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Water Body No. WA-23-1020
(Segment No. 10-23-13)

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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June 29, 1992

TO: Bill Backous and Sandra Stephens

FROM: Tapas Das TKD

SUBJECT: Maple Lane School, Centralia, Basin Class II Inspection on October 22-23, 1991.

INTRODUCTION

The Washington State Department of Ecology (Ecology) conducted a basin Class II Inspection at the Maple Lane School Wastewater Treatment Plant (WTP) on October 22-23, 1991. Tapas Das from Ecology's Environmental Investigations and Laboratory Services Program (EILS) and Cyronose Spicer of the Ecology Southwest Regional Office (SWRO) conducted the inspection.

A concurrent Total Maximum Daily Load (TMDL) study by EILS is also progressing in the Chehalis River Basin.

The objective of the inspection was to chemically characterize WTP influent by collecting two grab samples over a 24-hour period.

Maple Lane School (ML) is located near the city of Centralia and is operated as a correctional institution within the Washington State Department of Social and Health Services (DSHS). Wastewater consists entirely of domestic sewage from the school. Currently, the WTP serves about 150 residing students and 150 non-residing supervisors. The facility is regulated by NPDES permit No. WA-003780-0, which expired May 7, 1985. The WTP has no continuous discharge to the Chehalis River; an existing outfall is to be used for emergencies only. Since there is no continuous surface water discharge, Ecology does not require sampling or discharge monitoring reports (DMRs) (Stephens, 1992). If a surface discharge occurs, DSHS must report it as required in special conditions S3 and S4 of the permit.

The WTP is a single cell stabilization lagoon with disinfection equipment (Figure 1). Depth of the 2.5 acre unlined lagoon is 4 feet. Loss from the lagoon is predominantly through

