US EPA RECORDS CENTER REGION 5
487377

EPA Water Samples - Metals

| Parameter | Well Number | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 6 | 18 | 2 | 9 | 11 | 16 |
| Calcuim | 41.3 | 677 | 1670 | 134 | 2280 | 1990 | 295 |
| Magnesium | 97 | 8.1 | 49.7 | 10.6 | 81.1 | 194 | 144 |
| Sodium | 43000 | 20100 | 11300 | 16600 | 17700 | 5120 | 2381 |
| Silver | 140 | <20 | <300 | <300 | 450 | 359 | <300 |
| Aluminium | 10200 | 12700 | 34000 | 27000 | 158000 | 402000 | 34300 |
| Boron | 2050 | 4290 | <8000 | 82900 | 23100 | 28300 | <3000 |
| Barium | 80 | 640 | 3950 | 648 | 5480 | 20900 | 551 |
| Berylium | <2 | <2 | <100 | <100 | <100 | <100 | <100 |
| Cadmium | <5 | <5 | <200 | <200 | 279 | 313 | 255 |
| Cobalt | 20 | 50 | <500 | <500 | <500 | <500 | <500 |
| Chromium | 80 | 240 | 1900 | 5450 | 1470 | 6930 | <800 |
| Copper | 120 | 1760 | 1470 | 1570 | 1600 | 9260 | 1140 |
| Iron | 25000 | 23200 | 131000 | 56.8 | 170000 | 752000 | 51400 |
| Manganese | 530 | 540 | 1470 | 701 | 3220 | 11100 | 1820 |
| Molybodenum | - | - | <1000 | 1330 | <1000 | <1000 | <1000 |
| Nickel | 260 | 420 | 4120 | 14800 | 2250 | 27500 | 1850 |
| Lead | 280 | 1880 | <7000 | <7000 | 7080 | 22400 | <7000 |
| Tin | 5000 | <500 | <4000 | <4000 | <4000 | <4000 | <4000 |
| Titanium | - | - | 4070 | 860 | 6260 | 9520 | 681 |
| Vanadium | 110 | - | 1190 | 17100 | 1790 | 1070 | <500 |
| Yttrium | - | - | <500 | <500 | <500 | <500 | <500 |
| Zinc | 3650 | 6230 | <400 | <400 | 15000 | 31300 | 23700 |
| Arsenic | 500 | 750 | - | - | - | - | - |
| Antimony | 300 | 20 | - | - | - | - | - |
| Selenium | 1200 | 30 | - | - | - | - | - |
| Thalium | <200 | <200 | - | - | - | - | - |
| Mercury | 4 | 5000 | 1600 | 20 | 800 | 800 | 25 |
| Cyanide | 31000 | 14000 | - | - | - | - | - |

Calcium - Sodium mg/l

Silver - Cyanide ug/l

## EPA Soil Samples - Metals

| Parameter | Well No. 1 | 3 | 5 | 6 | 7 | 8 | 10 | 15 |
|---|---|---|---|---|---|---|---|---|
| Calcium | 6.1 | 8.3 | 10 | 28 | 37 | 110 | 19 | 140 |
| Magnesium | 3 | 8.4 | 9.2 | 2.9 | 3.1 | 14 | 7.2 | 13 |
| Sodium | 12 | 5.1 | 5.9 | 17 | 13 | 3.1 | 5 | 9.4 |
| Potassium | 4 | 6.7 | 6.4 | 3.1 | 2.8 | 1.7 | 3 | 3.5 |
| Aluminum | 37 | 59 | 58 | 26 | 28 | 22 | 2 8 | 32 |
| Iron | 13 | 26 | 30 | 12 | 12 | 18 | 5.6 | 20 |
| Silver | <2.8 | <2.8 | <3 | <2.9 | <3 | <3 | <2.9 | <2.9 |
| Barium | 360 | 430 | 420 | 300 | 270 | 230 | 30 0 | 280 |
| Berylium | 3.1 | 4.1 | 4.1 | 3.1 | 2.9 | 2.6 | 2.5 | 37 |
| Cadmium | 4.9 | <1.9 | <2 | <1.9 | <2 | <2 | <1.9 | <2 |
| Cobalt | 12 | 25 | 37 | 9.2 | 10 | 11 | 8.4 | 18 |
| Chromium | 40 | 77 | 60 | 35 | 24 | 62 | 31 | 110 |
| Copper | 87 | 77 | 94 | 95 | 75 | 340 | 76 | 120 |
| Manganese | 130 | 280 | 210 | 120 | 170 | 370 | 130 | 370 |
| Nickel | <14 | 33 | 30 | <14 | <15 | 23 | <15 | 20 |
| Lead | <94 | <94 | <99 | 310 | <99 | 130 | <97 | <98 |
| Tin | 100 | 120 | 230 | 120 | 75 | 64 | 80 | 59 |
| Strontium | 140 | 120 | 150 | 200 | 133 | 270 | 130 | 270 |
| Titanium | 700 | 3300 | 3200 | 1400 | 1600 | 1400 | 1300 | 1800 |
| Vanadium | <18 | 110 | 110 | 53 | 58 | 60 | 48 | 73 |
| Tungsten | <47 | <47 | 100 | 26 | <50 | <50 | <49 | 53 |
| Yttrium | 12 | 21 | 26 | 12 | 17 | 17 | 14 | 21 |
| Zinc | 64 | 99 | 110 | 130 | 80 | 290 | 44 | 140 |
| Zirconium | 170 | 130 | 190 | 120 | 250 | 110 | 130 | 100 |
| Arsenic | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Selenium | 4.8 | 5.6 | <2 | <2 | <2 | <2 | <2 | <2 |
| Antimony | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Thallium | 2.8 | <2 | <2 | <2 | <2 | <2 | 2.4 | <2 |
| Mercury | 0.4 | .12 | 1.3 | 12 | - | 33 | 1.0 | 0.9 |

