											
6-22-81	2200	0.07	12.9	--	5	140	7	2	4	< 100	< 100
6-23-81	0745	0.08	13.9	--	8	120	1	< 2	5	< 100	< 100
North Intake											
6-22-81	2330	0.05	12.8	--	4	160	< 1	< 2	< 1	< 100	< 100
6-23-81	0915	0.07	13.0	--	< 4	140	< 1	< 2	< 1	< 100	< 100
820180 (001)											
6-22-81	1610	0.09	21.	--	15	140	14	6	11	220	< 100
6-22-81	2315	0.06	16.	--	8	140	1	< 2	< 1	130	< 100
6-23-81	0850	0.11	33.	--	16	180	11	15	4	240	< 100
820178 (003)											
6-22-81	2240	0.15	200	--	23	630	44	50	25	200	< 100
6-23-81	0815	0.23	510	--	23	1,200	38	68	25	460	< 100
6-23-81	1215	0.24	320	--	10	780	13	28	9	130	< 100
Ash Pond Discharge											
6-23-81	1245	0.13	14.9	--	< 4	92	< 1	< 2	< 1	< 100	< 100
6-23-81	1650	0.11	13.8	--	62	130	< 1	< 2	< 1	< 100	< 100
Wyandotte Water Plant - Raw Water											
6-23-81	0945	0.03	8.7	< 0.02 HT	5	150	< 1	< 2	--	--	< 100
6-23-81	1400	0.02	8.1	< 0.02 HT	8	150	< 1	< 2	--	--	< 100
Wyandotte Water Plant - Finished Water											
6-23-81	0945	< 0.01	10.3	< 0.02 HT	< 4	130	< 1	< 2	--	--	< 100
6-23-81	1400	< 0.01	10.5	< 0.02 HT	< 4	150	< 1	< 2	--	--	< 100

2 - Total aliphatic amines concentration is based upon a standard mixture of octa-decyl amine and di-octa-decyl amine. ASTM No. D 2327-80

BASF Wyandotte - North Works

Table 2 (continued)

Date	Time	Purgeable Halocarbons: Chloroform ug/l	1-2 Dichloro-ethane ug/l	1-2 Dichloro-propane ug/l	Others ug/l	Acrylo-nitrile ug/l	Bis (2-chloro-iso pro-pyl) ether ug/l
820407 South Intake							
6-22-81	2200	< 10	< 10	< 10	U	< 1,000	NAV
6-23-81	0745	< 10	< 10	< 10	U	< 1,000	NAV
North Intake							
6-22-81	2330	< 10	< 10	< 10	U	< 1,000	NAV
6-23-81	0915	< 10	< 10	< 10	U	< 1,000	NAV
820180 (001)							
6-22-81	1610	< 10	< 10	< 10	U	< 1,000	NAV
6-22-81	2315	< 10	< 10	< 10	U	< 1,000	NAV
6-23-81	0850	< 10	< 10	< 10	U	< 1,000	NAV
820178 (003)							
6-22-81	2240	< 10	< 10	680 LC	--	< 1,000	NAV
6-23-81	0815	< 10	120	1,400 LC	--	< 1,000	NAV
6-23-81	1215	< 10	39	1,200 LC	--	< 1,000	NAV
Ash Pond Discharge							
6-23-81	1245	< 10	< 10	< 10	U	< 1,000	NAV
6-23-81	1650	< 10	< 10	< 10	U	< 1,000	NAV
Wyandotte Water Plant - Raw Water							
6-23-81	0945	U	U	U	U	< 1,000	NAV
6-23-81	1400	U	U	U	U	< 1,000	NAV
Wyandotte Water Plant - Finished Water							
6-23-81	0945	U	U	U	U	< 1,000	NAV
6-23-81	1400	U	U	U	U	< 1,000	NAV

BASF Wyandotte - North Works

Table 2 (continued)