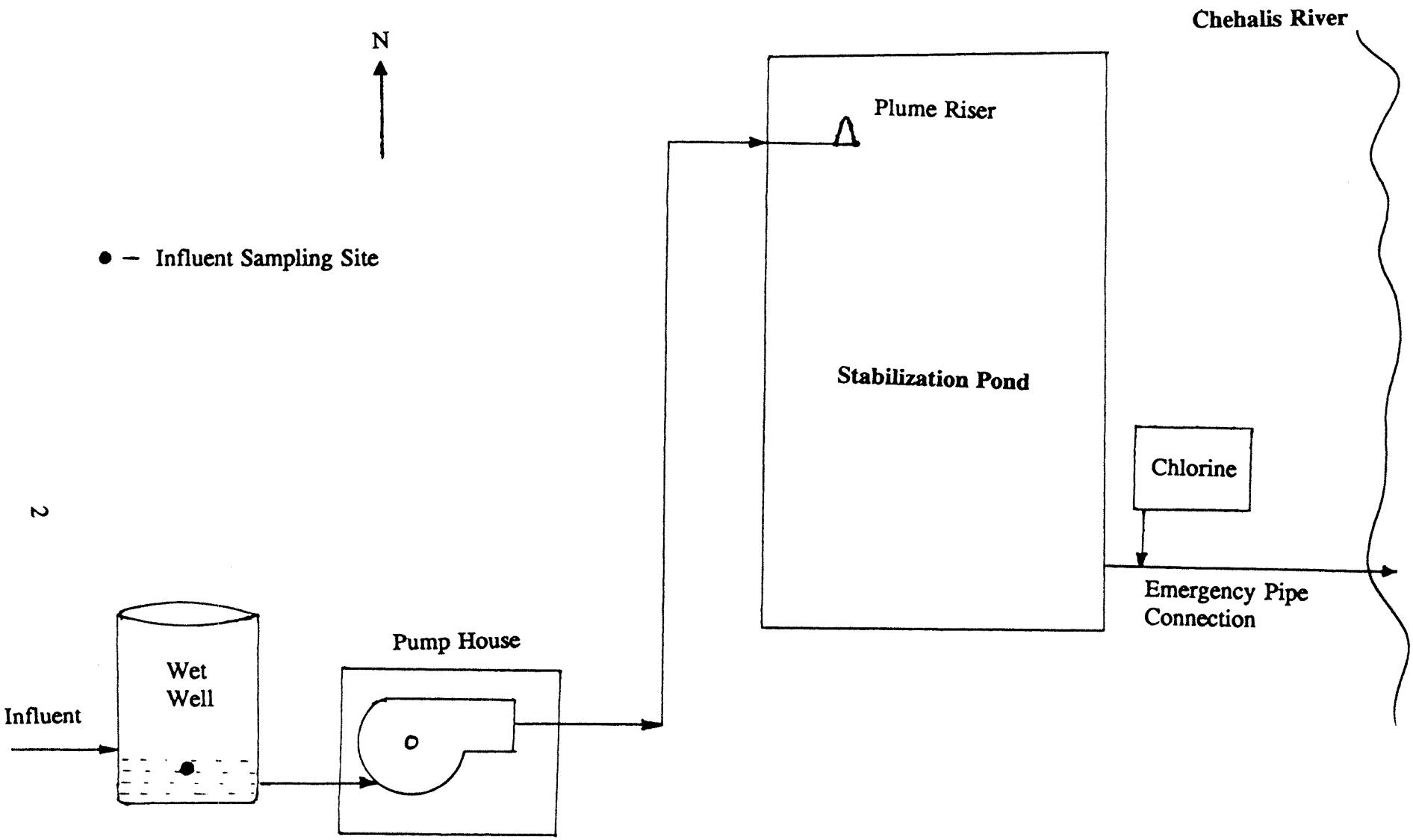

Figure 1. Plant Schematic and Sampling Site - Maple Lane WTP, 10/91

infiltration. There is no flow metering or screening of the influent. Influent flows to the wet well by gravity and the flow is intermittent. Raw sewage enters in the north side of the lagoon from the pumping station. Chlorine is available for disinfection during periods of emergency discharge to the receiving water. The last known direct discharge was in 1984 or 1985. Proximity to the Chehalis River is about 0.5 mile.

The Thurston County Health Department is currently preparing an engineering report for a regional facility in the neighboring Grand Mound area. If a regional facility becomes available, Maple Lane School will be required to hookup. If Thurston County abandons the Grand Mound plan or if DSHS proceeds sooner with plans to expand the Maple Lane School, Ecology will request an engineering report and plans which meet federal (NPDES) and state permit regulations.

PROCEDURES

Grab samples of wastewater were taken at the wet well on October 22 and 23, 1991. A peristaltic pump fitted with 1/4 inch diameter silastic tubing was used to lift wastewater from a depth of 25 feet. The intermittent nature and low flow rate of the waste stream, as well as depth to the wastewater, raised concerns about representativeness of the samples collected. These same conditions made collection of composite samples too difficult. During each sampling day, sample bottles were filled at the rate of about 1 liter per 10 minutes. Transfer blank samples were taken for volatile organic compounds (VOCs). No sample was taken from the lagoon. Sampling times and parameters analyzed are included in Table 1. All samples were held on ice at 4°C until delivery to the Ecology Manchester Laboratory. A summary of the analytical methods and laboratories conducting the analyses is given in Appendix A.

QUALITY ASSURANCE/QUALITY CONTROL

Laboratory quality assurance and quality control (QA/QC) methods used are as described by Huntamer and Hyre (1991), and Kirchmer (1988). Recommended holding times were met for all analyses performed.

For VOC analyses, the gas chromatograph/mass spectrometer (GC/MS) met contract laboratory protocol requirements (EPA, 1990). All initial and continuing calibration verification standards for metals were within the control limit of +/-10%. All spike recoveries for metals were within the acceptable limits of +/-25%, except for mercury which was low. For organic analyses, matrix spike/spike duplicate recovery and precision data were acceptable, and within QC limits, with two minor exceptions. Matrix spike recoveries for gamma-BHC and methoxychlor were 8% high and 29% low, respectively. Neither compound was detected in the samples and no data qualifiers were added (Huntamer, 1991).

RESULTS AND DISCUSSION

General Chemistry

Conventional pollutant results are given in Table 2. Influent BOD_5 results were in the range 255-780 mg/L and TSS results were in the range of 100-400 mg/L, respectively. These BOD_5

TABLE 1 – Sampling Schedule and Parameters Analyzed – Maple Lane WTP, 10/91.