Calcium - Iron mg/g

Silver - Mercury ug/g

| Tentatively Identified as Present | 1(w) | 3(s) | 5(s) | 6(s) | 6(w) | 7(s) | 2(w) | 8(s) | 9(w) | 10(s) | 11(w) | 15(s) | 16(w) | 18(w) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-fluorophenol | x | | | | | | | | | | | | | |
| hexanoic acid | x | | | | x | | | | x | | | | | |
| octanoic acid | x | | | | x | | | x | | | | | | |
| butanoic acid | | | | | x | | | | | | | | | |
| decanoic acid | | | | | x | | | | | | | | | |
| dodecanoic acid | | | | | x | | | | x | | | | | |
| 1,2 benzene dicarboxylic acid | x | | | | | | | | | | | | | |
| 2 methyl propanoic acid | | | | | x | | | | | | | | | |
| 2 methyl butanoic acid | | | | | x | | | | | | | | | |
| 2 ethyl hexanoic acid | | | | | x | | | | | | | | | |
| tetradecanoic acid | | | | | | | | | x | | | | | |
| hexadecanoic acid | | | | | | | | | x | | | | | |
| 9 hexadecanoic acid | | | | | | | | | x | | | | | |
| benzene acetic acid | | | | | x | | | | | | | | | |
| 2 methyl-1-benzene acetic acid | | | | | | | | | | | | | | |
| 2-butyl methylpropyl ester-1,2-benzene dicarboxylic acid | x | | | | | | | | | | | | | |
| 11,14 eicosadienoic acid, methyl ester | | | | | | | | | x | | | | | |
| 5 ethyl-2-methyl heptane | x | | | | | | | | | | | | | |
| 3,3 dimethyl heptane | | | | | x | | | | | | | | | |
| 1,3 dichlorobutane | | | | | | | | | x | | | | | |
| 1,1' oxybis 2 chloro ethane | | | | | | | | | x | | | | | |
| 2,6,11 trimethyl dodecane | x | | | | | | | | | | | | | |
| pentadecane | | | | | x | | | | | | | | | |
| 1,1'sulfonylbis benzene | x | | | | | | | | | | x | | | |
| 4 methyl benzene sulfonamide | | | | | x | | | | | | | | | |
| 1,3 dimethyl naphthalene | | | | | x | | | | | | | | | |
| 3,4 dimethyl phenol | | | | | | | | | | x | | | | |
| 2 methyl phenol | | | | | | | | | | x | | | | |
| 3-3(methoxyethoxy)propoxy-1-propanol | | | | | x | | | | | | | | | |

(s)-soil sample, (w)-water sample

| Tentatively Identified as Present | 1(w) | 3(s) | 5(s) | 6(s) | 6(w) | 7(s) | 2(w) | 8(s) | 9(w) | 10(s) | 11(w) | 15(s) | 16(w) | 18(w) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Azulene | | | | | | | | | | x | | | | |
| cyclopropane 1,1-dibromo-2 chloro-2-fluoro | | | | | | | | | | x | | | | |
| methyl oxirane | | | | | | | | x | | | | | | |
| 1,3,5,7 tetraazotricycle 3.3.1.13,7 decane | | | | | | x | | | | | | | | |
| tetrahydrofuran | | x | x | x | | x | | x | | x | | | | |
| dibenzofuran | | | | | | | | | | x | | | | |
| 9H carbazole | | | | | | | | | | x | | | | |
| 2-propanone (acetone) | | | | x | | | x | | | x | | | | |
| 3-hydroxy 3,5 dimethyl-2-hexanone | | | | | x | | | | | | | | | |
| 2-methoxy-1-propanol | | | | | x | | | | | | | | | |
| 1-methoxy-2methyl-2propanol | | | | | x | | | | | | | | | |
| 2-ethoxy-2methyl propane | | | | | x | | | | | | | | | |
| alpha,alpha, 4-trimethyl (s) 3-cyclo hexene-1-methanol | | | | | x | | | | | | | | | |
| 2,6,10-15,19,23 hexamethyl, 2,6,10,14,18,27,tetra cosehexane | | | | | | | | | x | | | | | |
| 2,2,dimethyl-1-octanol | x | | | | | | | | | | | | | |
| 3 methyl-1-benzene acetic acid | | | | | | | x | | | | | | | |

