



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8260B TCL	* 1,1,1-TRICHLOROETHANE	WATER	5.0		UG/L	0.67	30	70-130	70-130
8260B TCL	1,1,2,2-TETRACHLOROETHANE	WATER	5.0		UG/L	0.76	30	70-130	70-130
8260B TCL	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (FREON 113)	WATER	5.0		UG/L	0.71	30	70-130	70-130
8260B TCL	1,1,2-TRICHLOROETHANE	WATER	5.0		UG/L	0.77	30	70-130	70-130
8260B TCL	* 1,1-DICHLOROETHANE	WATER	5.0		UG/L	0.57	30	70-130	70-130
8260B TCL	* 1,1-DICHLOROETHENE	WATER	5.0		UG/L	0.65	30	70-130	70-130
8260B TCL	1,2,4-TRICHLOROBENZENE	WATER	5.0		UG/L	0.95	30	70-130	70-130
8260B TCL	1,2-DIBROMO-3-CHLOROPROPANE	WATER	5.0		UG/L	1.1	30	50-150	50-150
8260B TCL	1,2-DIBROMOETHANE	WATER	5.0		UG/L	0.77	30	70-130	70-130
8260B TCL	* 1,2-DICHLOROBENZENE	WATER	5.0		UG/L	0.69	30	70-130	70-130
8260B TCL	* 1,2-DICHLOROETHANE	WATER	5.0		UG/L	0.71	30	70-130	70-130
8260B TCL	1,2-DICHLOROPROPANE	WATER	5.0		UG/L	0.82	30	70-130	70-130
8260B TCL	1,3-DICHLOROBENZENE	WATER	5.0		UG/L	0.79	30	70-130	70-130
8260B TCL	1,4-DICHLOROBENZENE	WATER	5.0		UG/L	0.84	30	70-130	70-130
8260B TCL	2-BUTANONE (MEK)	WATER	1.0		UG/L	1.0	30	50-150	50-150
8260B TCL	2-HEXANONE	WATER	1.0		UG/L	0.80	30	70-130	70-130
8260B TCL	4-METHYL-2-PENTANONE (MIBK)	WATER	1.0		UG/L	0.66	30	70-130	70-130
8260B TCL	ACETONE	WATER	2.0		UG/L	2.0	30	50-150	50-150
8260B TCL	* BENZENE	WATER	5.0		UG/L	0.69	30	70-130	70-130
8260B TCL	BROMODICHLOROMETHANE	WATER	5.0		UG/L	0.69	30	70-130	70-130
8260B TCL	BROMOFORM	WATER	5.0		UG/L	0.78	30	70-130	70-130
8260B TCL	BROMOMETHANE	WATER	5.0		UG/L	1.0	30	50-150	50-150
8260B TCL	CARBON DISULFIDE	WATER	1.0		UG/L	1.2	30	70-130	70-130
8260B TCL	CARBON TETRACHLORIDE	WATER	5.0		UG/L	0.66	30	70-130	70-130
8260B TCL	* CHLOROBENZENE	WATER	5.0		UG/L	0.69	30	70-130	70-130
8260B TCL	CHLOROETHANE	WATER	5.0		UG/L	0.73	30	70-130	70-130
8260B TCL	* CHLOROPROPANE	WATER	5.0		UG/L	0.60	30	70-130	70-130
8260B TCL	CHLOROMETHANE	WATER	5.0		UG/L	0.68	30	70-130	70-130
8260B TCL	* CIS-1,2-DICHLOROETHENE	WATER	5.0		UG/L	0.76	30	70-130	70-130
8260B TCL	CIS-1,3-DICHLOROPROPENE	WATER	5.0		UG/L	0.52	30	70-130	70-130
8260B TCL	CYCLOHEXANE	WATER	1.0		UG/L	0.60	30	50-150	50-150
8260B TCL	DIBROMOCHLOROMETHANE	WATER	5.0		UG/L	0.67	30	70-130	70-130
8260B TCL	DICHLORODIFLUOROMETHANE (FREON 12)	WATER	5.0		UG/L	0.72	30	70-130	70-130
8260B TCL	* ETHYLBENZENE	WATER	5.0		UG/L	0.81	30	70-130	70-130
8260B TCL	ISOPROPYLBENZENE	WATER	5.0		UG/L	0.74	30	70-130	70-130
8260B TCL	M+P-XYLENE	WATER	5.0		UG/L	1.4	30	70-130	70-130
8260B TCL	METHYL ACETATE	WATER	1.0		UG/L	0.79	30	50-150	50-150
8260B TCL	METHYLCYCLOHEXANE	WATER	1.0		UG/L	0.88	30	50-150	50-150
8260B TCL	METHYLENE CHLORIDE	WATER	5.0		UG/L	0.61	30	70-130	70-130
8260B TCL	METHYL-TERT-BUTYL ETHER (MTBE)	WATER	5.0		UG/L	0.82	30	70-130	70-130
8260B TCL	* O-XYLENE	WATER	5.0		UG/L	0.75	30	70-130	70-130
8260B TCL	STYRENE	WATER	5.0		UG/L	0.75	30	70-130	70-130
8260B TCL	* TETRACHLOROETHENE	WATER	5.0		UG/L	0.71	30	70-130	70-130
8260B TCL	* TOLUENE	WATER	5.0		UG/L	0.72	30	70-130	70-130
8260B TCL	* TRANS-1,2-DICHLOROETHENE	WATER	5.0		UG/L	0.51	30	70-130	70-130
8260B TCL	TRANS-1,3-DICHLOROPROPENE	WATER	5.0		UG/L	0.74	30	70-130	70-130
8260B TCL	* TRICHLOROETHENE	WATER	5.0		UG/L	0.74	30	70-130	70-130
8260B TCL	TRICHLOROFUOROMETHANE (FREON 11)	WATER	5.0		UG/L	0.94	30	70-130	70-130
8260B TCL	* VINYL CHLORIDE	WATER	5.0		UG/L	0.64	30	70-130	70-130
8260B TCL	4-BROMOFLUOROBENZENE -SURR	WATER	NA		UG/L	NA	NA	80-123	80-123
8260B TCL	DIBROMOFLUOROMETHANE -SURR	WATER	NA		UG/L	NA	NA	89-115	89-115
8260B TCL	DICHLOROETHANE-D4 -SURR	WATER	NA		UG/L	NA	NA	80-120	80-120
8260B TCL	TOLUENE-D8 -SURR	WATER	NA		UG/L	NA	NA	88-124	88-124



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8260B	ADDITIONAL COMPOUNDS BY REQUEST								
8260B	1,1,1,2-TETRACHLOROETHANE	WATER	5.0		UG/L	0.59	30	70-130	70-130
8260B	1,1-DICHLOROPROPENE	WATER	5.0		UG/L	0.76	30	70-130	70-130
8260B	1,2,3-TRICHLOROBENZENE	WATER	5.0		UG/L	0.92	30	70-130	70-130
8260B	1,2,3-TRICHLOROPROPANE	WATER	5.0		UG/L	1.70	30	70-130	70-130
8260B	1,2,4-TRIMETHYLBENZENE	WATER	5.0		UG/L	0.80	30	70-130	70-130
8260B	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE (FREON 123A)	WATER	5.0		UG/L	0.77	30	70-130	70-150
8260B	1,3,5-TRIMETHYLBENZENE	WATER	5.0		UG/L	0.76	30	70-130	70-130
8260B	1,3-DICHLOROPROPANE	WATER	5.0		UG/L	0.61	30	70-130	70-130
8260B	1,4-DIOXANE	WATER	100		UG/L	28	30	50-150	50-150
8260B	2,2-DICHLORO-1,1,1-TRIFLUOROETHANE (FREON 123)	WATER	5.0		UG/L	0.45	30	70-130	70-130
8260B	2,2-DICHLOROPROPANE	WATER	5.0		UG/L	0.70	30	70-130	70-130
8260B	2-CHLORO-1,3-BUTADIENE	WATER	5.0		UG/L	0.75	30	70-130	70-130
8260B	2-CHLOROBETHYL VINYL ETHER	WATER	5.0		UG/L	0.68	30	50-150	50-150
8260B	2-CHLOROTOLUENE	WATER	5.0		UG/L	0.75	30	70-130	70-130
8260B	2-NITROPROPANE	WATER	5.0		UG/L	1.8	30	50-150	50-150
8260B	2-PROPANOL	WATER	100		UG/L	12	30	70-130	70-130
8260B	3-CHLOROPROPENE (ALLYL CHLORIDE)	WATER	5.0		UG/L	1.1	30	70-130	70-130
8260B	4-CHLOROTOLUENE	WATER	5.0		UG/L	0.72	30	70-130	70-130
8260B	ACETONITRILE	WATER	100		UG/L	5.4	30	50-150	50-150
8260B	ACROLEIN	WATER	100		UG/L	13	30	50-150	50-150
8260B	ACRYLONITRILE	WATER	100		UG/L	8.1	30	50-150	50-150
8260B	ALLYL CHLORIDE	WATER	5.0		UG/L	1.1	30	70-130	70-130
8260B	BROMOBENZENE	WATER	5.0		UG/L	0.63	30	70-130	70-130
8260B	BROMOCHLOROMETHANE	WATER	5.0		UG/L	0.72	30	70-130	70-130
8260B	CYCLOHEXANONE	WATER	100		UG/L	10	30	50-150	50-150
8260B	DIBROMOMETHANE	WATER	5.0		UG/L	0.74	30	70-130	70-130
8260B	DICHLOROFLUOROMETHANE (FREON 21)	WATER	5.0		UG/L	0.74	30	50-150	50-150
8260B	DIETHYL ETHER	WATER	5.0		UG/L	0.74	30	70-130	70-130
8260B	ETHYL METHACRYLATE	WATER	10		UG/L	0.73	30	70-130	70-130
8260B	HEXACHLOROBUTADIENE	WATER	5.0		UG/L	1.5	30	70-130	70-130
8260B	IODOMETHANE	WATER	10		UG/L	0.73	30	50-150	50-150
8260B	ISOBUTYL ALCOHOL	WATER	100		UG/L	13	30	50-150	50-150
8260B	METHACRYLONITRILE	WATER	20		UG/L	0.52	30	50-150	50-150
8260B	METHYL METHACRYLATE	WATER	10		UG/L	0.71	30	70-130	70-130
8260B	NAPHTHALENE	WATER	5.0		UG/L	0.66	30	50-150	50-150
8260B	N-BUTYLBENZENE	WATER	5.0		UG/L	0.82	30	70-130	70-130
8260B	N-HEPTANE	WATER	5.0		UG/L	1.4	30	70-130	70-130
8260B	N-PROPYLBENZENE	WATER	5.0		UG/L	0.79	30	70-130	70-130
8260B	P-ISOPROPYLTOLUENE	WATER	5.0		UG/L	0.84	30	70-130	70-130
8260B	PROPIONITRILE	WATER	100		UG/L	3.2	30	50-150	50-150
8260B	SEC-BUTYLBENZENE	WATER	5.0		UG/L	0.80	30	70-130	70-130
8260B	TERT-BUTYL ALCOHOL	WATER	100		UG/L	15	30	50-150	50-150
8260B	TERT-BUTYLBENZENE	WATER	5.0		UG/L	0.80	30	70-130	70-130
8260B	TETRA HYDROFURAN	WATER	5.0		UG/L	0.89	30	50-150	50-150
8260B	TRANS-1,4-DICHLORO-2-BUTENE	WATER	5.0		UG/L	0.54	30	50-150	50-150
8260B	VINYL ACETATE	WATER	10		UG/L	1.9	30	50-150	50-150



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METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8260B TCL	* 1,1,1-TRICHLOROETHANE	SOIL	5.0		UG/KG	0.60	30	70-130	70-130
8260B TCL	1,1,2,2-TETRACHLOROETHANE	SOIL	5.0		UG/KG	0.51	30	70-130	70-130
8260B TCL	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (FREON 113)	SOIL	5.0		UG/KG	0.39	30	70-130	70-130
8260B TCL	1,1,2-TRICHLOROETHANE	SOIL	5.0		UG/KG	0.22	30	70-130	70-130
8260B TCL	* 1,1-DICHLOROETHANE	SOIL	5.0		UG/KG	0.24	30	70-130	70-130
8260B TCL	* 1,1-DICHLOROETHENE	SOIL	5.0		UG/KG	0.48	30	70-130	70-130
8260B TCL	1,2,4-TRICHLOROBENZENE	SOIL	5.0		UG/KG	0.94	30	70-130	70-130
8260B TCL	1,2-DIBROMO-3-CHLOROPROPANE	SOIL	5.0		UG/KG	0.70	30	50-150	50-150
8260B TCL	1,2-DIBROMOETHANE	SOIL	5.0		UG/KG	0.40	30	70-130	70-130
8260B TCL	* 1,2-DICHLOROBENZENE	SOIL	5.0		UG/KG	0.23	30	70-130	70-130
8260B TCL	* 1,2-DICHLOROETHANE	SOIL	5.0		UG/KG	0.30	30	70-130	70-130
8260B TCL	1,2-DICHLOROPROPANE	SOIL	5.0		UG/KG	0.47	30	70-130	70-130
8260B TCL	1,3-DICHLOROBENZENE	SOIL	5.0		UG/KG	0.53	30	70-130	70-130
8260B TCL	1,4-DICHLOROBENZENE	SOIL	5.0		UG/KG	0.57	30	70-130	70-130
8260B TCL	2-BUTANONE (MEK)	SOIL	10		UG/KG	1.0	30	50-150	50-150
8260B TCL	2-HEXANONE	SOIL	10		UG/KG	0.72	30	70-130	70-130
8260B TCL	4-METHYL-2-PENTANONE (MIBK)	SOIL	10		UG/KG	0.95	30	70-130	70-130
8260B TCL	ACETONE	SOIL	20		UG/KG	1.5	30	50-150	50-150
8260B TCL	* BENZENE	SOIL	5.0		UG/KG	0.19	30	70-130	70-130
8260B TCL	BROMODICHLOROMETHANE	SOIL	5.0		UG/KG	0.39	30	70-130	70-130
8260B TCL	BROMOFORM	SOIL	5.0		UG/KG	0.46	30	70-130	70-130
8260B TCL	BROMOMETHANE	SOIL	5.0		UG/KG	0.50	30	50-150	50-150
8260B TCL	CARBON DISULFIDE	SOIL	10		UG/KG	0.19	30	70-130	70-130
8260B TCL	CARBON TETRACHLORIDE	SOIL	5.0		UG/KG	0.35	30	70-130	70-130
8260B TCL	* CHLOROENZENE	SOIL	5.0		UG/KG	0.24	30	70-130	70-130
8260B TCL	CHLOROETHANE	SOIL	5.0		UG/KG	0.21	30	70-130	70-130
8260B TCL	* CHLOROFORM	SOIL	5.0		UG/KG	0.15	30	70-130	70-130
8260B TCL	CHLOROMETHANE	SOIL	5.0		UG/KG	0.44	30	70-130	70-130
8260B TCL	* CIS-1,2-DICHLOROETHENE	SOIL	5.0		UG/KG	0.55	30	70-130	70-130
8260B TCL	CIS-1,3-DICHLOROPROPENE	SOIL	5.0		UG/KG	0.20	30	70-130	70-130
8260B TCL	CYCLOHEXANE	SOIL	10		UG/KG	0.36	30	70-130	70-130
8260B TCL	DIBROMOCHLOROMETHANE	SOIL	5.0		UG/KG	0.32	30	70-130	70-130
8260B TCL	DICHLORODIFLUOROMETHANE (FREON 12)	SOIL	5.0		UG/KG	0.35	30	70-130	70-130
8260B TCL	* ETHYLBENZENE	SOIL	5.0		UG/KG	0.37	30	70-130	70-130
8260B TCL	ISOPROPYLBENZENE	SOIL	5.0		UG/KG	0.40	30	70-130	70-130
8260B TCL	M+P-XYLENE	SOIL	5.0		UG/KG	0.78	30	70-130	70-130
8260B TCL	METHYLCYCLOHEXANE	SOIL	10		UG/KG	0.34	30	50-150	50-150
8260B TCL	METHYLENE CHLORIDE	SOIL	5.0		UG/KG	0.32	30	70-130	70-130
8260B TCL	METHYL-TERT-BUTYL ETHER (MTBE)	SOIL	5.0		UG/KG	0.19	30	70-130	70-130
8260B TCL	* O-XYLENE	SOIL	5.0		UG/KG	0.31	30	70-130	70-130
8260B TCL	STYRENE	SOIL	5.0		UG/KG	0.16	30	70-130	70-130
8260B TCL	* TETRACHLOROETHENE	SOIL	5.0		UG/KG	0.24	30	70-130	70-130
8260B TCL	* TOLUENE	SOIL	5.0		UG/KG	0.30	30	70-130	70-130
8260B TCL	* TRANS-1,2-DICHLOROETHENE	SOIL	5.0		UG/KG	0.30	30	70-130	70-130
8260B TCL	TRANS-1,3-DICHLOROPROPENE	SOIL	5.0		UG/KG	0.33	30	70-130	70-130
8260B TCL	* TRICHLOROETHENE	SOIL	5.0		UG/KG	0.28	30	70-130	70-130
8260B TCL	TRICHLOROFLUOROMETHANE (FREON 11)	SOIL	5.0		UG/KG	0.32	30	70-130	70-130
8260B TCL	* VINYL CHLORIDE	SOIL	5.0		UG/KG	0.68	30	70-130	70-130
8260B TCL	4-BROMOFLUOROBENZENE -SURR	SOIL	NA		UG/KG	NA	NA	50-135	50-135
8260B TCL	DIBROMOFLUOROMETHANE -SURR	SOIL	NA		UG/KG	NA	NA	58-133	58-133
8260B TCL	DICHLOROETHANE-D4	SOIL	NA		UG/KG	NA	NA	80-120	80-120
8260B TCL	TOLUENE-D8 -SURR	SOIL	NA		UG/KG	NA	NA	75-128	75-128



ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8260B	ADDITIONAL COMPOUNDS BY REQUEST								
8260B	1,1,1,2-TETRACHLOROETHANE	SOIL	5.0		UG/KG	0.44	30	70-130	70-130
8260B	1,1-DICHLOROPROPENE	SOIL	5.0		UG/KG	0.43	30	70-130	70-130
8260B	1,2,3-TRICHLOROBENZENE	SOIL	5.0		UG/KG	1.1	30	70-130	70-130
8260B	1,2,3-TRICHLOROPROPANE	SOIL	5.0		UG/KG	0.95	30	70-130	70-130
8260B	1,2,4-TRIMETHYLBENZENE	SOIL	5.0		UG/KG	0.42	30	70-130	70-130
8260B	1,3,5-TRIMETHYLBENZENE	SOIL	5.0		UG/KG	0.51	30	70-130	70-130
8260B	1,3-DICHLOROPROPANE	SOIL	5.0		UG/KG	0.38	30	70-130	70-130
8260B	1,4-DIOXANE	SOIL	100		UG/KG	21	30	50-150	50-150
8260B	2,2-DICHLOROPROPANE	SOIL	5.0		UG/KG	0.21	30	70-130	70-130
8260B	2-CHLORO-1,3-BUTADIENE	SOIL	5.0		UG/KG	0.53	30	70-130	70-130
8260B	2-CHLOROETHYLVINYL ETHER	SOIL	5.0		UG/KG	2.7	30	50-150	50-150
8260B	2-CHLOROTOLUENE	SOIL	5.0		UG/KG	0.28	30	70-130	70-130
8260B	2-NITROPROPANE	SOIL	5.0		UG/KG	1.5	30	50-150	50-150
8260B	2-PROPANOL	SOIL	100		UG/KG	39	30	70-130	70-130
8260B	3-CHLOROPROPENE (ALLYL CHLORIDE)	SOIL	5.0		UG/KG	1.0	30	70-130	70-130
8260B	4-CHLOROTOLUENE	SOIL	5.0		UG/KG	0.37	30	70-130	70-130
8260B	ACETONITRILE	SOIL	100		UG/KG	13	30	50-150	50-150
8260B	ACROLEIN	SOIL	100		UG/KG	5.4	30	50-150	50-150
8260B	ACRYLONITRILE	SOIL	100		UG/KG	3.6	30	50-150	50-150
8260B	ALLYL CHLORIDE	SOIL	5.0		UG/KG	1.0	30	70-130	70-130
8260B	BROMOBENZENE	SOIL	5.0		UG/KG	0.42	30	70-130	70-130
8260B	BROMOCHLOROMETHANE	SOIL	5.0		UG/KG	0.34	30	70-130	70-130
8260B	DIBROMOMETHANE	SOIL	5.0		UG/KG	0.35	30	70-130	70-130
8260B	DIETHYL ETHER	SOIL	5.0		UG/KG	0.49	30	70-130	70-130
8260B	ETHYL METHACRYLATE	SOIL	10.0		UG/KG	0.26	30	70-130	70-130
8260B	HEXACHLOROBUTADIENE	SOIL	5.0		UG/KG	0.60	30	70-130	70-130
8260B	IODOMETHANE	SOIL	10		UG/KG	0.35	30	50-150	50-150
8260B	ISOBUTYL ALCOHOL	SOIL	100		UG/KG	14	30	50-150	50-150
8260B	METHACRYLONITRILE	SOIL	20		UG/KG	1.7	30	50-150	50-150
8260B	METHYL METHACRYLATE	SOIL	10		UG/KG	1.2	30	70-130	70-130
8260B	NAPHTHALENE	SOIL	5.0		UG/KG	1.1	30	50-150	50-150
8260B	N-BUTYLBENZENE	SOIL	5.0		UG/KG	0.61	30	70-130	70-130
8260B	N-HEPTANE	SOIL	5.0		UG/KG	0.36	30	70-130	70-130
8260B	N-PROPYLBENZENE	SOIL	5.0		UG/KG	0.36	30	70-130	70-130
8260B	P-ISOPROPYLTOLUENE	SOIL	5.0		UG/KG	0.41	30	70-130	70-130
8260B	PROPIONITRILE	SOIL	100		UG/KG	8.9	30	50-150	50-150
8260B	SEC-BUTYLBENZENE	SOIL	5.0		UG/KG	0.32	30	70-130	70-130
8260B	TERT-BUTYL ALCOHOL	SOIL	100		UG/KG	10	30	50-150	50-150
8260B	TERT-BUTYLBENZENE	SOIL	5.0		UG/KG	0.29	30	70-130	70-130
8260B	TETRA HYDROFURAN	SOIL	5.0		UG/KG	1.1	30	50-150	50-150
8260B	TRANS-1,4-DICHLORO-2-BUTENE	SOIL	5.0		UG/KG	0.98	30	50-150	50-150
8260B	VINYL ACETATE	SOIL	10		UG/KG	1.2	30	50-150	50-150



## ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8270C TCL	1,1'-BIPHENYL	WATER	10		UG/L	0.55	30	40-150	40-150
8270C TCL	2,2'-OXYBIS (1-CHLOROPROPANE)	WATER	10		UG/L	0.78	30	10-140	10-140
8270C TCL	* 2,4,5-TRICHLOROPHENOL	WATER	10		UG/L	0.84	30	40-110	40-110
8270C TCL	* 2,4,6-TRICHLOROPHENOL	WATER	10		UG/L	0.59	30	40-110	40-110
8270C TCL	2,4-DICHLOROPHENOL	WATER	10		UG/L	0.37	30	66-104	66-104
8270C TCL	2,4-DIMETHYLPHENOL	WATER	10		UG/L	1.8	30	31-92	31-92
8270C TCL	* 2,4-DINITROPHENOL	WATER	50		UG/L	14	30	21-123	21-123
8270C TCL	2,4-DINITROTOLUENE	WATER	10		UG/L	0.53	30	68-113	58-114
8270C TCL	2,6-DINITROTOLUENE	WATER	10		UG/L	0.55	30	70-130	70-130
8270C TCL	* 2-CHLORONAPHTHALENE	WATER	10		UG/L	0.55	30	52-111	52-111
8270C TCL	2-CHLOROPHENOL	WATER	10		UG/L	0.69	30	16-116	37-105
8270C TCL	* 2-METHYLNAPHTHALENE	WATER	10		UG/L	0.45	30	42-107	42-107
8270C TCL	2-METHYLPHENOL	WATER	10		UG/L	0.79	30	16-102	16-102
8270C TCL	2-NITROANILINE	WATER	50		UG/L	0.59	30	63-130	63-130
8270C TCL	2-NITROPHENOL	WATER	10		UG/L	0.61	30	63-130	63-130
8270C TCL	3,3'-DICHLOROBENZIDINE	WATER	10		UG/L	0.73	30	48-119	48-119
8270C TCL	3-NITROANILINE	WATER	50		UG/L	0.43	30	56-111	56-111
8270C TCL	* 4,6-DINITRO-2-METHYLPHENOL	WATER	50		UG/L	0.51	30	47-130	47-130
8270C TCL	* 4-BROMOPHENYL-PHENYLETHER	WATER	10		UG/L	0.67	30	64-130	64-130
8270C TCL	4-CHLORO-3-METHYLPHENOL	WATER	10		UG/L	0.50	30	21-131	21-131
8270C TCL	4-CHLOROANILINE	WATER	10		UG/L	0.70	30	39-107	39-107
8270C TCL	4-CHLOROPHENYL-PHENYLETHER	WATER	10		UG/L	0.49	30	55-106	55-106
8270C TCL	4-METHYLPHENOL	WATER	10		UG/L	1.5	30	26-99	26-99
8270C TCL	* 4-NITROANILINE	WATER	50		UG/L	0.59	30	70-130	70-130
8270C TCL	* 4-NITROPHENOL	WATER	50		UG/L	6.7	30	11-130	10-130
8270C TCL	* ACENAPHTHENE	WATER	10		UG/L	0.48	30	41-121	41-121
8270C TCL	ACENAPHTHYLENE	WATER	10		UG/L	0.33	30	36-125	36-125
8270C TCL	ACETOPHENONE	WATER	10		UG/L	1.4	30	40-150	40-150
8270C TCL	ANTHRACENE	WATER	10		UG/L	0.60	30	73-130	73-130
8270C TCL	ATRAZINE	WATER	10		UG/L	1.3	30	40-150	40-150
8270C TCL	BENZALDEHYDE	WATER	10		UG/L	1.3	30	40-150	40-150
8270C TCL	BENZO (A) ANTHRACENE	WATER	10		UG/L	0.54	30	71-130	40-130
8270C TCL	BENZO (A) PYRENE	WATER	10		UG/L	0.42	30	61-119	38-118
8270C TCL	BENZO (B) FLUORANTHENE	WATER	10		UG/L	0.54	30	68-130	39-130
8270C TCL	BENZO (G, H, I) PERYLENE	WATER	10		UG/L	0.62	30	50-125	50-125
8270C TCL	BENZO (K) FLUORANTHENE	WATER	10		UG/L	0.53	30	68-113	41-112
8270C TCL	BIS (-2-CHLOROETHOXY) METHANE	WATER	10		UG/L	0.86	30	61-130	61-130
8270C TCL	BIS (2-CHLOROETHYL) ETHER	WATER	10		UG/L	0.74	30	55-130	55-130
8270C TCL	BIS (2-ETHYLHEXYL) PHTHALATE	WATER	10		UG/L	0.48	30	70-130	70-130
8270C TCL	BUTYL BENZYL PHTHALATE	WATER	10		UG/L	0.59	30	22-141	22-141
8270C TCL	CAPROLACTAM	WATER	10		UG/L	1.0	30	8-100	8-100
8270C TCL	CARBAZOLE	WATER	10		UG/L	0.47	30	70-130	70-130
8270C TCL	CHRYSENE	WATER	10		UG/L	0.53	30	61-119	61-119
8270C TCL	DIBENZO (A, H) ANTHRACENE	WATER	10		UG/L	0.63	30	70-130	70-130
8270C TCL	DIBENZOFURAN	WATER	10		UG/L	0.41	30	70-130	70-130
8270C TCL	DIETHYLPHTHALATE	WATER	10		UG/L	0.31	30	31-124	31-124
8270C TCL	DIMETHYL PHTHALATE	WATER	10		UG/L	0.53	30	10-121	10-121
8270C TCL	DI-N-BUTYLPHTHALATE	WATER	10		UG/L	0.39	30	46-130	46-130
8270C TCL	DI-N-OCTYL PHTHALATE	WATER	10		UG/L	0.45	30	65-130	65-130
8270C TCL	FLUORANTHENE	WATER	10		UG/L	0.32	30	75-130	62-130
8270C TCL	FLUORENE	WATER	10		UG/L	0.47	30	60-111	27-113
8270C TCL	* HEXACHLOROBENZENE	WATER	10		UG/L	0.43	30	58-130	58-130
8270C TCL	HEXACHLOROBUTADIENE	WATER	10		UG/L	0.69	30	13-130	13-130
8270C TCL	HEXACHLOROCYCLOPENTADIENE	WATER	10		UG/L	1.1	30	10-130	10-130
8270C TCL	HEXACHLOROETHANE	WATER	10		UG/L	0.48	30	11-130	11-130
8270C TCL	INDENO (1,2,3-CD) PYRENE	WATER	10		UG/L	0.49	30	70-130	70-130
8270C TCL	ISOPHORONE	WATER	10		UG/L	0.61	30	58-130	58-130
8270C TCL	* NAPHTHALENE	WATER	10		UG/L	0.62	30	26-109	26-109
8270C TCL	* NITROBENZENE	WATER	10		UG/L	0.78	30	49-130	49-130
8270C TCL	* N-NITROSO-DI-N-PROPYLAMINE	WATER	10		UG/L	1.2	30	25-120	25-120
8270C TCL	N-NITROSODIPHENYLAMINE	WATER	10		UG/L	0.75	30	70-130	70-130
8270C TCL	* PENTACHLOROPHENOL	WATER	50		UG/L	0.60	30	16-131	16-131
8270C TCL	* PHENANTHRENE	WATER	10		UG/L	0.45	30	68-130	38-130
8270C TCL	* PHENOL	WATER	10		UG/L	0.54	30	10-65	10-71
8270C TCL	* PYRENE	WATER	10		UG/L	0.65	30	60-130	52-130