Location:	Inf1	Inf2	Blank–1	Blank–2
Type:	grab	grab	trans	trans
Date:	10/22	10/23	10/22	10/23
Time:	0830	0830	0815	0815
Lab Log#4382:	–50	–51	–36	–46
GENERAL CHEMISTRY				
Turbidity	x	x		
Conductivity	x	x		
Chloride	x	x		
TS	x	x		
TNVS	x	x		
TSS	x	x		
TNVSS	x	x		
BOD5	x	x		
TOC	x	x		
NH3–N	x	x		
NO2+NO3–N	x	x		
T–Phosphorus	x	x		
pp Metals	x	x		
BNAs	x	x		
Pest/PCBs	x	x		
VOCs	x	x	x	x

Inf – Influent

TABLE 2 – Summary of General Chemistry – Maple Lane WTP, 10/91.

Location:	INF1	INF2
Type:	grab	grab
Date:	10/22	10/23
Time:	0830	0830
Lab Log#4382:	-50	-51
GENERAL CHEMISTRY		
Turbidity, N.T.U.	81	125
Conductivity, μmhos/cm	900	640
Chloride, mg/L	41.5	43.0
TS, mg/L	698	1010
TNVS, mg/L	303	254
TSS, mg/L	100	400
TNVSS, mg/L	9 J	31
BOD5, mg/L	255	780
TOC, mg/L	146	325
NH3-N, mg/L	25.9	13.4
NO2+NO3-N, mg/L	1.59	1.67
T-Phosphorus, mg/L	12.5	10.3
FIELD OBSERVATIONS		
Temperature, °C	15.8	16.1
pH, S.U.	7.9	8.2
Conductivity, μmhos/cm	-	592

J – Indicates an estimated value when result is less than specified detection limit.
Inf – Influent.

and TSS results are much higher than typically found in untreated domestic wastewaters (Metcalf and Eddy, 1991). The cause for the high variability in influent BOD_5 and TSS results might be attributable to: (1) the small population using the facility and, (2) high organic loading at the particular times the grab samples were taken.

Priority Pollutant Scan

A complete listing of influent priority pollutant scan results is included in Appendix B. A listing of priority pollutant metals, BNAs, and VOCs detected in transfer blank and influent samples is presented in Table 3. Arsenic, copper, mercury, and zinc were found in the wastewater. Four BNA compounds and three VOC compounds were also detected.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. The current permit is generally satisfactory, however, certain minor modifications are needed.

2. Effects of infiltrating wastewater on adjacent ground and surface waters are unknown, however, the Chehalis River Basin TMDL study should provide us with some information on potential impacts of the discharge.

Recommendations

1. The permittee should install a flow monitoring device in the facility.

2. The NPDES permit should be modified to include requirements for testing BOD_5, TSS, and pH and DMR submittal during periods of no discharge.

3. A ground water monitoring network should be installed to determine the effect of the lagoon infiltration on ground water quality and to assess whether contaminants are migrating toward the Chehalis River.

4. Maple Lane should be required to hook up to a regional wastewater treatment facility if one becomes available.

TABLE 3 - Results of Influent Metals, BNAs and VOCs Analyses - Maple Lane WTP, 10/91.

Field Station:	Inf1	Inf2	Blank1	Blank2
Type:	grab	grab	trans	trans
Date:	10/22	10/23	10/22	10/23
Time:	0830	0830	0815	0815
Lab Sample ID#:	438250	438251	438236	432546
Metals (µg/L)	Tot Rec	Tot Rec		
Arsenic	-	1.8 P		
Copper	155	14.8		
Mercury	075 PN	079 PN		
Zinc	672	190		
BNAs (µg/L)				
Di-n-butylphthalate	22	38		
Phenol	-	8		
4-Methylphenol	79	52		
Benzoic Acid	290 J	170 J		
VOCs (µg/L)				
Acetone	15 J	41 J	14 J	19 J
2-Butanone	10	-	-	-
Chloroform	1 J	2 J	-	-

P - The analyte was detected above the instrument detection limit but below the established minimum quantitation limit.
N - For metals analyte the spike sample recovery is not within control limits.
J - Indicates an estimated value when result is less than specified detection limit.

REFERENCES

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Kirchmer, C. Quality Assurance Manual. Manchester Laboratory, Washington State Department of Ecology, 1988.

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APPENDICES

Appendix A. Chemical Analytical Methods Used - Maple Lane WTP, 10/91.