(w)-water sample, (s)-soil sample

| PARAMETER | WELL NUMBER | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1(w) | 3(s) | 5(s) | 6(s) | 6(w) | 7(s) | 2(w) | 8(s) | 9(w) | 10(s) | 11(w) | 15(s) | 16(w) | 18(w) |
| pentachlorophenol | | | | | 121 | | | | 802 | | | | 1100 | |
| phenol | | | | | 227 | | 2370 | | 4400 | | 526 | | | 424 |
| fluoranthene | 19 | | | | 434 | 670 | | | 15000 | 2000 | 370 | 1900 | | 1675 |
| naphthalene | | | | | 429 | 2600 | | 570 | 24000 | | 330 | 2400 | | 400 |
| pyrene | 21 | | | | 347 | | | | 20500 | 1200 | 500 | 1400 | | 2150 |
| anthracene/phenanthrene | | | | | 799 | 1700 | | | 10000 | 5600 | 310 | 4400 | | 835 |
| fluorene | | | | | 93 | | | | 4100 | 1200 | | 850 | | 211 |
| chrysene/benzo(a)anthracene | 45 | | | | 396 | | | | 7000 | 580 | | 1300 | | 900 |
| acenaphthylene | | | | | 73 | | | | 5400 | 1000 | | 600 | | 163 |
| methylene chloride | | 2.4 | 67 | 6400 | 56 | | 290 | 15 | 3800 | 16 | 1000 | | 880 | 580 |
| benzene | | | | | 27 | | 280 | | | | 195 | | 190 | 174 |
| ethyl benzene | | | | | 13 | 7.1 | | | | | | | | 648 |
| benzo(a)pyrene | 62 | | | | | | | | | | | 650 | | 760 |
| toluene | | | | | 597 | 6.3 | 64 | | | | 69 | | | 430 |
| 2-chlorophenol | | | | | | | 29 | | | | | | | |
| p-chloro-m-cresol | | | | | | | 339 | | | | | | | |
| 2,4 dichlorophenol | | | | | | | 364 | | 522 | | | | | |
| bis (2ethyl hexyl)phthalate | 51 | | | | 566 | | | | 3100 | | 950 | | | 2700 |
| 3,4 benzofluoranthene/ benezo(k) fluoranthene | 34 | | | | 284 | | | | 3900 | | 150 | 800 | | 550 |
| di n butyl phthalate | | 2.2 | | ~~2200~~ | 32 | | | | | | 230 | | | 400 |
| benzo (ghi) perylene | 14 | | | | 143 | | | | | | | | | |
| indeno (1,2,3-cd)pyrene | 12 | | | | 123 | | | | | | | | | |
| bis (2 chloroethyl)ether | | | | | 271 | | | | | | | | | |
| N-Nitrosodiphenyl amine | | | | | 88 | | | | | | | | | |
| tetrachloroethylene | | | | | 23 | | | | | | | | | 139 |
| chlorobenzene | | | | | | | | | | | | 1900 | | |
| 1,4 dichlorobenzene | | | | | | | | 6800 | | | | 3600 | | |

All results are in ug/l; (w)-water sample, (s)-soil sample

| PARAMETER | WELL NUMBER | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1(w) | 3(s) | 5(s) | 6(s) | 6(w) | 7(s) | 2(w) | 8(s) | 9(w) | 10(s) | 11(w) | 15(s ) | 16(w) | 18(w) |
| acenaphthene | | | | | | | | | | | | 3100 | | |
| isophorene | | | | | | | | | | | | 1500 | | |
| 1,2 dichloroethane | | | | | | | | 15 | | | | | | |
| endosulfate | | | | | | | | | 32 | | | | | 19 |
| heptachlor | | | | | | | | | | | | | | 12 |
| BHC | | | | | | | | | | | 22 | | | 16 |
| BHC | | | | | | | | | | | 19 | | | |
| PCB1260 | | | | 11300 | 73 | | | 9000 | | | | | | |
| PCB1254 | | | | | 67 | | | | | | | | | |
| PCB1248 | | | | | | | | | | 7100 | | 6800 | | |
| PCB1232 | | | | | | | | | 215 | | | | | 47 |