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8270C TCL	2,4,6-TRIBROMOPHENOL -SURR	WATER	NA		UG/L	NA	NA	41-135	41-135
8270C TCL	2-FLUOROBIPHENYL -SURR	WATER	NA		UG/L	NA	NA	38-100	38-100
8270C TCL	2-FLUOROPHENOL -SURR	WATER	NA		UG/L	NA	NA	17-74	17-74
8270C TCL	NITROBENZENE-d5 -SURR	WATER	NA		UG/L	NA	NA	38-105	38-105
8270C TCL	PHENOL-d6 -SURR	WATER	NA		UG/L	NA	NA	10-69	10-69
8270C TCL	TERPHENYL-d14 -SURR	WATER	NA		UG/L	NA	NA	40-137	40-137
8270C ADDITIONAL COMPOUNDS BY REQUEST									
8270C	1,2,4,5-TETRACHLOROBENZENE	WATER	10		UG/L	0.74	30	40-150	40-150
8270C	* 1,2,4-TRICHLOROBENZENE	WATER	10		UG/L	0.65	30	17-99	27-104
8270C	1,2-DICHLOROBENZENE	WATER	10		UG/L	0.67	30	23-130	23-130
8270C	1,2-DIPHENYLHYDRAZINE	WATER	10		UG/L	0.48	30	10-142	10-142
8270C	1,3,5-TRINITROBENZENE	WATER	10		UG/L	1.1	30	40-150	40-150
8270C	1,3-DICHLOROBENZENE	WATER	10		UG/L	0.50	30	17-130	17-130
8270C	* 1,4-DICHLOROBENZENE	WATER	10		UG/L	0.58	30	16-83	23-85
8270C	1,4-NAPHTHOQUINONE	WATER	50		UG/L	12	30	40-150	40-150
8270C	1-METHYLNAPHTHALENE	WATER	10		UG/L	0.62	30	40-150	40-150
8270C	1-NAPHTHYLAMINE	WATER	50		UG/L	4.5	30	40-150	40-150
8270C	2,3,4,6-TETRACHLOROPHENOL	WATER	10		UG/L	0.60	30	40-150	40-150
8270C	2,6-DICHLOROPHENOL	WATER	10		UG/L	0.82	30	40-150	40-150
8270C	2-ACETYLAMINOFLUORENE	WATER	10		UG/L	0.59	30	40-150	40-150
8270C	2-NAPHTHYLAMINE	WATER	50		UG/L	3.6	30	40-150	40-150
8270C	2-PICOLINE	WATER	10		UG/L	2.5	30	40-150	40-150
8270C	3,3'-DIMETHYLBENZIDINE	WATER	50		UG/L	24	30	40-150	40-150
8270C	3-METHYLCHOLANTHRENE	WATER	10		UG/L	2.2	30	40-150	40-150
8270C	4-AMINOBIIPHENYL	WATER	50		UG/L	3.1	30	40-150	40-150
8270C	4-NITROQUINOLINE-1-OXIDE	WATER	50		UG/L	24	30	40-150	40-150
8270C	5-NITRO-O-TOLUIDINE	WATER	10		UG/L	1.4	30	40-150	40-150
8270C	7,12-DIMETHYLBENZ (a) ANTHRACENE	WATER	10		UG/L	2.4	30	40-150	40-150
8270C	aa-DIMETHYLPHENETHYLAMINE	WATER	50		UG/L	46	30	40-150	40-150
8270C	ANILINE	WATER	10		UG/L	0.78	30	13-123	13-123
8270C	ARAMITE	WATER	50		UG/L	6.3	30	40-150	40-150
8270C	BENZIDINE	WATER	100	200	UG/L	43	30	10-130	10-130
8270C	BENZOIC ACID	WATER	50	100	UG/L	15	30	30-130	30-130
8270C	BENZYL ALCOHOL	WATER	10		UG/L	1.1	30	31-109	31-109
8270C	CHLOROBENZILATE	WATER	10		UG/L	0.78	30	40-150	40-150
8270C	DIALATE	WATER	10		UG/L	1.4	30	40-150	40-150
8270C	DIMETHOATE	WATER	50		UG/L	1.1	30	40-150	40-150
8270C	DINOSB	WATER	50		UG/L	1.0	30	40-150	40-150
8270C	DIPHENYLAMINE	WATER	10		UG/L	0.64	30	40-150	40-150
8270C	DISULFOTON	WATER	10		UG/L	2.7	30	40-150	40-150
8270C	ETHYL METHANESULFONATE	WATER	10		UG/L	1.0	30	40-150	40-150
8270C	ETHYL PARATHION	WATER	10		UG/L	1.1	30	40-150	40-150
8270C	HEXACHLOROPHENE	WATER	500		UG/L	310	30	40-150	40-150
8270C	HEXACHLOROPROPENE	WATER	10		UG/L	1.4	30	40-150	40-150
8270C	ISODRIN	WATER	10		UG/L	1.1	30	40-150	40-150
8270C	ISOSAFROLE	WATER	10		UG/L	1.8	30	40-150	40-150
8270C	m-DINITROBENZENE	WATER	10		UG/L	0.69	30	40-150	40-150
8270C	METHAPYRILENE	WATER	50		UG/L	36	30	40-150	40-150
8270C	METHYL METHANESULFONATE	WATER	10		UG/L	1.1	30	40-150	40-150
8270C	METHYL PARATHION	WATER	10		UG/L	0.90	30	40-150	40-150
8270C	N-NITROSODIETHYLAMINE	WATER	10		UG/L	2.0	30	40-150	40-150
8270C	N-NITROSODIMETHYLAMINE	WATER	10		UG/L	0.79	30	27-130	27-130
8270C	N-NITROSODI-N-BUTYLAMINE	WATER	10		UG/L	2.7	30	40-150	40-150
8270C	N-NITROSOMETHYLETHYLAMINE	WATER	10		UG/L	1.8	30	40-150	40-150
8270C	N-NITROSOMORPHOLINE	WATER	10		UG/L	2.2	30	40-150	40-150
8270C	N-NITROSOPIPERIDINE	WATER	10		UG/L	2.6	30	40-150	40-150
8270C	N-NITROSOPYRROLIDINE	WATER	10		UG/L	2.2	30	40-150	40-150
8270C	ooo-TRIETHYL PHOSPHOROTHIOATE	WATER	10		UG/L	0.99	30	40-150	40-150
8270C	o-TOLUIDINE	WATER	10		UG/L	1.5	30	40-150	40-150
8270C	p-DIMETHYLAMINOAZOBENZENE	WATER	10		UG/L	1.0	30	40-150	40-150
8270C	PENTACHLOROBENZENE	WATER	10		UG/L	0.88	30	40-150	40-150
8270C	PENTACHLOROETHANE	WATER	10		UG/L	1.5	30	40-150	40-150
8270C	PENTACHLORONITROBENZENE	WATER	10		UG/L	0.89	30	40-150	40-150
8270C	PHENACETIN	WATER	10		UG/L	0.73	30	40-150	40-150
8270C	PHORATE	WATER	10		UG/L	1.2	30	40-150	40-150



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8270C	p-PHENYLENEDIAMINE	WATER	50		UG/L		30	40-150	40-150
8270C	PRONAMIDE	WATER	10		UG/L	1.0	30	40-150	40-150
8270C	PYRIDINE	WATER	50		UG/L	0.020	30	10-130	10-130
8270C	SAFROLE	WATER	10		UG/L	1.5	30	40-150	40-150
8270C	SULFOTEPP	WATER	10		UG/L	1.1	30	40-150	40-150
8270C	THIONAZIN	WATER	10		UG/L	0.98	30	40-150	40-150



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8270C TCL	1,1'-BIPHENYL	SOIL	330		UG/KG	23	30	40-150	40-150
8270C TCL	2,2'-OXYBIS (1-CHLOROPROPANE)	SOIL	330		UG/KG	25	30	10-126	10-126
8270C TCL	2,4,5-TRICHLOROPHENOL	SOIL	330		UG/KG	24	30	34-121	34-121
8270C TCL	* 2,4,6-TRICHLOROPHENOL	SOIL	330		UG/KG	24	30	33-120	33-120
8270C TCL	* 2,4-DICHLOROPHENOL	SOIL	330		UG/KG	24	30	57-130	57-130
8270C TCL	2,4-DIMETHYLPHENOL	SOIL	330		UG/KG	19	30	45-130	45-130
8270C TCL	2,4-DINITROPHENOL	SOIL	1700		UG/KG	420	30	23-130	23-130
8270C TCL	* 2,4-DINITROTOLUENE	SOIL	330		UG/KG	32	30	46-124	46-124
8270C TCL	2,6-DINITROTOLUENE	SOIL	330		UG/KG	33	30	62-130	62-130
8270C TCL	2-CHLORONAPHTHALENE	SOIL	330		UG/KG	21	30	55-130	55-130
8270C TCL	* 2-CHLOROPHENOL	SOIL	330		UG/KG	18	30	36-116	36-116
8270C TCL	2-METHYLNAPHTHALENE	SOIL	330		UG/KG	22	30	52-130	52-130
8270C TCL	* 2-METHYLPHENOL	SOIL	330		UG/KG	27	30	26-105	26-105
8270C TCL	2-NITROANILINE	SOIL	1700		UG/KG	32	30	51-111	51-111
8270C TCL	2-NITROPHENOL	SOIL	330		UG/KG	26	30	55-130	55-130
8270C TCL	3,3'-DICHLOROBENZIDINE	SOIL	330		UG/KG	46	30	10-121	10-121
8270C TCL	3-NITROANILINE	SOIL	1700		UG/KG	25	30	10-130	10-130
8270C TCL	4,6-DINITRO-2-METHYLPHENOL	SOIL	1700		UG/KG	22	30	38-119	38-119
8270C TCL	* 4-BROMOPHENYL-PHENYLETHER	SOIL	330		UG/KG	36	30	61-113	61-113
8270C TCL	* 4-CHLORO-3-METHYLPHENOL	SOIL	330		UG/KG	26	30	40-125	40-125
8270C TCL	4-CHLOROANILINE	SOIL	330		UG/KG	33	30	10-130	10-130
8270C TCL	4-CHLOROPHENYL-PHENYLETHER	SOIL	330		UG/KG	27	30	60-130	60-130
8270C TCL	4-METHYLPHENOL	SOIL	330		UG/KG	52	30	22-108	22-108
8270C TCL	4-NITROANILINE	SOIL	1700		UG/KG	24	30	31-105	31-105
8270C TCL	* 4-NITROPHENOL	SOIL	1700	3300	UG/KG	710	30	25-132	25-132
8270C TCL	* ACENAPHTHENE	SOIL	330		UG/KG	28	30	47-123	47-123
8270C TCL	* ACENAPHTHYLENE	SOIL	330		UG/KG	22	30	44-124	44-124
8270C TCL	ACETOPHENONE	SOIL	330		UG/KG	60	30	40-150	40-150
8270C TCL	ANTHRACENE	SOIL	330		UG/KG	29	30	44-125	44-125
8270C TCL	ATRAZINE	SOIL	330		UG/KG	74	30	40-150	40-150
8270C TCL	BENZALDEHYDE	SOIL	330	670	UG/KG	130	30	40-150	40-150
8270C TCL	BENZO (A) ANTHRACENE	SOIL	330		UG/KG	28	30	48-122	48-122
8270C TCL	BENZO (A) PYRENE	SOIL	330		UG/KG	68	30	49-126	49-126
8270C TCL	BENZO (B) FLUORANTHENE	SOIL	330		UG/KG	32	30	42-128	42-128
8270C TCL	BENZO (G, H, I) PERYLENE	SOIL	330		UG/KG	35	30	42-126	42-126
8270C TCL	BENZO (K) FLUORANTHENE	SOIL	330		UG/KG	27	30	48-124	48-124
8270C TCL	BIS (-2-CHLOROETHOXY) METHANE	SOIL	330		UG/KG	43	30	48-130	48-130
8270C TCL	BIS (2-CHLOROETHYL) ETHER	SOIL	330		UG/KG	27	30	43-130	43-130
8270C TCL	BIS (2-ETHYLHEXYL) PHTHALATE	SOIL	330		UG/KG	38	30	60-130	60-130
8270C TCL	BUTYL BENZYL PHTHALATE	SOIL	330		UG/KG	30	30	56-130	56-130
8270C TCL	CAPROLACTAM	SOIL	330		UG/KG	26	30	40-150	40-150
8270C TCL	CARBAZOLE	SOIL	330		UG/KG	25	30	51-130	51-130
8270C TCL	CHRYSENE	SOIL	330		UG/KG	28	30	49-122	49-122
8270C TCL	DIBENZO (A, H) ANTHRACENE	SOIL	330		UG/KG	29	30	23-140	23-140
8270C TCL	DIBENZOPURAN	SOIL	330		UG/KG	27	30	42-130	42-130
8270C TCL	DIETHYLPHTHALATE	SOIL	330		UG/KG	29	30	62-130	62-130
8270C TCL	DIMETHYL PHTHALATE	SOIL	330		UG/KG	32	30	61-130	61-130
8270C TCL	DI-N-BUTYLPHTHALATE	SOIL	330		UG/KG	33	30	62-130	62-130
8270C TCL	DI-N-OCTYL PHTHALATE	SOIL	330		UG/KG	40	30	59-130	59-130
8270C TCL	FLUORANTHENE	SOIL	330		UG/KG	36	30	42-124	42-124
8270C TCL	FLUORENE	SOIL	330		UG/KG	34	30	36-128	36-128
8270C TCL	* HEXACHLOROBENZENE	SOIL	330		UG/KG	21	30	56-116	56-116
8270C TCL	HEXACHLOROBUTADIENE	SOIL	330		UG/KG	23	30	10-104	10-104
8270C TCL	HEXACHLOROCYCLOPENTADIENE	SOIL	330		UG/KG	18	30	9-102	9-102
8270C TCL	HEXACHLOROETHANE	SOIL	330		UG/KG	28	30	10-107	10-107
8270C TCL	INDENO (1, 2, 3-CD) PYRENE	SOIL	330		UG/KG	28	30	41-127	41-127
8270C TCL	ISOPHORONE	SOIL	330		UG/KG	27	30	50-130	50-130
8270C TCL	* NAPHTHALENE	SOIL	330		UG/KG	20	30	38-116	38-116
8270C TCL	* NITROBENZENE	SOIL	330		UG/KG	21	30	32-130	32-130
8270C TCL	* N-NITROSO-DI-N-PROPYLAMINE	SOIL	330		UG/KG	26	30	45-117	45-117
8270C TCL	N-NITROSODIPHENYLAMINE	SOIL	330		UG/KG	24	30	54-116	54-116
8270C TCL	* PENTACHLOROPHENOL	SOIL	1700		UG/KG	340	30	21-131	21-131
8270C TCL	* PHENANTHRENE	SOIL	330		UG/KG	43	30	48-130	48-130
8270C TCL	* PHENOL	SOIL	330	670	UG/KG	160	30	34-118	34-118
8270C TCL	* PYRENE	SOIL	330		UG/KG	41	30	53-130	53-130