Parameters	Method	Lab Used
GENERAL CHEMISTRY		
Conductivity	EPA, 1983: 120.1	Ecology; Manchester, WA
Turbidity	EPA, 1983: 180.1	Ecology; Manchester, WA
Chloride	APHA, 1989: 4110B	Ecology; Manchester, WA
SOLIDS 4		
TS	EPA, 1983: 160.3	Ecology; Manchester, WA
TNVS	EPA, 1983: 106.4	Ecology; Manchester, WA
TSS	EPA, 1983: 160.2	Ecology; Manchester, WA
TNVSS	EPA, 1983: 106.4	Ecology; Manchester, WA
BOD5	EPA, 1983: 405.1	Ecology; Manchester, WA
TOC (water)	EPA, 1983: 415.2	Ecology; Manchester, WA
NUTRIENTS		
NH3-N	EPA, 1983: 350.1	Ecology; Manchester, WA
NO2+NO3-N	EPA, 1983: 353.2	Ecology; Manchester, WA
Phosphorus - Total	EPA, 1983: 365.1	Ecology; Manchester, WA
ORGANICS		
VOCs (water)	EPA, 1984: 624	Weyerhaeuser Analytical Chemistry Lab; Tacoma, WA
BNAs (water)	EPA, 1984: 625	Ecology; Manchester, WA
Pesticides/PCBs (water)	EPA, 1984: 608	Ecology; Manchester, WA
METALS		
PP Metals	EPA, 1983: 200	
Total Rec. (water)	EPA, 1983: 200	Ecology; Manchester, WA

Appendix B – Cont. – Results of Influent BNA Analyses – Maple Lane WTP, 10/91 .

Field Station:	Inf1	Inf2
Type:	grab	grab
Date:	10/22	4/23
Time:	0830	0830
Parameters (µg/L) Lab sample#4382:	-50	-51
N-Nitrosodiphenylamine	31 U	4 U
Bis(2-Chloroethyl)Ether	2 U	4 U
1,3-Dichlorobenzene	2 U	4 U
1,4-Dichlorobenzene	2 U	4 U
1,2-Dichlorobenzene	2 U	4 U
Bis(2-chloroisopropyl)ether	2 U	4 U
N-Nitroso-Di-n-Propylamine	2 U	44 U
Hexachloroethane	2 U	4 U
Nitrobenzene	2 U	4 U
Isophorone	2 U	4 U
Bis(2-Chloroethoxy)Methane	2 U	4 U
1,2,4-Trichlorobenzene	2 U	4 U
Naphthalene	2 U	4 U
4-Chloroaniline	31 UJ	44 UJ
Hexachlorobutadiene	6 U	9 U
4-Chloro-3-methylphenol	12 U	18 U
2-Methylnaphthalene	2 U	4 U
Hexachlorocyclopentadiene	12 U	18 U
2-Chloronaphthalene	2 U	4 U
2-Nitroaniline	6 U	9 U
Dimethyl Phthalate	2 U	4 U
Acenaphthylene	2 U	4 U
3-Nitroaniline	31 UJ	44 UJ
Acenaphthene	2 U	4 U
Dibenzofuran	2 U	4 U
2,4-Dinitrotoluene	2 U	9 U
2,6-Dinitrotoluene	6 U	4 U
Diethyl Phthalate	6 U	9 U
4-Chlorophenyl-Phenylether	2 U	4 U
Carbazole	12 UJ	18 UJ
4-Nitroaniline	31 UJ	44 UJ
4-Bromophenyl-Phenylether	2 U	4 U
Hexachlorobenzene	2 U	4 U
Phenanthrene	2 U	4 U
Anthracene	2 U	4 U
Di-n-butylphthalate	22	38
Fluoranthene	2 U	4 U
Pyrene	2 U	4 U
Butylbenzylpthalate	6 U	9 U
3,3'-Dichlorobenzidine	REJ	REJ
Benzo(a)Anthracene	2 U	4 U
Bis(2-Ethylhexyl)phthalate	18 U	33 U
Chrysene	2 U	4 U
Di-n-Octyl Phthalate	2 UJ	4 UJ
Benzo(b)Fluoranthene	2 U	4 U
Benzo(k)Fluoranthene	2 U	4 U
Benzo(a)Pyrene	2 U	4 U
Indeno(1,2,3-cd)Pyrene	2 U	4 U
Dibenzo(a,h)Anthracene	6 U	9 U
Benzo(g,h,i)Perylene	2 U	4 U
Phenol	6 U	8
2-Chlorophenol	2 U	4 U
Benzyl Alcohol	50 UJ	71 UJ
2-Methylphenol	3 U	4 U
4-Methylphenol	79	52
2-Nitrophenol	6 U	9 U
2,4-Dimethylphenol	2 U	4 U
Benzoic Acid	290 J	170 J
2,4-Dichlorophenol	2 U	4 U
2,4,6-Trichlorophenol	6 U	9 U
2,4,5-Trichlorophenol	12 U	18 U
2,4-Dinitrophenol	31 UJ	44 UJ
4-Nitrophenol	16 U	22 U
4,6-Dinitro-2-Methylphenol	31 U	44 U
Pentachlorophenol	12 U	18 U

U – None detected at or above the method reporting limit. REJ – The data are unsuitable for all purposes.