All results are in ug/l; (w)-water sample, (s)-soil sample

| PARAMETER | WELL NUMBER | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1(w) | 3(s) | 5(s) | 6(s) | 6(w) | 7(s) | 2(w) | 8(s) | 9(w) | 10(s) | 11(w) | 15(s) | 16(w) | 18(w) |
| pentachlorophenol | | | | | 121 | | | | 802 | | | | 1100 | |
| phenol | | | | | 227 | | 2370 | | 4400 | | 526 | | | 424 |
| fluoranthene | 19 | | | | 434 | 670 | | | 15000 | 2000 | 370 | 1900 | | 1675 |
| naphthalene | | | | | 429 | 2600 | | 570 | 24000 | | 330 | 2400 | | 400 |
| pyrene | 21 | | | | 347 | | | | 20500 | 1200 | 500 | 1400 | | 2150 |
| anthracene/phenanthrene | | | | | 799 | 1700 | | | 10000 | 5600 | 310 | 4400 | | 835 |
| luorene | | | | | 93 | | | | 4100 | 1200 | | 850 | | 211 |
| chrysene/benzo(a)anthracene | 45 | | | | 396 | | | | 7000 | 580 | | 1300 | | 900 |
| acenaphthylene | | | | | 73 | | | | 5400 | 1000 | | 600 | | 163 |
| methylene chloride | | 2.4 | 67 | 6400 | 56 | | 290 | 15 | 3800 | 16 | 1000 | | 880 | 580 |
| benzene | | | | | 27 | | 280 | | | | 195 | | 190 | 174 |
| ethyl benzene | | | | | 13 | 7.1 | | | | | | | | 648 |
| benzo(a)pyrene | 62 | | | | | | | | | | | 650 | | 760 |
| toluene | | | | | 597 | 6.3 | 64 | | | | 69 | | | 430 |
| 2-chlorophenol | | | | | | | 29 | | | | | | | |
| p-chloro-m-cresol | | | | | | | 339 | | | | | | | |
| 2,4 dichlorophenol | | | | | | | 364 | | 522 | | | | | |
| bis (2ethyl hexyl)phthalate | 51 | | | | 566 | | | | 3100 | | 950 | | | 2700 |
| 3,4 benzofluoranthene/ benezo(k) fluoranthene | 34 | | | | 284 | | | | 3900 | | 150 | 800 | | 550 |
| di n butyl phthalate | | 2201 | | ~~2200~~ | 32 | | | | | | 230 | | | 400 |
| benzo (ghi) perylene | 14 | | | | 143 | | | | | | | | | |
| ndeno (1,2,3-cd)pyrene | 12 | | | | 123 | | | | | | | | | |
| bis (2 chloroethyl)ether | | | | | 271 | | | | | | | | | |
| N-Nitrosodiphenyl amine | | | | | 88 | | | | | | | | | |
| tetrachloroethylene | | | | | 23 | | | | | | | | | 139 |
| chlorobenzene | | | | | | | | | | | | 1900 | | |
| 1,4 dichlorobenzene | | | | | | | | 6800 | | | | 3600 | | |

All results are in ug/l; (w)-water sample, (s)-soil sample

| PARAMETER | WELL NUMBER | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1(w) | 3(s) | 5(s) | 6(s) | 6(w) | 7(s) | 2(w) | 8(s) | 9(w) | 10(s) | 11(w) | 15(s ) | 16(w) | 18(w) |
| acenaphthene | | | | | | | | | | | | 3100 | | |
| isophorene | | | | | | | | | | | | 1500 | | |
| 1,2 dichloroethane | | | | | | | | 15 | | | | | | |
| endosulfate | | | | | | | | | 32 | | | | | 19 |
| heptachlor | | | | | | | | | | | | | | 12 |
| BHC | | | | | | | | | | | 22 | | | 16 |
| BHC | | | | | | | | | | | 19 | | | |
| PCB1260 | | | | 11300 | 73 | | | 9000 | | | | | | |
| PCB1254 | | | | | 67 | | | | | | | | | |
| PCB1248 | | | | | | | | | | 7100 | | 6800 | | |
| PCB1232 | | | | | | | | | 215 | | | | | 47 |