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8270C TCL	2,4,6-TRIBROMOPHENOL -SURR	SOIL	NA		UG/KG	NA	NA	33-139	33-139
8270C TCL	2-FLUOROBIPHENYL -SURR	SOIL	NA		UG/KG	NA	NA	32-130	32-130
8270C TCL	2-FLUOROPHENOL -SURR	SOIL	NA		UG/KG	NA	NA	10-130	10-130
8270C TCL	NITROBENZENE-d5 -SURR	SOIL	NA		UG/KG	NA	NA	27-130	27-130
8270C TCL	PHENOL-d6 -SURR	SOIL	NA		UG/KG	NA	NA	10-133	10-133
8270C TCL	TERPHENYL-d14 -SURR	SOIL	NA		UG/KG	NA	NA	48-131	48-131
8270C ADDITIONAL COMPOUNDS BY REQUEST									
8270C	1,2,4,5-TETRACHLOROBENZENE	SOIL	330		UG/KG	35	30	40-150	40-150
8270C	* 1,2,4-TRICHLOROBENZENE	SOIL	330		UG/KG	22	30	42-130	34-130
8270C	1,2-DICHLOROBENZENE	SOIL	330		UG/KG	19	30	45-130	45-130
8270C	1,2-DIPHENYLHYDRAZINE	SOIL	330		UG/KG	34	30	10-136	10-136
8270C	1,3,5-TRINITROBENZENE	SOIL	330		UG/KG	62	30	40-150	40-150
8270C	1,3-DICHLOROBENZENE	SOIL	330		UG/KG	18	30	43-130	43-130
8270C	* 1,4-DICHLOROBENZENE	SOIL	330		UG/KG	16	30	20-112	18-107
8270C	1,4-NAPHTHOQUINONE	SOIL	1700		UG/KG	160	30	40-150	40-150
8270C	1-METHYLNAPHTHALENE	SOIL	330		UG/KG	26	30	40-150	40-150
8270C	1-NAPHTHYLAMINE	SOIL	1700		UG/KG	110	30	40-150	40-150
8270C	2,3,4,6-TETRACHLOROPHENOL	SOIL	330		UG/KG	38	30	40-150	40-150
8270C	2,6-DICHLOROPHENOL	SOIL	330		UG/KG	40	30	40-150	40-150
8270C	2-ACETYLAMINOFLUORENE	SOIL	330		UG/KG	60	30	40-150	40-150
8270C	2-NAPHTHYLAMINE	SOIL	1700		UG/KG	110	30	40-150	40-150
8270C	2-PICOLINE	SOIL	330		UG/KG	140	30	40-150	40-150
8270C	3,3'-DIMETHYLBENZINE	SOIL	1700		UG/KG	400	30	40-150	40-150
8270C	3-METHYLCHOLANTHRENE	SOIL	330		UG/KG	64	30	40-150	40-150
8270C	4-AMINOBIIPHENYL	SOIL	1700		UG/KG	71	30	40-150	40-150
8270C	4-NITROQUINOLINE-1-OXIDE	SOIL	1700		UG/KG	590	30	40-150	40-150
8270C	5-NITRO-O-TOLUIDINE	SOIL	330		UG/KG	62	30	40-150	40-150
8270C	7,12-DIMETHYLBENZ(a)ANTHRACENE	SOIL	330		UG/KG	51	30	40-150	40-150
8270C	aa-DIMETHYLPHENETHYLAMINE	SOIL	1700		UG/KG	650	30	40-150	40-150
8270C	ANILINE	SOIL	330		UG/KG	42	30	10-130	10-130
8270C	ARAMITE	SOIL	1700		UG/KG	85	30	40-150	40-150
8270C	BENZIDINE	SOIL	3300	6700	UG/KG	1,200	30	30-130	30-130
8270C	BENZOIC ACID	SOIL	1700	3300	UG/KG	880	30	30-130	30-130
8270C	BENZYL ALCOHOL	SOIL	330		UG/KG	31	30	38-106	38-106
8270C	CHLOROBENZILATE	SOIL	330		UG/KG	52	30	40-150	40-150
8270C	DIALATE	SOIL	330		UG/KG	55	30	40-150	40-150
8270C	DIMETHOATE	SOIL	1700		UG/KG	49	30	40-150	40-150
8270C	DINOSEB	SOIL	1700		UG/KG	44	30	40-150	40-150
8270C	DIPHENYLAMINE	SOIL	330		UG/KG	24	30	40-150	40-150
8270C	DISULFOTON	SOIL	330		UG/KG	190	30	40-150	40-150
8270C	ETHYL METHANESULFONATE	SOIL	330		UG/KG	46	30	40-150	40-150
8270C	ETHYL PARATHION	SOIL	330		UG/KG	49	30	40-150	40-150
8270C	HEXACHLOROPHENE	SOIL	17000		UG/KG	6,800	30	40-150	40-150
8270C	HEXACHLOROPROPENE	SOIL	330		UG/KG	36	30	40-150	40-150
8270C	ISODRIN	SOIL	330		UG/KG	50	30	40-150	40-150
8270C	ISOSAFROLE	SOIL	330		UG/KG	42	30	40-150	40-150
8270C	m-DINITROBENZINE	SOIL	330		UG/KG	37	30	40-150	40-150
8270C	METHAPYRILENE	SOIL	1700		UG/KG	680	30	40-150	40-150
8270C	METHYL METHANESULFONATE	SOIL	330		UG/KG	44	30	40-150	40-150
8270C	METHYL PARATHION	SOIL	330		UG/KG	47	30	40-150	40-150
8270C	N-NITROSODIETHYLAMINE	SOIL	330		UG/KG	37	30	40-150	40-150
8270C	N-NITROSODIMETHYLAMINE	SOIL	330		UG/KG	29	30	38-130	38-130
8270C	N-NITROSODI-N-BUTYLAMINE	SOIL	330		UG/KG	72	30	40-150	40-150
8270C	N-NITROSOMETHYLETHYLAMINE	SOIL	330		UG/KG	89	30	40-150	40-150
8270C	N-NITROSOMORPHOLINE	SOIL	330		UG/KG	56	30	40-150	40-150
8270C	N-NITROSOPYRROLIDINE	SOIL	330		UG/KG	53	30	40-150	40-150
8270C	N-NITROSOPYRROLIDINE	SOIL	330		UG/KG	70	30	40-150	40-150
8270C	ooo-TRIETHYL PHOSPHOROTHIOATE	SOIL	330		UG/KG	57	30	40-150	40-150
8270C	o-TOLUIDINE	SOIL	330		UG/KG	76	30	40-150	40-150
8270C	p-DIMETHYLAMINOAZOBENZENE	SOIL	330		UG/KG	55	30	40-150	40-150
8270C	PENTACHLOROBENZENE	SOIL	330		UG/KG	48	30	40-150	40-150
8270C	PENTACHLOROETHANE	SOIL	330		UG/KG	26	30	40-150	40-150
8270C	PENTACHLORONITROBENZENE	SOIL	330		UG/KG	59	30	40-150	40-150
8270C	PHENACETIN	SOIL	330		UG/KG	45	30	40-150	40-150
8270C	PHORATE	SOIL	330		UG/KG	120	30	40-150	40-150



**ROCHESTER ORGANIC QC LIMITS**

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8270C	p-PHENYLENEDIAMINE	SOIL	1700		UG/KG	590	30	40-150	40-150
8270C	PRONAMIDE	SOIL	330		UG/KG	51	30	40-150	40-150
8270C	PYRIDINE	SOIL	1700		UG/KG	50	30	28-130	28-130
8270C	SAFROLE	SOIL	330		UG/KG	40	30	40-150	40-150
8270C	SULFOTEP	SOIL	330		UG/KG	73	30	40-150	40-150
8270C	THIONAZIN	SOIL	330		UG/KG	50	30	40-150	40-150



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8270C LVI	ACENAPHTHENE	WATER	0.20		UG/L	0.022	30	44-112	44-112
8270C LVI	ACENAPHTHYLENE	WATER	0.20		UG/L	0.025	30	51-115	51-115
8270C LVI	ANTHRACENE	WATER	0.20		UG/L	0.019	30	51-119	51-119
8270C LVI	BENZO (A) ANTHRACENE	WATER	0.10		UG/L	0.028	30	58-115	58-115
8270C LVI	BENZO (A) PYRENE	WATER	0.20		UG/L	0.016	30	36-119	36-119
8270C LVI	BENZO (B) FLUORANTHENE	WATER	0.20		UG/L	0.027	30	45-121	45-121
8270C LVI	BENZO (G, H, I) PERYLENE	WATER	0.20		UG/L	0.023	30	39-122	39-122
8270C LVI	BENZO (K) FLUORANTHENE	WATER	0.20		UG/L	0.019	30	47-119	47-119
8270C LVI	CHRYSENE	WATER	0.20		UG/L	0.022	30	55-113	55-113
8270C LVI	DIBENZO (A, H) ANTHRACENE	WATER	0.20		UG/L	0.025	30	47-116	47-116
8270C LVI	FLUORANTHENE	WATER	0.20		UG/L	0.035	30	59-117	59-117
8270C LVI	FLUORENE	WATER	0.20		UG/L	0.021	30	38-121	38-121
8270C LVI	INDENO (1, 2, 3-CD) PYRENE	WATER	0.20		UG/L	0.016	30	47-119	47-119
8270C LVI	NAPHTHALENE	WATER	0.20		UG/L	0.042	30	33-121	33-121
8270C LVI	PHENANTHRENE	WATER	0.20		UG/L	0.025	30	54-114	54-114
8270C LVI	PYRENE	WATER	0.20		UG/L	0.011	30	55-115	55-115
8270C LVI	2-FLUOROBIPHENYL -SURR	WATER	NA		UG/L	NA	NA	27-114	27-114
8270C LVI	NITROBENZENE-d5 -SURR	WATER	NA		UG/L	NA	NA	22-124	22-124
8270C LVI	TERPHENYL-d14 -SURR	WATER	NA		UG/L	NA	NA	23-139	23-139
8270C LVI ADDITIONAL COMPOUNDS BY REQUEST									
8270C LVI	1,4-DIOXANE	WATER	0.20		UG/L	0.075	30	31-80	31-80
8270C LVI	1-METHYLNAPHTHALENE	WATER	0.20		UG/L	0.031	30	62-102	50-150
8270C LVI	2-METHYLNAPHTHALENE	WATER	0.10		UG/L	0.023	30	42-130	42-130
8270C LVI	BIS (2-ETHYLHEXYL) PHTHALATE	WATER	2.0		UG/L	0.19	30	55-130	55-130
8270C LVI	CARBAZOLE	WATER	1.0		UG/L	0.032	30	40-150	40-150
8270C LVI	DIBENZOFURAN	WATER	0.20		UG/L	0.027	30	50-150	50-150
8270C LVI	HEXACHLOROBENZENE	WATER	0.20		UG/L	0.027	30	47-108	47-108
8270C LVI	NITROBENZENE	WATER	0.20		UG/L	0.032	30	50-150	50-150



ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8270C LVI	2, 6-DIMETHYLNAPHTHALENE	SOIL	6.6		UG/KG	0.78	30	50-150	50-150
8270C LVI	ACENAPHTHENE	SOIL	6.6		UG/KG	1.8	30	39-130	39-130
8270C LVI	ACENAPHTHYLENE	SOIL	6.6		UG/KG	2.0	30	44-130	44-130
8270C LVI	ANTHRACENE	SOIL	6.6		UG/KG	2.5	30	49-130	49-130
8270C LVI	BENZO (A) ANTHRACENE	SOIL	3.3		UG/KG	2.7	30	47-116	47-116
8270C LVI	BENZO (A) PYRENE	SOIL	6.6		UG/KG	2.5	30	27-124	27-124
8270C LVI	BENZO (B) FLUORANTHENE	SOIL	6.6		UG/KG	2.5	30	19-132	19-132
8270C LVI	BENZO (G, H, I) PERYLENE	SOIL	6.6		UG/KG	2.4	30	24-128	24-128
8270C LVI	BENZO (K) FLUORANTHENE	SOIL	6.6		UG/KG	2.9	30	41-123	41-123
8270C LVI	CHRYSENE	SOIL	6.6		UG/KG	2.1	30	45-117	45-117
8270C LVI	DIBENZO (A, H) ANTHRACENE	SOIL	6.6		UG/KG	1.9	30	29-129	29-129
8270C LVI	FLUORANTHENE	SOIL	6.6		UG/KG	4.0	30	51-124	51-124
8270C LVI	FLUORENE	SOIL	6.6		UG/KG	1.8	30	40-130	40-130
8270C LVI	INDENO (1, 2, 3-CD) PYRENE	SOIL	6.6		UG/KG	2.3	30	40-122	40-122
8270C LVI	NAPHTHALENE	SOIL	6.6		UG/KG	2.7	30	44-130	44-130
8270C LVI	PHENANTHRENE	SOIL	6.6		UG/KG	5.0	30	51-130	51-130
8270C LVI	PYRENE	SOIL	6.6		UG/KG	3.5	30	33-123	33-123
8270C LVI	2-FLUOROBIPHENYL -SURR	SOIL	NA		UG/KG	NA	NA	23-120	23-120
8270C LVI	NITROBENZENE-d5 -SURR	SOIL	NA		UG/KG	NA	NA	18-125	18-125
8270C LVI	TERPHENYL-d14 -SURR	SOIL	NA		UG/KG	NA	NA	19-145	19-145
8270C LVI ADDITIONAL COMPOUNDS BY REQUEST									
8270C LVI	1, 4-DIOXANE	SOIL	67		UG/KG	1.4	30	31-80	31-80
8270C LVI	1-METHYLNAPHTHALENE	SOIL	6.6		UG/KG	2.0	30	50-150	50-150
8270C LVI	2-METHYLNAPHTHALENE	SOIL	3.3		UG/KG	2.8	30	42-130	50-150
8270C LVI	BIS (2-ETHYLHEXYL) PHTHALATE	SOIL	67		UG/KG	7.8	30	50-150	50-150
8270C LVI	CARBAZOLE	SOIL	33		UG/KG	1.8	30	40-150	40-150
8270C LVI	DIBENZOFURAN	SOIL	6.6		UG/KG	1.9	30	50-150	50-150
8270C LVI	HEXACHLOROBENZENE	SOIL	6.6		UG/KG	2.6	30	50-150	50-150
8270C LVI	NITROBENZENE	SOIL	6.6		UG/KG	1.8	30	50-150	50-150
8310	NAPHTHALENE	WATER	0.080		UG/L	0.020	30	50-150	50-150
8310	ACENAPHTHYLENE	WATER	0.080		UG/L	0.048	30	50-150	50-150
8310	FLUORENE	WATER	0.080		UG/L	0.013	30	50-150	50-150
8310	ACENAPHTHENE	WATER	0.080		UG/L	0.029	30	50-150	50-150
8310	PHENANTHRENE	WATER	0.080		UG/L	0.017	30	50-150	50-150
8310	ANTHRACENE	WATER	0.080		UG/L	0.016	30	50-150	50-150
8310	FLUORANTHENE	WATER	0.080		UG/L	0.015	30	50-150	50-150
8310	PYRENE	WATER	0.080		UG/L	0.016	30	50-150	50-150
8310	BENZO (A) ANTRACENE	WATER	0.080		UG/L	0.013	30	50-150	50-150
8310	CHRYSENE	WATER	0.080		UG/L	0.015	30	50-150	50-150
8310	BENZO (B) FLUORANTHENE	WATER	0.080		UG/L	0.016	30	50-150	50-150
8310	BENZO (K) FLUORANTHENE	WATER	0.080		UG/L	0.017	30	50-150	50-150
8310	BENZO (A) PYRENE	WATER	0.080		UG/L	0.024	30	50-150	50-150
8310	DIBENZO (A, H) ANTHRACENE	WATER	0.080		UG/L	0.019	30	50-150	50-150
8310	INDENO (1, 2, 3-CD) PYRENE	WATER	0.080		UG/L	0.011	30	50-150	50-150
8310	BENZO (G, H, I) PERYLENE	WATER	0.080		UG/L	0.022	30	50-150	50-150
8310	O-TERPHENYL -SURR	WATER	NA		UG/L	NA	NA	50-150	50-150