Date	Time	Benzene ug/l	Toluene ug/l	Xylene ug/l	Styrene ug/l	Ethylbenzene ug/l	Others ug/l
		Purgeable Aromatic Hydrocarbons					
820407 South Intake							
6-22-81	2200	< 10	< 10	< 10	< 10	< 10	U
6-23-81	0745	< 10	< 10	< 10	< 10	< 10	U
North Intake							
6-22-81	2330	< 10	< 10	< 10	< 10	< 10	U
6-23-81	0915	< 10	< 10	< 10	< 10	< 10	U
820180 (001)							
6-22-81	1610	< 10	< 10	< 10	< 10	< 10	U
6-22-81	2315	< 10	< 10	< 10	< 10	< 10	U
6-23-81	0850	< 10	< 10	< 10	< 10	< 10	U
820178 (003)							
6-22-81	2240	< 10	< 10	< 10	< 10	< 10	U
6-23-81	0815	< 10	< 10	< 10	< 10	< 10	U
6-23-81	1215	< 10	< 10	< 10	< 10	< 10	U
Ash Pond Discharge							
6-23-81	1245	< 10	< 10	< 10	< 10	< 10	U
6-23-81	1650	< 10	< 10	< 10	< 10	< 10	U
Wyandotte Water Plant - Raw Water							
6-23-81	0945	U	U	U	U	U	U
6-23-81	1400	U	U	U	U	U	U
Wyandotte Water Plant - Finished Water							
6-23-81	0945	U	U	U	U	U	U
6-23-81	1400	U	U	U	U	U	U

Table 3 Comparison of survey results with the facility's NPDES Permit and Monthly Operating Report.

Parameter (Unit)	NPDES Permit Final Limitations		June Monthly Operating Report				Survey Results[1]
	Daily Average	Daily Maximum	Monthly Average	Monthly Maximum	6-22-81	6-23-81	
820180 (001)							
Flow (M^3/day)	--	--	21,000	26,000	23,000	23,000	23,000
Susp. sol.-net (mg/l)	20	60	1	22	6	0	1
(kg/day)	811	2434	20	341	138	0	23
BOD_5 (mg/l)	--	--	19	28	28	--	24 (8.0, 12., 78.)
COD (mg/l)	--	--	145	184	129	--	97 (58, 42, 420)
Chlorine residual (mg/l)	--	0.5	0	0	0	0	(U, U, U)
Total phosphorus-P (mg/l)	1.0	2.0	0.1	0.1	0.1	0	0.09 (0.09, 0.06, .11)
(kg/day)	41	81	1.9	2.3	2.3	--	2
*Petroleum hydrocarbons (mg/l)	--	10	--	--	--	--	(11, <1, 4)
Chlorides (mg/l)	--	--	26	34	33	31	18.2 (21., 16., 33.)
Phenol (mg/l)	--	--	0.026	0.055	0.019	--	0.017 (0.006, 0.011, 0.03)
pH (S.U.)	not <6.5 nor >9.5		--	9.1 min. 6.6	max. 7.5 min. 6.9	max. 7.0 min. 6.7	(7.4, 7.5, 7.2)
820178 (003)							
Flow (M^3/day)	--	--	6,400	12,000	9,800	12,000	9,770
COD (low level) (mg/l)	--	--	104	172	172	--	180 (290, 300, 120)
Susp. sol.-net (mg/l)	20	60	4	35	2	35	0
(kg/day)	250	750	30	436	20	436	0
Chlorides (mg/l)	--	--	236	442	308	442	270 (200, 510, 320)
Chlorine Residual (mg/l)	--	0.5	0.0	0.0	0.0	0.0	(U, U, U)
Total phosphorus-P (mg/l)	1.0	2.0	0.1	0.2	0.2	--	0.19 (0.15, 0.23, 0.24)
(kg/day)	12.5	25	0.95	2.0	2.0	--	1.9
Phenol (mg/l)	--	--	0.015	0.027	0.01	--	0.045 (0.16, 0.029, 0.022)
*Petroleum Hydrocarbons (mg/l)	--	10	0	2	0	2	(25, 25, 9)
Ammonia nitrogen-N (mg/l)	10	20	0.3	1.0	0.5	0.6	1.2 (1.3, 0.95, 0.84)
(kg/day)	62.5	125	2.2	7.48	4.90	7.48	12
pH (S.U.)	not <6.0 nor >8.0		--	7.9 min. 6.3	max. 7.2 min. 6.6	max. 7.9 min. 7.0	(7.3, 7.1, 7.0)
820407 (Intake)							
Susp. solids (mg/l)	--	--	16	28	14	15	12 (5, 8)
820314 All Outfalls							
Chlorides (kg/day)	585,000	--	2,048	6,225.6	3,786	6,225.6	--

- Survey results are for the composite sample. Grab sample ranges are shown in parentheses ( ).
- Environmental Monitoring and Support Laboratory, U.S. EPA, Cincinnati, Ohio (July, 1975).

Net is defined as the difference between the discharge and intake values.

To obtain MGD multiply M^3/day by 0.0002642 To obtain lbs/day multiply kg/day by 2.205

Table 4 Comparison of the laboratory analytical results obtained by BASF Wyandotte - North Works and the Environmental Protection Bureau from the split composite sample and individual grabs.