J – Indicates an estimated value when result is less than specified detection limit. Shaded area denotes compound detected.

Appendix B. Results of Influent Pesticides/PCBs and Priority Pollutant Metal Analyses - Maple Lane WTP, 10/91.

	Field Station:	Inf1	Inf2
	Type:	grab	grab
	Date:	10/22	10/23
	Time:	0830	0830
Parameter (µg/L)	Lab sample#:	438250	438251
4,4'-DDT		0.013 U	0.018 U
Chlordane (Tech)		0.13 U	0.18 U
gamma-BHC (Lindane)		0.013 U	0.018 U
Dieldrin		0.013 U	0.018 U
Endrin		0.013 U	0.018 U
Methoxychlor		0.013 U	0.018 U
4,4'-DDD		0.013 U	0.018 U
4,4'-DDE		0.013 U	0.018 U
Heptachlor		0.013 U	0.018 U
Aldrin		0.013 U	0.018 U
alpha-BHC		0.013 U	0.018 U
beta-BHC		0.013 U	0.018 U
delta-BHC		0.013 U	0.018 U
Endosulfan I		0.013 U	0.018 U
Heptachlor Epoxide		0.013 U	0.018 U
Endosulfan sulfate		0.013 U	0.018 U
Endrin aldehyde		0.013 U	0.018 U
Toxaphene		0.25 U	0.35 U
PCB - 1260		0.13 U	0.18 U
PCB - 1254		0.13 U	0.18 U
PCB - 1221		0.13 U	0.18 U
PCB - 1232		0.13 U	0.18 U
PCB - 1248		0.13 U	0.18 U
PCB - 1016		0.13 U	0.18 U
Endosulfan II		0.013 U	0.018 U
PCB - 1242		0.13 U	0.18 U
Endrin Ketone		0.013 U	0.018 U
	Field Station:	Inf1	Inf2
	Type:	grab	grab
	Date:	10/22	10/23
	Time:	0830	0830
	Lab sample#:	438250	438251
Metals Tot Rec (µg/L)			
Antimony		30 U	30 U
Arsenic		1.5 U	1.8 P
Beryllium		1.0 U	1.0 U
Cadmium		2.0 U	2.0 U
Chromium		5.0 U	5.0 U
Copper		155	148
Lead		20 U	20 U
Mercury		0.075 PN	0.079 PN
Nickel		10 U	10 U
Selenium		2.0 U	2.0 U
Silver		3.0 UN	3.0 UN
Thallium		2.5 U	2.5 U
Zinc		672	190

U - Indicates compound was analyzed for but not detected at the given detection limit.

N - For metals analytes the spike sample recovery is not within control limits.

P - The analyte was detected above the instrument detection limit but below the established minimum quantitation limit. Shaded area denotes compound and metal detected.

Appendix B. Cont. - Results of Blank and Influent VOC Analysis - Maple Lane WTP, 10/91.

Field Station:	Inf1	Inf2	Blank1	Blank2
Type:	grab	grab	trans	trans
Date:	10/22	10/23	10/22	10/23
Time:	0830	0830	0815	0815
Lab sample ID#4382:	-50	-51	-36	-46
Parameters (μg/L)				
Chloromethane	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U
Acetone	15 J	41 J	14 J	19 J
Carbon Disulfide	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	10 U	10 U	10 U
2-Butanone	10	10 U	10 U	10 U
Acrolein	10 U	10 U	10 U	10 U
Chloroform	1 J	2 J	10 U	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U
Vinyl Acetate	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U
Trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U
Tetrachloroethene (PCE)	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U
Total Xylenes	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U
Acrylonitrile	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U

U - None detected at or above the method reporting limit.
J - Indicates an estimated value when result is less than specified detection limit.
Shaded area denotes compound detected.