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
8315A	FORMALDEHYDE	WATER	8.0		UG/L	1.1	30	59-136	59-153
8315A	FORMALDEHYDE	SOIL	1000		UG/KG	230	30	70-130	50-150
8330	1,3,5-TRINITROBENZENE	SOIL	2000		UG/KG	160	30	70-130	70-130
8330	1,3-DINITROBENZENE	SOIL	2000		UG/KG	150	30	70-130	70-130
8330	2,4,6-TRINITROTOLUENE (TNT)	SOIL	2000		UG/KG	170	30	70-130	70-130
8330	2,4-DINITROTOLUENE	SOIL	2000		UG/KG	150	30	70-130	70-130
8330	2,6-DINITROTOLUENE	SOIL	2000		UG/KG	160	30	70-130	70-130
8330	2-AMINO-4,6-DINITROTOLUENE	SOIL	2000		UG/KG	180	30	70-130	70-130
8330	2-NITROTOLUENE	SOIL	2000		UG/KG	150	30	70-130	70-130
8330	3-NITROTOLUENE	SOIL	2000		UG/KG	150	30	70-130	70-130
8330	4-AMINO-2,6-DINITROTOLUENE	SOIL	2000		UG/KG	190	30	70-130	70-130
8330	4-NITROTOLUENE	SOIL	2000		UG/KG	160	30	70-130	70-130
8330	HMX (OCTAHYDRO-1,3,5,7-TETRANITRO-	SOIL	2000		UG/KG	180	30	70-130	70-130
8330	NITROBENZENE	SOIL	2000		UG/KG	150	30	70-130	70-130
8330	NITROGLYCERIN	SOIL	2000		UG/KG	860	30	70-130	70-130
8330	PETN	SOIL	2000		UG/KG	420	30	70-130	70-130
8330	RDX (HEXAHYDRO-1,3,5-TRINITRO-1,3,	SOIL	2000		UG/KG	170	30	70-130	70-130
8330	TETRYL (METHYL-2,4,6-TRINITROPHENY	SOIL	2000		UG/KG	530	30	70-130	70-130
8330	1,2-DINITROBENZENE - SURR	SOIL	NA		UG/KG	NA	NA	50-150	50-150
HPLC-DoDPerchlorate	PERCHLORATE	WATER	0.2		UG/L	0.051	15	80-120	80-120
HPLC-DoDPerchlorate	PERCHLORATE	SOIL	2.0		UG/KG	0.031	15	85-115	75-125



ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
VOA OLM4.2/4.3	1,1,1-TRICHLOROETHANE	WATER	10		UG/L	0.35			
VOA OLM4.2/4.3	1,1,2,2-TETRACHLOROETHANE	WATER	10		UG/L	0.56			
VOA OLM4.2/4.3	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (FREON 113)	WATER	10		UG/L	0.79			
VOA OLM4.2/4.3	1,1,2-TRICHLOROETHANE	WATER	10		UG/L	0.31			
VOA OLM4.2/4.3	1,1-DICHLOROETHANE	WATER	10		UG/L	0.49			
VOA OLM4.2/4.3	* 1,1-DICHLOROETHENE	WATER	10		UG/L	0.80	14	61-145	61-145
VOA OLM4.2/4.3	1,2,4-TRICHLOROBENZENE	WATER	10		UG/L	0.41			
VOA OLM4.2/4.3	1,2-DIBROMO-3-CHLOROPROPANE	WATER	10		UG/L	0.40			
VOA OLM4.2/4.3	1,2-DIBROMOETHANE	WATER	10		UG/L	0.57			
VOA OLM4.2/4.3	1,2-DICHLOROBENZENE	WATER	10		UG/L	0.39			
VOA OLM4.2/4.3	1,2-DICHLOROETHANE	WATER	10		UG/L	0.32			
VOA OLM4.2/4.3	1,2-DICHLOROPROPANE	WATER	10		UG/L	0.58			
VOA OLM4.2/4.3	1,3-DICHLOROBENZENE	WATER	10		UG/L	0.35			
VOA OLM4.2/4.3	1,4-DICHLOROBENZENE	WATER	10		UG/L	0.41			
VOA OLM4.2/4.3	2-BUTANONE	WATER	10		UG/L	0.72			
VOA OLM4.2/4.3	2-HEXANONE	WATER	10		UG/L	1.4			
VOA OLM4.2/4.3	4-METHYL-2-PENTANONE	WATER	10		UG/L	1.2			
VOA OLM4.2/4.3	ACETONE	WATER	10		UG/L	2.3			
VOA OLM4.2/4.3	* BENZENE	WATER	10		UG/L	0.45	11	76-127	76-127
VOA OLM4.2/4.3	BROMODICHLOROMETHANE	WATER	10		UG/L	0.36			
VOA OLM4.2/4.3	BROMOFORM	WATER	10		UG/L	0.44			
VOA OLM4.2/4.3	BROMOMETHANE	WATER	10		UG/L	0.53			
VOA OLM4.2/4.3	CARBON DISULFIDE	WATER	10		UG/L	0.34			
VOA OLM4.2/4.3	CARBON TETRACHLORIDE	WATER	10		UG/L	0.42			
VOA OLM4.2/4.3	* CHLOROBENZENE	WATER	10		UG/L	0.36	13	75-130	75-130
VOA OLM4.2/4.3	CHLOROETHANE	WATER	10		UG/L	0.41			
VOA OLM4.2/4.3	CHLOROFORM	WATER	10		UG/L	0.37			
VOA OLM4.2/4.3	CHLOROMETHANE	WATER	10		UG/L	0.72			
VOA OLM4.2/4.3	CIS-1,2-DICHLOROETHENE	WATER	10		UG/L	0.59			
VOA OLM4.2/4.3	CIS-1,3-DICHLOROPROPENE	WATER	10		UG/L	0.50			
VOA OLM4.2/4.3	CYCLOHEXANE	WATER	10		UG/L	0.46			
VOA OLM4.2/4.3	DIBROMOCHLOROMETHANE	WATER	10		UG/L	0.56			
VOA OLM4.2/4.3	DICHLORODIFLUOROMETHANE	WATER	10		UG/L	0.43			
VOA OLM4.2/4.3	ETHYLBENZENE	WATER	10		UG/L	0.46			
VOA OLM4.2/4.3	ISOPROPYLBENZENE	WATER	10		UG/L	0.44			
VOA OLM4.2/4.3	M+P-XYLENE	WATER	10		UG/L	0.60			
VOA OLM4.2/4.3	METHYL ACETATE	WATER	10		UG/L	0.49			
VOA OLM4.2/4.3	METHYL TERT-BUTYL ETHER	WATER	10		UG/L	0.31			
VOA OLM4.2/4.3	METHYLCYCLOHEXANE	WATER	10		UG/L	0.71			
VOA OLM4.2/4.3	METHYLENE CHLORIDE	WATER	10		UG/L	0.48			
VOA OLM4.2/4.3	O-XYLENE	WATER	10		UG/L	0.37			
VOA OLM4.2/4.3	STYRENE	WATER	10		UG/L	0.27			
VOA OLM4.2/4.3	TETRACHLOROETHENE	WATER	10		UG/L	0.60			
VOA OLM4.2/4.3	* TOLUENE	WATER	10		UG/L	0.54	13	76-125	76-125
VOA OLM4.2/4.3	TRANS-1,2-DICHLOROETHENE	WATER	10		UG/L	0.41			
VOA OLM4.2/4.3	TRANS-1,3-DICHLOROPROPENE	WATER	10		UG/L	0.26			
VOA OLM4.2/4.3	* TRICHLOROETHENE	WATER	10		UG/L	0.57	14	71-120	71-120
VOA OLM4.2/4.3	TRICHLOROFLUOROMETHANE	WATER	10		UG/L	0.44			
VOA OLM4.2/4.3	VINYL CHLORIDE	WATER	10		UG/L	0.42			
VOA OLM4.2/4.3	BROMOFLUOROBENZENE -SURR	WATER	NA		UG/L	NA	NA	86-115	86-115
VOA OLM4.2/4.3	1,2-DICHLOROETHANE-D4 -SURR	WATER	NA		UG/L	NA	NA	76-114	76-114
VOA OLM4.2/4.3	TOLUENE-D8 -SURR	WATER	NA		UG/L	NA	NA	88-110	88-110



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
VOA OLM4.2/4.3	1,1,1-TRICHLOROETHANE	SOIL	10		UG/KG	0.53			
VOA OLM4.2/4.3	1,1,2,2-TETRACHLOROETHANE	SOIL	10		UG/KG	0.27			
VOA OLM4.2/4.3	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	SOIL	10		UG/KG	0.62			
VOA OLM4.2/4.3	1,1,2-TRICHLOROETHANE	SOIL	10		UG/KG	0.45			
VOA OLM4.2/4.3	1,1-DICHLOROETHANE	SOIL	10		UG/KG	0.41			
VOA OLM4.2/4.3	* 1,1-DICHLOROETHENE	SOIL	10		UG/KG	0.72	22	59-172	59-172
VOA OLM4.2/4.3	1,2,4-TRICHLOROBENZENE	SOIL	10		UG/KG	0.94			
VOA OLM4.2/4.3	1,2-DIBROMO-3-CHLOROPROPANE	SOIL	10		UG/KG	0.85			
VOA OLM4.2/4.3	1,2-DIBROMOETHANE	SOIL	10		UG/KG	0.45			
VOA OLM4.2/4.3	1,2-DICHLOROBENZENE	SOIL	10		UG/KG	0.52			
VOA OLM4.2/4.3	1,2-DICHLOROETHANE	SOIL	10		UG/KG	0.66			
VOA OLM4.2/4.3	1,2-DICHLOROPROPANE	SOIL	10		UG/KG	0.46			
VOA OLM4.2/4.3	1,3-DICHLOROBENZENE	SOIL	10		UG/KG	0.50			
VOA OLM4.2/4.3	1,4-DICHLOROBENZENE	SOIL	10		UG/KG	0.73			
VOA OLM4.2/4.3	2-BUTANONE	SOIL	10		UG/KG	2.2			
VOA OLM4.2/4.3	2-HEXANONE	SOIL	10		UG/KG	1.3			
VOA OLM4.2/4.3	4-METHYL-2-PENTANONE	SOIL	10		UG/KG	1.4			
VOA OLM4.2/4.3	ACETONE	SOIL	10		UG/KG	3.1			
VOA OLM4.2/4.3	* BENZENE	SOIL	10		UG/KG	0.38	21	66-142	66-142
VOA OLM4.2/4.3	BROMODICHLOROMETHANE	SOIL	10		UG/KG	0.37			
VOA OLM4.2/4.3	BROMOFORM	SOIL	10		UG/KG	0.37			
VOA OLM4.2/4.3	BROMOMETHANE	SOIL	10		UG/KG	0.59			
VOA OLM4.2/4.3	CARBON DISULFIDE	SOIL	10		UG/KG	0.51			
VOA OLM4.2/4.3	CARBON TETRACHLORIDE	SOIL	10		UG/KG	0.33			
VOA OLM4.2/4.3	* CHLOROBENZENE	SOIL	10		UG/KG	0.33	21	60-133	60-133
VOA OLM4.2/4.3	CHLOROETHANE	SOIL	10		UG/KG	0.23			
VOA OLM4.2/4.3	CHLOROFORM	SOIL	10		UG/KG	0.50			
VOA OLM4.2/4.3	CHLOROMETHANE	SOIL	10		UG/KG	0.55			
VOA OLM4.2/4.3	CIS-1,2-DICHLOROETHENE	SOIL	10		UG/KG	0.69			
VOA OLM4.2/4.3	CIS-1,3-DICHLOROPROPENE	SOIL	10		UG/KG	0.35			
VOA OLM4.2/4.3	CYCLOHEXANE	SOIL	10		UG/KG	0.91			
VOA OLM4.2/4.3	DIBROMOCHLOROMETHANE	SOIL	10		UG/KG	0.20			
VOA OLM4.2/4.3	DICHLORODIFLUOROMETHANE	SOIL	10		UG/KG	0.83			
VOA OLM4.2/4.3	ETHYLBENZENE	SOIL	10		UG/KG	1.7			
VOA OLM4.2/4.3	ISOPROPYLBENZENE	SOIL	10		UG/KG	0.77			
VOA OLM4.2/4.3	M-P-XYLENE	SOIL	10		UG/KG	1.6			
VOA OLM4.2/4.3	METHYL ACETATE	SOIL	10		UG/KG	0.81			
VOA OLM4.2/4.3	METHYL TERT-BUTYL ETHER	SOIL	10		UG/KG	0.44			
VOA OLM4.2/4.3	METHYLCYCLOHEXANE	SOIL	10		UG/KG	0.80			
VOA OLM4.2/4.3	METHYLENE CHLORIDE	SOIL	10		UG/KG	1.0			
VOA OLM4.2/4.3	O-XYLENE	SOIL	10		UG/KG	0.53			
VOA OLM4.2/4.3	STYRENE	SOIL	10		UG/KG	0.36			
VOA OLM4.2/4.3	TETRACHLOROETHENE	SOIL	10		UG/KG	0.62			
VOA OLM4.2/4.3	* TOLUENE	SOIL	10		UG/KG	0.40	21	59-139	59-139
VOA OLM4.2/4.3	TRANS-1,2-DICHLOROETHENE	SOIL	10		UG/KG	0.42			
VOA OLM4.2/4.3	TRANS-1,3-DICHLOROPROPENE	SOIL	10		UG/KG	0.41			
VOA OLM4.2/4.3	* TRICHLOROETHENE	SOIL	10		UG/KG	0.68	24	62-137	62-137
VOA OLM4.2/4.3	TRICHLOROFLUOROMETHANE	SOIL	10		UG/KG	0.53			
VOA OLM4.2/4.3	VINYL CHLORIDE	SOIL	10		UG/KG	0.65			
VOA OLM4.2/4.3	BROMOFLUOROBENZENE -SURR	SOIL	NA		UG/KG	NA	NA	59-113	59-113
VOA OLM4.2/4.3	1,2-DICHLOROETHANE-D4 -SURR	SOIL	NA		UG/KG	NA	NA	70-121	70-121
VOA OLM4.2/4.3	TOLUENE-D8 -SURR	SOIL	NA		UG/KG	NA	NA	84-138	84-138