Outfalls	820407 (South Intake)		820180 (001)	
	BASF mg/l	E.P.B. mg/l	BASF mg/l	E.P.B. mg/l
COD	--	--	129	97
BOD_5	--	--	28	24
Total phosphorus-P	--	--	0.1	0.09
Chlorides	--	--	33	18.2
Phenol	--	--	0.019	0.017
Suspended solids	13	12	15	13

Outfall	820178 (003)	
	BASF	E.P.B.
Flow (M^3/day)	5,700	9,770
	mg/l	mg/l
COD	172	180
Chloride	308	270
Phenol	0.010	0.045
Ammonia nitrogen-N	0.5	1.2
Total phosphorus-P	0.2	0.19
Suspended solids	50	10

BASF Wyandotte - North Works

Table 5 Comparison of the previous survey results with the results obtained in this survey.

Outfalls	820407 (South Intake)		820180 (001)	
Survey Date From	5-1-79	6-22-81	5-1-79	6-22-81
To	5-2-79	6-23-81	5-2-79	6-23-81
Flow Rate (M^3/day)	--	--	34,100	23,000
	mg/l	mg/l	mg/l	mg/l
COD	18	6	270	97
TOC	--	--	66	31
Phenol	0.010	0.005	0.24	0.017
Cyanide (Total)	0.01	< 0.005	0.01	0.009
Sulfide	--	--	< 0.05	< 0.02
BOD_5	--	--	48	24
Nitrite & nitrate nitrogen-N	0.42	0.33	0.44	0.31
Ammonia nitrogen-N	0.40	0.30	0.25	0.32
Total phosphorus-P	0.05	0.07	0.14	0.09
Chlorides	17.8	13.1	24	18.2
Suspended solids	14	12	16	13
Dissolved solids	160	160	190	150
	ug/l	ug/l	ug/l	ug/l
Total iron (Fe)	560	600	360	580

BASF Wyandotte - North Works

Table 5 (continued)

Outfall	820178 (003)	
Survey Date From	5-1-79	6-22-81
To	5-2-79	6-23-81
Flow Rate (M^3/day)	5,490	9,770
	mg/l	mg/l
COD	120	180
TOC	43	54
Phenol	0.36	0.045
Cyanide (Total)	0.03	0.048
Sulfide	< 0.05	< 0.02
BOD_5	87	32.
Nitrite & nitrate nitrogen-N	0.55	0.45
Ammonia nitrogen-N	0.75	1.2
Total phosphorus-P	0.13	0.19
Chlorides	330	270
Suspended solids	16	10
Dissolved solids	1,060	680
	ug/l	ug/l
Total iron (Fe)	1,100	990

Table 6 Sample Preservation

Parameter	Preservative
COD/TOC/Phenol (Chlorine Absent)	10 drops conc. H_2SO_4/250 ml (to pH <2).
Cyanide	Dechlorinate if needed with sodium thiosulfate (1 drop 0.141 N/mg/l Cl_2/250 ml. 10 drops 10 N NaOH (to pH ≥12)/250 ml.
Total Metals	2 ml 1:1 HNO_3/250 ml (to pH <2).
Oil & Grease	10 drops conc. H_2SO_4/250 ml (to pH <2).
Sulfides	10 drops 1M ZnAc/250 ml.
Acid & Base-neutral Extractables Puregable Organics	Dechlorinated (if needed) with sodium thiosulfate (1 drop 0.141 N/mg/l Cl_2/250 ml).

All samples cooled to 4°C and preserved upon collection and chain of custody maintained.

Lab Letter Codes

U - Material was analyzed for but not detected.
NA - Analytical method has not yet been approved by the laboratory.
PS - Possible interference may have effected the accuracy of the laboratory results.
HT - The recommended maximum laboratory holding time was exceeded before analysis.
NAV - Requested analysis not available.
LC - Laboratory conditions during analysis were not optimum.

Survey by: Martin Rock, Environmental Engineer
Elizabeth Browne, Water Quality Technician
Richard Irvin, Water Quality Technician

Contact with Management: H. Dale Roush, Manager - Environmental Protection, Health and Safety

Hydrocarbon Analyses by: Environmental Protection Bureau Laboratory

Physical, Chemical & Bacteriological Analyses by: Environmental Protection Bureau Laboratory

Report by: Martin Rock
Elizabeth Browne
Point Source Studies Section
Environmental Services Division
Environmental Protection Bureau
Michigan Dept. of Natural Resources

Distribution "A"
MM
10/14/81