All results are in ug/l; (w)-water sample, (s)-soil sample

EPA Water Samples - Metals

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|---|---|---|---|---|---|---|---|
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| Boron | 2050 | 4290 | <8000 | 82900 | 23100 | 28300 | <3000 |
| Barium | 80 | 640 | 3950 | 648 | 5480 | 20900 | 551 |
| Berylium | <2 | <2 | <100 | <100 | <100 | <100 | <100 |
| Cadmium | <5 | <5 | <200 | <200 | 279 | 313 | 255 |
| Cobalt | 20 | 50 | <500 | <500 | <500 | <500 | <500 |
| Chromium | 80 | 240 | 1900 | 5450 | 1470 | 6930 | <800 |
| Copper | 120 | 1760 | 1470 | 1570 | 1600 | 9260 | 1140 |
| Iron | 25000 | 23200 | 131000 | 56.8 | 170000 | 752000 | 51400 |
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| Nickel | 260 | 420 | 4120 | 14800 | 2250 | 27500 | 1850 |
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| Tin | 5000 | <500 | <4000 | <4000 | <4000 | <4000 | <4000 |
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| Yttrium | - | - | <500 | <500 | <500 | <500 | <500 |
| Zinc | 3650 | 6230 | <400 | <400 | 15000 | 31300 | 23700 |
| Arsenic | 500 | 750 | - | - | - | - | - |
| Antimony | 300 | 20 | - | - | - | - | - |
| Selenium | 1200 | 30 | - | - | - | - | - |
| Thalium | <200 | <200 | - | - | - | - | - |
| Mercury | 4 | 5000 | 1600 | 20 | 800 | 800 | 25 |
| Cyanide | 31000 | 14000 | - | - | - | - | - |

Calcium - Sodium mg/l

Silver - Cyanide ug/l

## EPA Soil Samples - Metals

| Parameter | Well No. 1 | 3 | 5 | 6 | 7 | 8 | 10 | 15 |
|---|---|---|---|---|---|---|---|---|
| Calcium | 6.1 | 8.3 | 10 | 28 | 37 | 110 | 19 | 140 |
| Magnesium | 3 | 8.4 | 9.2 | 2.9 | 3.1 | 14 | 7.2 | 13 |
| Sodium | 12 | 5.1 | 5.9 | 17 | 13 | 3.1 | 5 | 9.4 |
| Potassium | 4 | 6.7 | 6.4 | 3.1 | 2.8 | 1.7 | 3 | 3.5 |
| Aluminum | 37 | 59 | 58 | 26 | 28 | 22 | 2 8 | 32 |
| Iron | 13 | 26 | 30 | 12 | 12 | 18 | 5.6 | 20 |
| Silver | <2.8 | <2.8 | <3 | <2.9 | <3 | <3 | <2.9 | <2.9 |
| Barium | 360 | 430 | 420 | 300 | 270 | 230 | 30 0 | 280 |
| Berylium | 3.1 | 4.1 | 4.1 | 3.1 | 2.9 | 2.6 | 2.5 | 37 |
| Cadmium | 4.9 | <1.9 | <2 | <1.9 | <2 | <2 | <1.9 | <2 |
| Cobalt | 12 | 25 | 37 | 9.2 | 10 | 11 | 8.4 | 18 |
| Chromium | 40 | 77 | 60 | 35 | 24 | 62 | 31 | 110 |
| Copper | 87 | 77 | 94 | 95 | 75 | 340 | 76 | 120 |
| Manganese | 130 | 280 | 210 | 120 | 170 | 370 | 130 | 370 |
| Nickel | <14 | 33 | 30 | <14 | <15 | 23 | <15 | 20 |
| Lead | <94 | <94 | <99 | 310 | <99 | 130 | <97 | <98 |
| Tin | 100 | 120 | 230 | 120 | 75 | 64 | 80 | 59 |
| Strontium | 140 | 120 | 150 | 200 | 133 | 270 | 130 | 270 |
| Titanium | 700 | 3300 | 3200 | 1400 | 1600 | 1400 | 1300 | 1800 |
| Vanadium | <18 | 110 | 110 | 53 | 58 | 60 | 48 | 73 |
| Tungsten | <47 | <47 | 100 | 26 | <50 | <50 | <49 | 53 |
| Yttrium | 12 | 21 | 26 | 12 | 17 | 17 | 14 | 21 |
| Zinc | 64 | 99 | 110 | 130 | 80 | 290 | 44 | 140 |
| Zirconium | 170 | 130 | 190 | 120 | 250 | 110 | 130 | 100 |
| Arsenic | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Selenium | 4.8 | 5.6 | <2 | <2 | <2 | <2 | <2 | <2 |
| Antimony | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Thallium | 2.8 | <2 | <2 | <2 | <2 | <2 | 2.4 | <2 |
| Mercury | 0.4 | .12 | 1.3 | 12 | - | 33 | 1.0 | 0.9 |