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
BNA OLM4.2/4.3	1,1'-BIPHENYL	WATER	10		UG/L	0.28			
BNA OLM4.2/4.3	2,2'-OXYBIS(1-CHLOROPROPANE)	WATER	10		UG/L	1.2			
BNA OLM4.2/4.3	2,4,5-TRICHLOROPHENOL	WATER	25		UG/L	1.8			
BNA OLM4.2/4.3	2,4,6-TRICHLOROPHENOL	WATER	10		UG/L	1.2			
BNA OLM4.2/4.3	2,4-DICHLOROPHENOL	WATER	10		UG/L	0.73			
BNA OLM4.2/4.3	2,4-DIMETHYLPHENOL	WATER	10		UG/L	0.36			
BNA OLM4.2/4.3	2,4-DINITROPHENOL	WATER	25		UG/L	2.0			
BNA OLM4.2/4.3	* 2,4-DINITROTOLUENE	WATER	10		UG/L	1.8	38	24-96	24-96
BNA OLM4.2/4.3	2,6-DINITROTOLUENE	WATER	10		UG/L	1.3			
BNA OLM4.2/4.3	2-CHLORONAPHTHALENE	WATER	10		UG/L	0.18			
BNA OLM4.2/4.3	* 2-CHLOROPHENOL	WATER	10		UG/L	0.53	40	27-123	27-123
BNA OLM4.2/4.3	2-METHYLNAPHTHALENE	WATER	10		UG/L	0.33			
BNA OLM4.2/4.3	2-METHYLPHENOL	WATER	10		UG/L	2.2			
BNA OLM4.2/4.3	2-NITROANILINE	WATER	25		UG/L	1.5			
BNA OLM4.2/4.3	2-NITROPHENOL	WATER	10		UG/L	1.3			
BNA OLM4.2/4.3	3,3'-DICHLOROBENZIDINE	WATER	10		UG/L	0.86			
BNA OLM4.2/4.3	3-NITROANILINE	WATER	25		UG/L	0.78			
BNA OLM4.2/4.3	4,6-DINITRO-2-METHYLPHENOL	WATER	25		UG/L	1.4			
BNA OLM4.2/4.3	4-BROMOPHENYL-PHENYLETHER	WATER	10		UG/L	0.11			
BNA OLM4.2/4.3	* 4-CHLORO-3-METHYLPHENOL	WATER	10		UG/L	0.36	42	23-97	23-97
BNA OLM4.2/4.3	4-CHLOROANILINE	WATER	10		UG/L	0.46			
BNA OLM4.2/4.3	4-CHLOROPHENYL-PHENYLETHER	WATER	10		UG/L	0.75			
BNA OLM4.2/4.3	4-METHYLPHENOL	WATER	10		UG/L	0.85			
BNA OLM4.2/4.3	4-NITROANILINE	WATER	25		UG/L	0.94			
BNA OLM4.2/4.3	* 4-NITROPHENOL	WATER	25		UG/L	1.6	50	10-80	10-80
BNA OLM4.2/4.3	* ACENAPHTHENE	WATER	10		UG/L	0.53	31	46-118	46-118
BNA OLM4.2/4.3	ACENAPHTHYLENE	WATER	10		UG/L	0.74			
BNA OLM4.2/4.3	ACETOPHENONE	WATER	10		UG/L	0.96			
BNA OLM4.2/4.3	ANTHRACENE	WATER	10		UG/L	0.46			
BNA OLM4.2/4.3	ATRAZINE	WATER	10		UG/L	1.3			
BNA OLM4.2/4.3	BENZALDEHYDE	WATER	10		UG/L	0.86			
BNA OLM4.2/4.3	BENZO(A)ANTHRACENE	WATER	10		UG/L	0.16			
BNA OLM4.2/4.3	BENZO(A)PYRENE	WATER	10		UG/L	0.53			
BNA OLM4.2/4.3	BENZO(B)FLUORANTHENE	WATER	10		UG/L	2.7			
BNA OLM4.2/4.3	BENZO(G,H,I)PERYLENE	WATER	10		UG/L	2.5			
BNA OLM4.2/4.3	BENZO(K)FLUORANTHENE	WATER	10		UG/L	0.66			
BNA OLM4.2/4.3	BIS(-2-CHLOROETHOXY)METHANE	WATER	10		UG/L	0.69			
BNA OLM4.2/4.3	BIS(-2-CHLOROETHYL)ETHER	WATER	10		UG/L	1.1			
BNA OLM4.2/4.3	BIS(2-ETHYLHEXYL)PHTHALATE	WATER	10		UG/L	0.40			
BNA OLM4.2/4.3	BUTYL BENZYL PHTHALATE	WATER	10		UG/L	1.4			
BNA OLM4.2/4.3	CAPROLACTAM	WATER	10		UG/L	0.91			
BNA OLM4.2/4.3	CARBAZOLE	WATER	10		UG/L	0.56			
BNA OLM4.2/4.3	CHRYSENE	WATER	10		UG/L	0.07			
BNA OLM4.2/4.3	DIBENZ(A,H)ANTHRACENE	WATER	10		UG/L	2.09			
BNA OLM4.2/4.3	DIBENZOFURAN	WATER	10		UG/L	0.21			
BNA OLM4.2/4.3	DIETHYLPHTHALATE	WATER	10		UG/L	0.38			
BNA OLM4.2/4.3	DIMETHYL PHTHALATE	WATER	10		UG/L	0.54			
BNA OLM4.2/4.3	DI-N-BUTYLPHTHALATE	WATER	10		UG/L	0.35			
BNA OLM4.2/4.3	DI-N-OCTYL PHTHALATE	WATER	10		UG/L	2.5			
BNA OLM4.2/4.3	FLUORANTHENE	WATER	10		UG/L	0.76			
BNA OLM4.2/4.3	FLUORENE	WATER	10		UG/L	0.63			
BNA OLM4.2/4.3	HEXACHLOROBENZENE	WATER	10		UG/L	1.4			
BNA OLM4.2/4.3	HEXACHLOROBUTADIENE	WATER	10		UG/L	0.48			
BNA OLM4.2/4.3	HEXACHLOROCYCLOPENTADIENE	WATER	10		UG/L	1.6			
BNA OLM4.2/4.3	HEXACHLOROETHANE	WATER	10		UG/L	0.74			
BNA OLM4.2/4.3	INDENO(1,2,3-CD)PYRENE	WATER	10		UG/L	2.5			
BNA OLM4.2/4.3	ISOPHORONE	WATER	10		UG/L	0.45			
BNA OLM4.2/4.3	NAPHTHALENE	WATER	10		UG/L	0.14			
BNA OLM4.2/4.3	NITROBENZENE	WATER	10		UG/L	0.90			
BNA OLM4.2/4.3	* N-NITROSO-DI-N-PROPYLAMINE	WATER	10		UG/L	0.64	38	41-116	41-116
BNA OLM4.2/4.3	N-NITROSODIPHENYLAMINE	WATER	10		UG/L	1.1			
BNA OLM4.2/4.3	* PENTACHLOROPHENOL	WATER	25		UG/L	3.0	50	9-103	9-103
BNA OLM4.2/4.3	PHENANTHRENE	WATER	10		UG/L	0.56			
BNA OLM4.2/4.3	* PHENOL	WATER	10		UG/L	0.37	42	12-110	12-110
BNA OLM4.2/4.3	* PYRENE	WATER	10		UG/L	1.6	31	26-127	26-127



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
BNA OLM4.2/4.3	TERPHENYL-D14 -SURR	WATER	NA		UG/L	NA	NA	33-141	33-141
BNA OLM4.2/4.3	2-CHLOROPHENOL-D4 -SURR (adviso	WATER	NA		UG/L	NA	NA	33-110	33-110
BNA OLM4.2/4.3	1,2-DICHLOROBENZENE-D4 -SURR (ad	WATER	NA		UG/L	NA	NA	16-110	16-110
BNA OLM4.2/4.3	NITROBENZENE-D5 -SURR	WATER	NA		UG/L	NA	NA	35-114	35-114
BNA OLM4.2/4.3	PHENOL-D6 -SURR	WATER	NA		UG/L	NA	NA	10-110	10-110
BNA OLM4.2/4.3	2-FLUOROBIPHENYL -SURR	WATER	NA		UG/L	NA	NA	43-116	43-116
BNA OLM4.2/4.3	2-FLUOROPHENOL -SURR	WATER	NA		UG/L	NA	NA	21-110	21-110
BNA OLM4.2/4.3	2,4,6-TRIBROMOPHENOL -SURR	WATER	NA		UG/L	NA	NA	10-123	10-123
BNA OLM4.2/4.3 additional compounds upon request									
BNA OLM4.2/4.3	1,3-DICHLOROBENZENE	WATER	10		UG/L	0.51			
BNA OLM4.2/4.3	1,2-DICHLOROBENZENE	WATER	10		UG/L	0.86			
BNA OLM4.2/4.3	1,4-DICHLOROBENZENE	WATER	10		UG/L	0.53			
BNA OLM4.2/4.3	1,1'-BIPHENYL	SOIL	330		UG/KG	9.3			
BNA OLM4.2/4.3	2,2'-OXYBIS(1-CHLOROPROPANE)	SOIL	330		UG/KG	41			
BNA OLM4.2/4.3	2,4,5-TRICHLOROPHENOL	SOIL	800		UG/KG	61			
BNA OLM4.2/4.3	2,4,6-TRICHLOROPHENOL	SOIL	330		UG/KG	41			
BNA OLM4.2/4.3	2,4-DICHLOROPHENOL	SOIL	330		UG/KG	24			
BNA OLM4.2/4.3	2,4-DIMETHYLPHENOL	SOIL	330		UG/KG	12			
BNA OLM4.2/4.3	2,4-DINITROPHENOL	SOIL	800		UG/KG	66			
BNA OLM4.2/4.3	* 2,4-DINITROTOLUENE	SOIL	330		UG/KG	59	47	28-89	28-89
BNA OLM4.2/4.3	2,6-DINITROTOLUENE	SOIL	330		UG/KG	44			
BNA OLM4.2/4.3	2-CHLORONAPHTHALENE	SOIL	330		UG/KG	6.0			
BNA OLM4.2/4.3	* 2-CHLOROPHENOL	SOIL	330		UG/KG	18	50	25-102	25-102
BNA OLM4.2/4.3	2-METHYLNAPHTHALENE	SOIL	330		UG/KG	11			
BNA OLM4.2/4.3	2-METHYLPHENOL	SOIL	330		UG/KG	73			
BNA OLM4.2/4.3	2-NITROANILINE	SOIL	800		UG/KG	50			
BNA OLM4.2/4.3	2-NITROPHENOL	SOIL	330		UG/KG	42			
BNA OLM4.2/4.3	3,3'-DICHLOROBENZIDINE	SOIL	330		UG/KG	29			
BNA OLM4.2/4.3	3-NITROANILINE	SOIL	800		UG/KG	26			
BNA OLM4.2/4.3	4,6-DINITRO-2-METHYLPHENOL	SOIL	800		UG/KG	47			
BNA OLM4.2/4.3	4-BROMOPHENYL-PHENYLETHER	SOIL	330		UG/KG	3.7			
BNA OLM4.2/4.3	* 4-CHLORO-3-METHYLPHENOL	SOIL	330		UG/KG	12	33	26-103	26-103
BNA OLM4.2/4.3	4-CHLOROANILINE	SOIL	330		UG/KG	15			
BNA OLM4.2/4.3	4-CHLOROPHENYL-PHENYLETHER	SOIL	330		UG/KG	25			
BNA OLM4.2/4.3	4-METHYLPHENOL	SOIL	330		UG/KG	28			
BNA OLM4.2/4.3	4-NITROANILINE	SOIL	800		UG/KG	31			
BNA OLM4.2/4.3	* 4-NITROPHENOL	SOIL	800		UG/KG	54	50	11-114	11-114
BNA OLM4.2/4.3	* ACENAPHTHENE	SOIL	330		UG/KG	18	19	31-137	31-137
BNA OLM4.2/4.3	ACENAPHTHYLENE	SOIL	330		UG/KG	25			
BNA OLM4.2/4.3	ACETOPHENONE	SOIL	330		UG/KG	32			
BNA OLM4.2/4.3	ANTHRACENE	SOIL	330		UG/KG	15			
BNA OLM4.2/4.3	ATRAZINE	SOIL	330		UG/KG	42			
BNA OLM4.2/4.3	BENZALDEHYDE	SOIL	330		UG/KG	29			
BNA OLM4.2/4.3	BENZO (A) ANTHRACENE	SOIL	330		UG/KG	5.3			
BNA OLM4.2/4.3	BENZO (A) PYRENE	SOIL	330		UG/KG	18			
BNA OLM4.2/4.3	BENZO (B) FLUORANTHENE	SOIL	330		UG/KG	88			
BNA OLM4.2/4.3	BENZO (G, H, I) PERYLENE	SOIL	330		UG/KG	82			
BNA OLM4.2/4.3	BENZO (K) FLUORANTHENE	SOIL	330		UG/KG	22			
BNA OLM4.2/4.3	BIS (-2-CHLOROETHOXY) METHANE	SOIL	330		UG/KG	23			
BNA OLM4.2/4.3	BIS (-2-CHLOROETHYL) ETHER	SOIL	330		UG/KG	37			
BNA OLM4.2/4.3	BIS (2-ETHYLHEXYL) PHTHALATE	SOIL	330		UG/KG	13			
BNA OLM4.2/4.3	BUTYL BENZYL PHTHALATE	SOIL	330		UG/KG	46			
BNA OLM4.2/4.3	CAPROLACTAM	SOIL	330		UG/KG	30			
BNA OLM4.2/4.3	CARBAZOLE	SOIL	330		UG/KG	19			
BNA OLM4.2/4.3	CHRYSENE	SOIL	330		UG/KG	2.3			
BNA OLM4.2/4.3	DIBENZ (A, H) ANTHRACENE	SOIL	330		UG/KG	70			
BNA OLM4.2/4.3	DIBENZOPURAN	SOIL	330		UG/KG	7.0			
BNA OLM4.2/4.3	DIETHYLPHTHALATE	SOIL	330		UG/KG	13			
BNA OLM4.2/4.3	DIMETHYL PHTHALATE	SOIL	330		UG/KG	18			
BNA OLM4.2/4.3	DI-N-BUTYLPHTHALATE	SOIL	330		UG/KG	12			
BNA OLM4.2/4.3	DI-N-OCTYL PHTHALATE	SOIL	330		UG/KG	82			
BNA OLM4.2/4.3	FLUORANTHENE	SOIL	330		UG/RG	25			
BNA OLM4.2/4.3	FLUORENE	SOIL	330		UG/KG	21			
BNA OLM4.2/4.3	HEXACHLOROBENZENE	SOIL	330		UG/KG	45			
BNA OLM4.2/4.3	HEXACHLOROBUTADIENE	SOIL	330		UG/KG	16			



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
BNA OLM4.2/4.3	HEXACHLOROCYCLOPENTADIENE	SOIL	330		UG/KG	53			
BNA OLM4.2/4.3	HEXACHLOROETHANE	SOIL	330		UG/KG	25			
BNA OLM4.2/4.3	INDENO (1,2,3-CD) PYRENE	SOIL	330		UG/KG	82			
BNA OLM4.2/4.3	ISOPHORONE	SOIL	330		UG/KG	15			
BNA OLM4.2/4.3	NAPHTHALENE	SOIL	330		UG/KG	4.7			
BNA OLM4.2/4.3	NITROBENZENE	SOIL	330		UG/KG	30			
BNA OLM4.2/4.3	* N-NITROSO-DI-N-PROPYLAMINE	SOIL	330		UG/KG	21	38	41-126	41-126
BNA OLM4.2/4.3	* N-NITROSODIPHENYLAMINE	SOIL	330		UG/KG	35			
BNA OLM4.2/4.3	* PENTACHLOROPHENOL	SOIL	800		UG/KG	99	47	17-109	17-109
BNA OLM4.2/4.3	* PHENANTHRENE	SOIL	330		UG/KG	19			
BNA OLM4.2/4.3	* PHENOL	SOIL	330		UG/KG	12	35	26-90	26-90
BNA OLM4.2/4.3	* PYRENE	SOIL	330		UG/KG	53	36	35-142	35-142
BNA OLM4.2/4.3	TERPHENYL-D14 -SURR	SOIL	NA		UG/KG	NA	NA	18-137	18-137
BNA OLM4.2/4.3	2-CHLOROPHENOL-D4 -SURR (advisor	SOIL	NA		UG/KG	NA	NA	20-130	20-130
BNA OLM4.2/4.3	1,2-DICHLOROBENZENE-D4 -SURR (a	SOIL	NA		UG/KG	NA	NA	20-130	20-130
BNA OLM4.2/4.3	NITROBENZENE-D5 -SURR	SOIL	NA		UG/KG	NA	NA	23-120	23-120
BNA OLM4.2/4.3	PHENOL-D6 -SURR	SOIL	NA		UG/KG	NA	NA	24-113	24-113
BNA OLM4.2/4.3	2-FLUOROBIPHENYL -SURR	SOIL	NA		UG/KG	NA	NA	30-115	30-115
BNA OLM4.2/4.3	2-FLUOROPHENOL -SURR	SOIL	NA		UG/KG	NA	NA	25-121	25-121
BNA OLM4.2/4.3	2,4,6-TRIBROMOPHENOL -SURR	SOIL	NA		UG/KG	NA	NA	19-122	19-122
BNA OLM4.2/4.3 additional compounds by request									
BNA OLM4.2/4.3	1,3-DICHLOROBENZENE	SOIL	330		UG/KG	17			
BNA OLM4.2/4.3	1,2-DICHLOROBENZENE	SOIL	330		UG/KG	29			
BNA OLM4.2/4.3	1,4-DICHLOROBENZENE	SOIL	330		UG/KG	18			



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
P/PCB OLM4.2/4.3	AROCLOR-1016	WATER	1.0		UG/L	0.48			
P/PCB OLM4.2/4.3	AROCLOR-1221	WATER	2.0		UG/L	0.68			
P/PCB OLM4.2/4.3	AROCLOR-1232	WATER	1.0		UG/L	0.79			
P/PCB OLM4.2/4.3	AROCLOR-1242	WATER	1.0		UG/L	0.36			
P/PCB OLM4.2/4.3	AROCLOR-1248	WATER	1.0		UG/L	0.27			
P/PCB OLM4.2/4.3	AROCLOR-1254	WATER	1.0		UG/L	0.073			
P/PCB OLM4.2/4.3	AROCLOR-1260	WATER	1.0		UG/L	0.19			
P/PCB OLM4.2/4.3	* ALDRIN	WATER	0.050		UG/L	0.0026	22	40-120	40-120
P/PCB OLM4.2/4.3	ALPHA-BHC	WATER	0.050		UG/L	0.0084			
P/PCB OLM4.2/4.3	BETA-BHC	WATER	0.050		UG/L	0.0041			
P/PCB OLM4.2/4.3	DELTA-BHC	WATER	0.050		UG/L	0.0035			
P/PCB OLM4.2/4.3	* GAMMA-BHC (LINDANE)	WATER	0.050		UG/L	0.0076	15	56-123	56-123
P/PCB OLM4.2/4.3	ALPHA-CHLORDANE	WATER	0.050		UG/L	0.0057			
P/PCB OLM4.2/4.3	GAMMA-CHLORDANE	WATER	0.050		UG/L	0.0025			
P/PCB OLM4.2/4.3	4,4'-DDD	WATER	0.10		UG/L	0.0091			
P/PCB OLM4.2/4.3	4,4'-DDE	WATER	0.10		UG/L	0.0049			
P/PCB OLM4.2/4.3	4,4'-DDT	WATER	0.10		UG/L	0.0034	27	38-127	38-127
P/PCB OLM4.2/4.3	* DIELDRIN	WATER	0.10		UG/L	0.014	18	52-126	52-126
P/PCB OLM4.2/4.3	ENDOSULFAN I	WATER	0.050		UG/L	0.0056			
P/PCB OLM4.2/4.3	ENDOSULFAN II	WATER	0.10		UG/L	0.011			
P/PCB OLM4.2/4.3	ENDOSULFAN SULFATE	WATER	0.10		UG/L	0.0074			
P/PCB OLM4.2/4.3	* ENDRIN	WATER	0.10		UG/L	0.014	21	56-121	56-121
P/PCB OLM4.2/4.3	ENDRIN ALDEHYDE	WATER	0.10		UG/L	0.006			
P/PCB OLM4.2/4.3	ENDRIN KETONE	WATER	0.10		UG/L	0.009			
P/PCB OLM4.2/4.3	* HEPTACHLOR	WATER	0.050		UG/L	0.0081	20	40-131	40-131
P/PCB OLM4.2/4.3	HEPTACHLOR EPOXIDE	WATER	0.050		UG/L	0.0024			
P/PCB OLM4.2/4.3	METHOXYCHLOR	WATER	0.50		UG/L	0.031			
P/PCB OLM4.2/4.3	TOXAPHENE	WATER	5.0		UG/L	1.0			
P/PCB OLM4.2/4.3	DECACHLOROBIPHENYL (DCB) -SURR	WATER	NA		UG/L	NA	NA	30-150	30-150
P/PCB OLM4.2/4.3	TETRACHLORO-META-XYLENE (TCMX) -SU	WATER	NA		UG/L	NA	NA	30-150	30-150
P/PCB OLM4.2/4.3	AROCLOR-1016	SOIL	33		UG/KG	16			
P/PCB OLM4.2/4.3	AROCLOR-1221	SOIL	67		UG/KG	23			
P/PCB OLM4.2/4.3	AROCLOR-1232	SOIL	33		UG/KG	26			
P/PCB OLM4.2/4.3	AROCLOR-1242	SOIL	33		UG/KG	12			
P/PCB OLM4.2/4.3	AROCLOR-1248	SOIL	33		UG/KG	9.2			
P/PCB OLM4.2/4.3	AROCLOR-1254	SOIL	33		UG/KG	2.4			
P/PCB OLM4.2/4.3	AROCLOR-1260	SOIL	33		UG/KG	6.3			
P/PCB OLM4.2/4.3	* ALDRIN	SOIL	1.7		UG/KG	0.10	43	40-120	34-132
P/PCB OLM4.2/4.3	ALPHA-BHC	SOIL	1.7		UG/KG	0.27			
P/PCB OLM4.2/4.3	BETA-BHC	SOIL	1.7		UG/KG	0.13			
P/PCB OLM4.2/4.3	DELTA-BHC	SOIL	1.7		UG/KG	0.13			
P/PCB OLM4.2/4.3	* GAMMA-BHC (LINDANE)	SOIL	1.7		UG/KG	0.27	50	56-123	46-127
P/PCB OLM4.2/4.3	ALPHA-CHLORDANE	SOIL	1.7		UG/KG	0.20			
P/PCB OLM4.2/4.3	GAMMA-CHLORDANE	SOIL	1.7		UG/KG	0.10			
P/PCB OLM4.2/4.3	4,4'-DDD	SOIL	3.3		UG/KG	0.30			
P/PCB OLM4.2/4.3	4,4'-DDE	SOIL	3.3		UG/KG	0.17			
P/PCB OLM4.2/4.3	4,4'-DDT	SOIL	3.3		UG/KG	0.10	50	38-127	23-134
P/PCB OLM4.2/4.3	* DIELDRIN	SOIL	3.3		UG/KG	0.47	38	52-126	31-134
P/PCB OLM4.2/4.3	ENDOSULFAN I	SOIL	1.7		UG/KG	0.20			
P/PCB OLM4.2/4.3	ENDOSULFAN II	SOIL	3.3		UG/KG	0.37			
P/PCB OLM4.2/4.3	ENDOSULFAN SULFATE	SOIL	3.3		UG/KG	0.23			
P/PCB OLM4.2/4.3	* ENDRIN	SOIL	3.3		UG/KG	0.47	45	56-121	42-139
P/PCB OLM4.2/4.3	ENDRIN ALDEHYDE	SOIL	3.3		UG/KG	0.20			
P/PCB OLM4.2/4.3	ENDRIN KETONE	SOIL	3.3		UG/KG	0.30			
P/PCB OLM4.2/4.3	* HEPTACHLOR	SOIL	1.7		UG/KG	0.27	31	40-131	35-130
P/PCB OLM4.2/4.3	HEPTACHLOR EPOXIDE	SOIL	1.7		UG/KG	0.070			
P/PCB OLM4.2/4.3	METHOXYCHLOR	SOIL	17		UG/KG	1.0			
P/PCB OLM4.2/4.3	TOXAPHENE	SOIL	170		UG/KG	34			
P/PCB OLM4.2/4.3	DECACHLOROBIPHENYL (DCB) -SURR	SOIL	NA		UG/KG	NA	NA	30-150	30-150
P/PCB OLM4.2/4.3	TETRACHLORO-META-XYLENE (TCMX) -SU	SOIL	NA		UG/KG	NA	NA	30-150	30-150



ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
MAVPH	BENZENE	WATER	0.5		UG/L	0.17	50	70-130	70-130
MAVPH	METHYL-TERT-BUTYL ETHER	WATER	5.0		UG/L	0.64	50	70-130	70-130
MAVPH	C9-C10 AROMATICS	WATER	10		UG/L	1.7	50	70-130	70-130
MAVPH	C9-C12 ALIPHATICS	WATER	20		UG/L	4.8	50	70-130	70-130
MAVPH	C5-C8 ALIPHATICS	WATER	15		UG/L	8.8	50	70-130	70-130
MAVPH	ETHYLBENZENE	WATER	1.0		UG/L	0.19	50	70-130	70-130
MAVPH	NAPHTHALENE	WATER	5.0		UG/L	0.51	50	70-130	70-130
MAVPH	TOLUENE	WATER	1.0		UG/L	0.46	50	70-130	70-130
MAVPH	M+P-XYLENE	WATER	1.0		UG/L	0.70	50	70-130	70-130
MAVPH	O-XYLENE	WATER	1.0		UG/L	0.50	50	70-130	70-130
MAVPH	1,4-DIFLUOROBENZENE (FID) -SURR	WATER	NA		UG/L	NA	NA	70-130	70-130
MAVPH	1,4-DIFLUOROBENZENE (PID) -SURR	WATER	NA		UG/L	NA	NA	70-130	70-130
MAVPH	BENZENE	SOIL	25		UG/KG	8.6	50	70-130	70-130
MAVPH	METHYL-TERT-BUTYL ETHER	SOIL	250		UG/KG	32	50	70-130	70-130
MAVPH	C9-C10 AROMATICS	SOIL	500		UG/KG	85	50	70-130	70-130
MAVPH	C9-C12 ALIPHATICS	SOIL	1000		UG/KG	240	50	70-130	70-130
MAVPH	C5-C8 ALIPHATICS	SOIL	750		UG/KG	440	50	70-130	70-130
MAVPH	ETHYLBENZENE	SOIL	50		UG/KG	9.7	50	70-130	70-130
MAVPH	NAPHTHALENE	SOIL	250		UG/KG	26	50	70-130	70-130
MAVPH	TOLUENE	SOIL	50		UG/KG	23	50	70-130	70-130
MAVPH	M+P-XYLENE	SOIL	50		UG/KG	35	50	70-130	70-130
MAVPH	O-XYLENE	SOIL	50		UG/KG	25	50	70-130	70-130
MAVPH	1,4-DIFLUOROBENZENE (FID) -SURR	SOIL	NA		UG/KG	NA	NA	70-130	70-130
MAVPH	1,4-DIFLUOROBENZENE (PID) -SURR	SOIL	NA		UG/KG	NA	NA	70-130	70-130
MAEPH	ACENAPHTHENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	ACENAPHTHYLENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	ANTHRACENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	BENZO (A) ANTHRACENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	BENZO (A) PYRENE	WATER	0.20		UG/L		50	40-140	40-140
MAEPH	BENZO (B) FLUORANTHENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	BENZO (G, H, I) PERYLENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	BENZO (K) FLUORANTHENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	C9-C18 ALIPHATIC HYDROCARBONS	WATER	100		UG/L	NA	50	40-140	40-140
MAEPH	UNADJUSTED C11-C22 AROMATIC HYDROCARBONS	WATER	100		UG/L	NA	50	40-140	40-140
MAEPH	C11-C22 AROMATICS	WATER	100		UG/L	NA	50	40-140	40-140
MAEPH	C19-C36 ALIPHATIC HYDROCARBONS	WATER	100		UG/L	NA	50	40-140	40-140
MAEPH	INDENO (1, 2, 3-CD) PYRENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	CHRYSENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	DIBENZ (A, H) ANTHRACENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	FLUORANTHENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	FLUORENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	2-METHYLNAPHTHALENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	NAPHTHALENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	PHENANTHRENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	PYRENE	WATER	0.50		UG/L		50	40-140	40-140
MAEPH	2-BROMONAPHTHALENE -SURR	WATER	NA		UG/L	NA	NA	40-140	40-140
MAEPH	2-FLUOROBIPHENYL -SURR	WATER	NA		UG/L	NA	NA	40-140	40-140
MAEPH	1-CHLORO-OCTADECANE -SURR	WATER	NA		UG/L	NA	NA	40-140	40-140
MAEPH	O-TERPHEYL -SURR	WATER	NA		UG/L	NA	NA	40-140	40-140