Calcium - Iron mg/g

Silver - Mercury ug/g

| Tentatively Identified as Present | 1(w) | 3(s) | 5(s) | 6(s) | 6(w) | 7(s) | 2(w) | 8(s) | 9(w) | 10(s) | 11(w) | 15(s) | 16(w) | 18(w) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-fluorophenol | x | | | | | | | | | | | | | |
| hexanoic acid | x | | | | x | | | | x | | | | | |
| octanoic acid | x | | | | x | | | x | | | | | | |
| butanoic acid | | | | | x | | | | | | | | | |
| decanoic acid | | | | | x | | | | | | | | | |
| dodecanoic acid | | | | | x | | | | x | | | | | |
| 1,2 benzene dicarboxylic acid | x | | | | | | | | | | | | | |
| 2 methyl propanoic acid | | | | | x | | | | | | | | | |
| 2 methyl butanoic acid | | | | | x | | | | | | | | | |
| 2 ethyl hexanoic acid | | | | | x | | | | | | | | | |
| tetradecanoic acid | | | | | | | | | x | | | | | |
| hexadecanoic acid | | | | | | | | | x | | | | | |
| 9 hexadecanoic acid | | | | | | | | | x | | | | | |
| benzene acetic acid | | | | | x | | | | | | | | | |
| 2 methyl-1-benzene acetic acid | | | | | | | | | | | | | | |
| 2-butyl methylpropyl ester-1,2-benzene dicarboxylic acid | x | | | | | | | | | | | | | |
| 11,14 eicosadienoic acid, methyl ester | | | | | | | | | x | | | | | |
| 5 ethyl-2-methyl heptane | x | | | | | | | | | | | | | |
| 3,3 dimethyl heptane | | | | | x | | | | | | | | | |
| 1,3 dichlorobutane | | | | | | | | | x | | | | | |
| 1,1' oxybis 2 chloro ethane | | | | | | | | | x | | | | | |
| 2,6,11 trimethyl dodecane | x | | | | | | | | | | | | | |
| pentadecane | | | | | x | | | | | | | | | |
| 1,1'sulfonylbis benzene | x | | | | | | | | | | x | | | |
| 4 methyl benzene sulfonamide | | | | | x | | | | | | | | | |
| 1,3 dimethyl naphthalene | | | | | x | | | | | | | | | |
| 3,4 dimethyl phenol | | | | | | | | | | x | | | | |
| 2 methyl phenol | | | | | | | | | | x | | | | |
| 3-3(methoxyethoxy)propoxy-1-propanol | | | | | x | | | | | | | | | |

(s)-soil sample, (w)-water sample

| Tentatively Identified as Present | 1(w) | 3(s) | 5(s) | 6(s) | 6(w) | 7(s) | 2(w) | 8(s) | 9(w) | 10(s) | 11(w) | 15(s) | 16(w) | 18(w) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Azulene | | | | | | | | | | x | | | | |
| cyclopropane 1,1-dibromo-2 chloro-2-fluoro | | | | | | | | | | x | | | | |
| methyl oxirane | | | | | | | | x | | | | | | |
| 1,3,5,7 tetraazotricycle 3.3.1.13,7 decane | | | | | | x | | | | | | | | |
| tetrahydrofuran | | x | x | x | | x | | x | | x | | | | |
| dibenzofuran | | | | | | | | | | x | | | | |
| 9H carbazole | | | | | | | | | | x | | | | |
| 2-propanone (acetone) | | | | x | | | x | | | x | | | | |
| 3-hydroxy 3,5 dimethyl-2-hexanone | | | | | x | | | | | | | | | |
| 2-methoxy-1-propanol | | | | | x | | | | | | | | | |
| 1-methoxy-2methyl-2propanol | | | | | x | | | | | | | | | |
| 2-ethoxy-2methyl propane | | | | | x | | | | | | | | | |
| alpha,alpha, 4-trimethyl (s) 3-cyclo hexene-1-methanol | | | | | x | | | | | | | | | |
| 2,6,10-15,19,23 hexamethyl, 2,6,10,14,18,27,tetra cosehexane | | | | | | | | | x | | | | | |
| 2,2,dimethyl-1-octanol | x | | | | | | | | | | | | | |
| 3 methyl-1-benzene acetic acid | | | | | | | x | | | | | | | |

(w)-water sample, (s)-soil sample

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.

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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 | |

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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

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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.

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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 | Aromatic Amines (as Analine) 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

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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 |

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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 |

BASF Wyandotte - North Works

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 |
|---|---|---|---|---|---|---|---|
| | 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, .1 |
| (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<br>min. 6.6 | max. 7.5<br>min. 6.9 | max. 7.0<br>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<br>min. 6.3 | max. 7.2<br>min. 6.6 | max. 7.9<br>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 | -- |

1 - 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 |

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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 |

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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<br>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

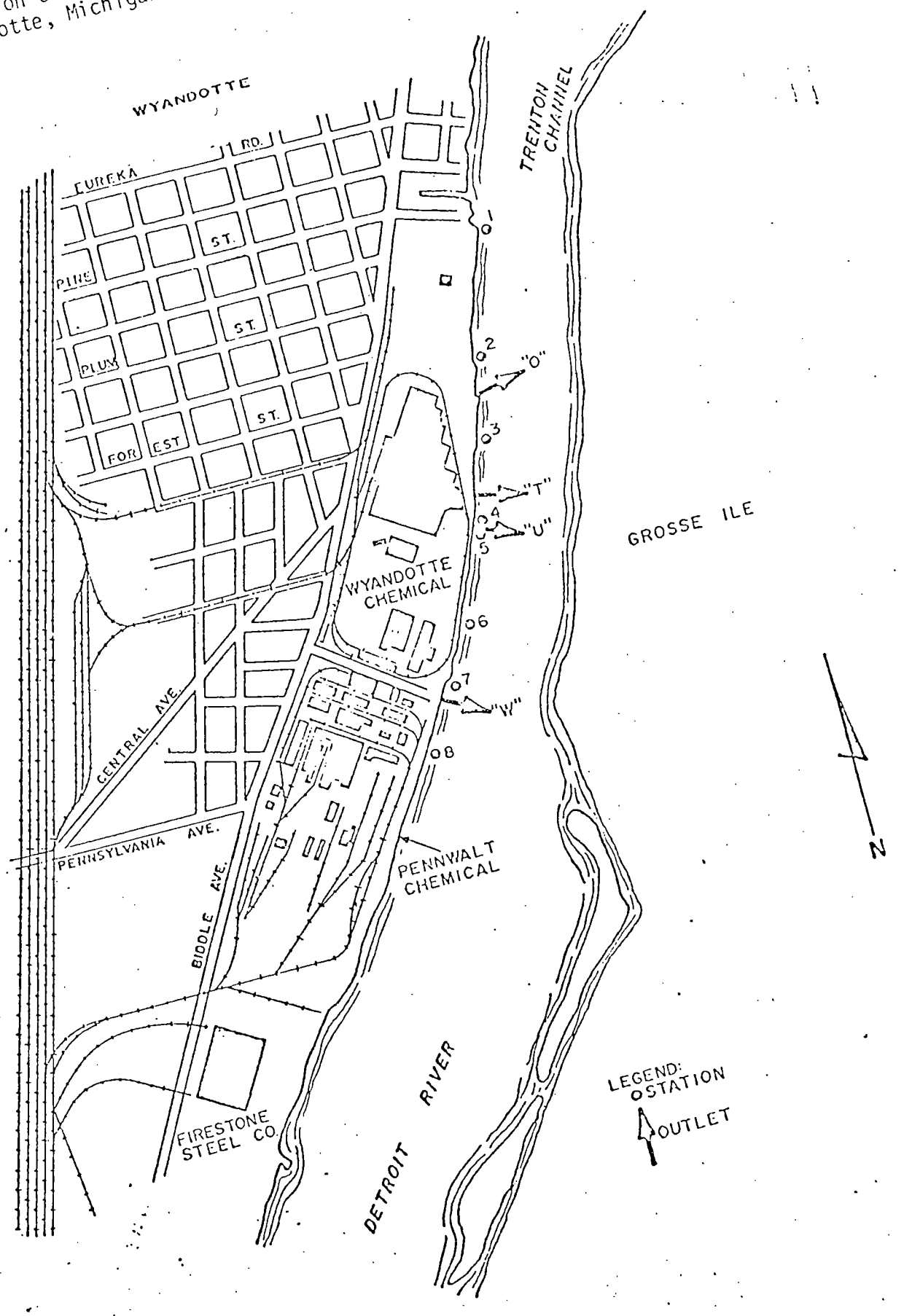
Hydrocarbon Analyses by: Environmental Protection Bureau Laboratory

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

RE 1. Location of BASF Wyandotte Corporation at 1609 Biddle Avenue, Wyandotte, Michigan.



1. BASF Wyandotte Corp.
North Plant
Biddle Avenue
Wyandotte, Michigan 48192

2. At the North Works the products made are soda ash, sodium bicarbonate, polyols, carboxy methyl cellulose, and transparent iron oxide.

3. Some of the constituents expected in the discharge at the North Works are phosphates, chlorine, petroleum hydrocarbons, chlorides, phenol, and ammonia. There are no groundwater discharges. All discharges except sanitary sewage are to the Detroit River.

4. Permit # MI 0000540

5. They are meeting final conditions of permit as of the survey ran Oct. 11-12, 1977. There have been some pH excursions though.

6. Survey Oct. 11-12, 1977

7. Styrene is stored in a 10-15,000 gallon diked storage tank. A loss occurred on Sept. 27, 1975 from this tank. The dike was made of concrete but the base was made of sand. The styrene went through the ground into an electrical conduit from which the styrene was pumped. There is about 20,000 lbs. of phenolic compounds stored in 100 lb. drums. These are solids and don't pose a problem. There is about 2000 lbs. of quinoline stored in 450 lb. drums. This is a viscous liquid and is stored in the warehouse.

8. An approved PIPP has been implemented. PIPP # 11202

9. Additional information is needed regarding styrene tank storage. The base of the diked area was to be redone with concrete or compacted clay.

10. According to the last survey, there are some housekeeping problems regarding the loading dock area for the polyols. There was some polyol material spilled on the ground by the railroad siding. The only other groundwater problem could occur from the styrene storage as previously mentioned if the diked area hasn't been fixed.

Polyols are not on the critical materials list. A loss of a stored critical material to either the groundwater or the Detroit River is possible but in our estimation improbable. A loss of material from the plant processing areas is much more likely.

BASF: This site in Wyandotte was not on the original 1979 suspected groundwater pollution list. Based on available information, useful aquifers are not readily present or susceptible to pollution due to site geology. This site was not included as a task force site by Environmental Enforcement Division since task force sites were taken from the 1979 known and suspected groundwater pollution list. Because of the volume, nature, and history of chemicals handled at the site, BASF is presently identified as a suspected site in the current 1981 groundwater pollution site list. A groundwater pollution potential evaluation (Modified LeGrand analysis) has been done for prioritization purposes. There is, according to our information, an investigation ongoing by Environmental Enforcement Division at the site even though it was not formally a task force site.

Union Carbide: This site is related to Sault Ste. Marie Disposal and was on the 1979 suspected groundwater pollution list. This site was not included in the task force because the heavy metal concern was not known prior to selections of task force sites. This site has also had a groundwater pollution potential evaluation (Modified LeGrand analysis) and is being prioritized for further action considering the heavy metals concerns.

DS:clp
cc: Gary Klepper/ Dave Slayton
Groundwater Quality Section Files
WQD Files

TABLE 1. BASF Wyandotte (North Plant) PEAS Incidents from February, 1975 ~~through June~~, 1976

| PEAS | DATE | MATERIAL (CONC.) / VOLUME |
|---|---|---|
| ' | 2/08/75 | polyol loss |
| # 578-75 | 5/08/75 | sodium hypochlorite(10%) 600-800 gallons |
| # 727-75 | 6/17/75 | distiller blowdown CaCl (4%), NaCl (10%) 20,000 gall. |
| # 752-75 | 6/23/75 | crude dichloropropane < 70 gallon |
| # 753-75 | 6/23/75 | polyol 10,000 lbs. |
| # 1072-75 | 8/28/75 | styrene 10,000 - 15,000 gallons |
| # 1322-75 | 10/19/75 | ammonia 2,000 gallons |
| # 1408-75 | 11/10/75 | ammonia 2,000 gallons |
| # 1474-75 | 12/01/75 | toluene 1500 lbs. |
| # 1485-75 | 12/05/75 | ammoniated brine 17000 lbs. |
| # 0029-76 | 1/10/76 | toluene |
| # 0132-76 | 2/12/76 | polyol P-434 1700 gallons |
| | 3/22/76 | oil/toluene spill |
| # 0452-76 | 4/11/76 | DBO liquor[1] 30,000 gallons |
| # 0715-76 | 6/11/76 | ammonia ($NH_3$) liquor 5700 lbs. |

[1] distallate blowoff (7% CaCl, 3-4% NaCl, 1% $CaCO_3$, 10 ppm $NH_3$)

TABLE 2. Phenol loading estimates for all outfalls combined at BASF Wyandotte (North Works) during January through November, 1977.

Outfall 001 — Flow (MGD) annual mean 10.9 MGD
Phenol (μg/l) annual mean 70.6 ± 89.9

lb/day = (10.9 MGD) (0.07) (8.34) = 6.36

Outfall 002 — Zero flow during 1977.

Outfall 003 — Flow (MGD) annual mean 1.2 MGD
Phenol (μg/l) annual mean 54.7 ± 26.8

lb/day = (1.2 MGD) (0.05) (8.34) = 0.5

Outfall 004 — Flow (MGD) annual mean 1.5 MGD
Phenol (μg/l) annual mean (Jan. - June) 560.5 ± 165.9
Cyanide (mg/l) annual mean 0.93 ± 0.36

Phenol lb/day = (1.5 MGD) (0.56) (8.34) = 7.01
Cyanide lb/day = (1.5 MGD) (0.93) (8.34) = 11.6

Outfall 005 — Flow (MGD) annual mean 37.5 MGD)
Phenol (μg/l) annual mean 23.2 ± 14.3

lb/day = (37.5 MGD) (0.02) (8.34) = 6.26

Combined phenol loading 20.13 lb/day or 7,347.45 lb/77

Total cyanide loading via 004/005 4,234.0 lb/77