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
MAEPH	ACENAPHTHENE	SOIL	330		UG/KG	29	50	40-140	40-140
MAEPH	ACENAPHTHYLENE	SOIL	330		UG/KG	28	50	40-140	40-140
MAEPH	ANTHRACENE	SOIL	330		UG/KG	195	50	40-140	40-140
MAEPH	BENZO (A) ANTHRACENE	SOIL	330		UG/KG	43	50	40-140	40-140
MAEPH	BENZO (A) PYRENE	SOIL	330		UG/KG	79	50	40-140	40-140
MAEPH	BENZO (B) FLUORANTHENE	SOIL	330		UG/KG	44	50	40-140	40-140
MAEPH	BENZO (G, H, I) PERYLENE	SOIL	330		UG/KG	39	50	40-140	40-140
MAEPH	BENZO (K) FLUORANTHENE	SOIL	330		UG/KG	67	50	40-140	40-140
MAEPH	C9-C18 ALIPHATIC HYDROCARBONS	SOIL	660		UG/KG	NA	50	40-140	40-140
MAEPH	UNADJUSTED C11-C22 AROMATIC HYDROCARBONS	SOIL	660		UG/KG	NA	50	40-140	40-140
MAEPH	C11-C22 AROMATICS	SOIL	660		UG/KG	NA	50	40-140	40-140
MAEPH	C19-C36 ALIPHATIC HYDROCARBONS	SOIL	660		UG/KG	NA	50	40-140	40-140
MAEPH	INDENO (1, 2, 3-CD) PYRENE	SOIL	330		UG/KG	54	50	40-140	40-140
MAEPH	CHRYSENE	SOIL	330		UG/KG	93	50	40-140	40-140
MAEPH	DIBENZ (A, H) ANTHRACENE	SOIL	330		UG/KG	81	50	40-140	40-140
MAEPH	FLUORANTHENE	SOIL	330		UG/KG	83	50	40-140	40-140
MAEPH	FLUORENE	SOIL	330		UG/KG	28	50	40-140	40-140
MAEPH	2-METHYLNAPHTHALENE	SOIL	660		UG/KG	33	50	40-140	40-140
MAEPH	NAPHTHALENE	SOIL	330		UG/KG	41	50	40-140	40-140
MAEPH	PHENANTHRENE	SOIL	330		UG/KG	162	50	40-140	40-140
MAEPH	PYRENE	SOIL	330		UG/KG	50	50	40-140	40-140
MAEPH	2-BROMONAPHTHALENE -SURR	SOIL	NA		UG/KG	NA	NA	40-140	40-140
MAEPH	2-FLUOROBIPHENYL -SURR	SOIL	NA		UG/KG	NA	NA	40-140	40-140
MAEPH	1-CHLORO-OCTADECANE -SURR	SOIL	NA		UG/KG	NA	NA	40-140	40-140
MAEPH	O-TERPHENYL -SURR	SOIL	NA		UG/KG	NA	NA	40-140	40-140
TO-15	1, 1, 1-TRICHLOROETHANE	AIR	0.50		ppbv	0.013	25	70-130	NA
TO-15	1, 1, 2, 2-TETRACHLOROETHANE	AIR	0.50		ppbv	0.023	25	70-130	NA
TO-15	FREON-113	AIR	0.50		ppbv	0.015	25	70-130	NA
TO-15	1, 1, 2-TRICHLOROETHANE	AIR	0.50		ppbv	0.017	25	70-130	NA
TO-15	1, 1-DICHLOROETHANE	AIR	0.50		ppbv	0.026	25	70-130	NA
TO-15	1, 1-DICHLOROETHENE	AIR	0.50		ppbv	0.028	25	70-130	NA
TO-15	1, 2, 4-TRICHLOROBENZENE	AIR	0.50		ppbv	0.046	25	70-130	NA
TO-15	1, 2, 4-TRIMETHYLBENZENE	AIR	0.50		ppbv	0.013	25	70-130	NA
TO-15	1, 2-DIBROMOETHANE	AIR	0.50		ppbv	0.024	25	70-130	NA
TO-15	1, 2-DICHLOROBENZENE	AIR	0.50		ppbv	0.025	25	70-130	NA
TO-15	DICHLORODIFLUOROMETHANE	AIR	0.50		ppbv	0.015	25	70-130	NA
TO-15	1, 2-DICHLOROETHANE	AIR	0.50		ppbv	0.021	25	70-130	NA
TO-15	1, 2-DICHLOROPROPANE	AIR	0.50		ppbv	0.019	25	70-130	NA
TO-15	1, 3, 5-TRIMETHYLBENZENE	AIR	0.50		ppbv	0.015	25	70-130	NA
TO-15	1, 3-BUTADIENE	AIR	0.50		ppbv	0.029	25	70-130	NA
TO-15	1, 3-DICHLOROBENZENE	AIR	0.50		ppbv	0.026	25	70-130	NA
TO-15	1, 4-DICHLOROBENZENE	AIR	0.50		ppbv	0.024	25	70-130	NA
TO-15	4-ETHYLTOLUENE	AIR	0.50		ppbv	0.021	25	70-130	NA
TO-15	ACETONE	AIR	1.00		ppbv	0.45	25	70-130	NA
TO-15	BENZENE	AIR	0.50		ppbv	0.013	25	70-130	NA
TO-15	BENZYL CHLORIDE	AIR	0.50		ppbv	0.031	25	70-130	NA
TO-15	BROMODICHLOROMETHANE	AIR	0.50		ppbv	0.015	25	70-130	NA
TO-15	BROMOFORM	AIR	0.50		ppbv	0.021	25	70-130	NA
TO-15	BROMOMETHANE	AIR	0.50		ppbv	0.025	25	70-130	NA
TO-15	CARBON DISULFIDE	AIR	0.50		ppbv	0.010	25	70-130	NA
TO-15	CARBON TETRACHLORIDE	AIR	0.50		ppbv	0.017	25	70-130	NA
TO-15	CHLOROBENZENE	AIR	0.50		ppbv	0.013	25	70-130	NA
TO-15	CHLOROETHANE	AIR	0.50		ppbv	0.032	25	70-130	NA
TO-15	CHLOROFORM	AIR	0.50		ppbv	0.025	25	70-130	NA
TO-15	CHLOROMETHANE	AIR	0.50		ppbv	0.015	25	70-130	NA
TO-15	CIS-1, 2-DICHLOROETHENE	AIR	0.50		ppbv	0.015	25	70-130	NA
TO-15	CIS-1, 3-DICHLOROPROPENE	AIR	0.50		ppbv	0.015	25	70-130	NA
TO-15	CYCLOHEXANE	AIR	0.50		ppbv	0.028	25	70-130	NA
TO-15	DIBROMOCHLOROMETHANE	AIR	0.50		ppbv	0.015	25	70-130	NA
TO-15	FREON-114	AIR	0.50		ppbv	0.013	25	70-130	NA
TO-15	ETHYL ACETATE	AIR	0.50		ppbv	0.057	25	70-130	NA
TO-15	ETHYLBENZENE	AIR	0.50		ppbv	0.017	25	70-130	NA
TO-15	HEPTANE	AIR	0.50		ppbv	0.015	25	70-130	NA
TO-15	HEXACHLOROBUTADIENE	AIR	0.50		ppbv	0.029	25	70-130	NA
TO-15	HEXANE	AIR	0.50		ppbv	0.021	25	70-130	NA



### ROCHESTER ORGANIC QC LIMITS

METHOD	ANALYTE	MATRIX	MRL	DOD LOQ**	UNITS	MDL/ LOD	DUP (RPD)	LCS (% REC)	MS (% REC)
TO-15	M+P-XYLENE	AIR	1.0		ppbv	0.010	25	70-130	NA
TO-15	2-HEXANONE	AIR	0.50		ppbv	0.061	25	70-130	NA
TO-15	2-BUTANONE	AIR	0.50		ppbv	0.060	25	70-130	NA
TO-15	4-METHYL-2-PENTANONE	AIR	0.50		ppbv	0.056	25	70-130	NA
TO-15	METHYL TERT-BUTYL ETHER	AIR	0.50		ppbv	0.015	25	70-130	NA
TO-15	METHYLENE CHLORIDE	AIR	0.50		ppbv	0.024	25	70-130	NA
TO-15	O-XYLENE	AIR	0.50		ppbv	0.010	25	70-130	NA
TO-15	PROPYLENE	AIR	0.50		ppbv	0.027	25	70-130	NA
TO-15	STYRENE	AIR	0.50		ppbv	0.017	25	70-130	NA
TO-15	TETRACHLOROETHENE	AIR	0.50		ppbv	0.019	25	70-130	NA
TO-15	TETRAHYDROFURAN	AIR	0.50		ppbv	0.033	25	70-130	NA
TO-15	TOLUENE	AIR	0.50		ppbv	0.010	25	70-130	NA
TO-15	TRANS-1,2-DICHLOROETHENE	AIR	0.50		ppbv	0.010	25	70-130	NA
TO-15	TRANS-1,3-DICHLOROPROPENE	AIR	0.50		ppbv	0.015	25	70-130	NA
TO-15	TRICHLOROETHENE	AIR	0.50		ppbv	0.028	25	70-130	NA
TO-15	TRICHLOROFLUOROMETHANE	AIR	0.50		ppbv	0.010	25	70-130	NA
TO-15	VINYL ACETATE	AIR	0.50		ppbv	0.15	25	70-130	NA
TO-15	VINYL CHLORIDE	AIR	0.50		ppbv	0.030	25	70-130	NA
TO-15	BROMOFLUOROBENZENE-SURR	AIR	NA		ppbv	NA	NA	70-140	NA

Method Reporting Limits for isomers reported as "total," are a summation of each isomer's MRL.

\* Subset of compounds used to control the acceptability of the QC sample for the batch. All targets are monitored against the limits provided, however outlying compounds outside of this subset may not stop analysis based upon the judgement of the analyst.

\*\* The DOD LoQ is the same as the MRL unless there is a value in the DoD LoQ column. DoD LoQ is required to be at least 3 times the MDL. Only populated for DoD Scope of Work. DoD requires use of DoD LCS and MS limits where available. See SOPs or DoD QSM.

EPA SOW OLM 04.3 does not require LCS analysis, limits are guidance for EPA and required for NYS ASP.

Limits for TCLP extracts are the same as the determinative method for the water matrix.

MDL = Method Detection Limit.  
 LOD = Limit of Detection  
 TCL = Target Compound List  
 LVI = Large Volume Injector  
 -SURR = Surrogate Compound

WETCHEM QC LIMITS

Columbia Analytical Services Rochester, NY

METHDD			ANALYTE	MATRIX	UNITS	MRL	MDL	DUP		MS		LCS		ICV/CCV
EPA	SM	Other						(RPD)	Freq	(% REC)	Freq	(% Rec)	Frequency	
305.1	2310B		Acidity	Water	mg/L	10.0	2.86	20	1/10	61-136	1/10	61-136	1/10	90-110
310.1	2320B		Alkalinity, Total, Carbonate, Bicarb	Water	mg/L	2.00	0.689	20	1/10	80-121	0.1	93-111	1/20	90-110
350.1			Ammonia	Water	mg/L	0.050	0.00955	20	1/10	59-129	0.1	90-110	1/20	90-110
350.1			Ammonia - Low Level	Water	mg/L	0.010	0.00955	20	1/10	59-129	0.1	90-110	1/20	90-110
350.1 M			Ammonia	Soil	mg/Kg	5.00	0.339	30	1/10	48-149	0.1	90-110	1/20	90-110
		D482	Ash, Percent	Non-Aq	%	0.10	NA	10	1/10	NA	NA	61-134	1/20	NA
405.1	5210B		BOD/CBOD	Water	mg/L	2.00	NA	20	1/20	47-141	1/20	85-115	1/20	NA
300.0/9056			Bromide by IC	Water	mg/L	0.10	0.0020	20	1/10	71-122	0.1	90-110	1/20	90-110
300.0M/9056			Bromide by IC	Soil	mg/Kg	10.0	0.385	30	1/10	71-127	0.1	90-110	1/20	90-110
5050/9056			Bromide for total halogens	NonAq/Soil	mg/Kg	30.0		20	1/20	NA	NA	50-150	1/20	90-110
		D4809	BTU	Non-Aq	BTU	500	NA	20	1/20	NA	1/20	90-110	1/20	NA
9081			Cation Exchange Capacity	Soil	meqNa/100g	1.0	NA	30	1/20	NA	NA	NA	NA	NA
410.4			Chemical Oxygen Demand - LL	Water	mg/L	5.00	3.31	20	1/10	41-142	1/10	75-116	1/20	85-115
410.4 M			Chemical Oxygen Demand	Soil	mg/Kg	100	49.9	30	1/10	10-170	1/10	10-170	1/20	85-115
325.2	4500-CI E		Chloride - Colorimetric	Water	mg/L	1.00	0.567	20	1/10	65-125	1/10	90-112	1/20	90-110
300.0/9056			Chloride by IC	Water	mg/L	0.200	0.029	20	1/10	72-118	1/10	90-110	1/20	90-110
300.0M/9056			Chloride by IC	Soil	mg/Kg	30.0	4.69	30	1/10	72-119	1/10	90-110	1/20	90-110
5050/9056			Chlorine, Percent	Non-Aq	%	0.01	NA	20	1/10	33-141	NA	33-141	1/20	NA
5050/9056			Chloride - for total halogens	NonAq/Soil	mg/kg	60.0		20	1/20	NA	NA	50-150	1/20	90-110
	409A		Chlorine Demand	Water	mg/L	5.00	NA	20	1/20	NA	NA	NA	NA	NA
330.4	4500-CI F		Chlorine Residual (Free)	Water	mg/L	0.100	NA	20	1/10	50-150	1/20	50-150	1/20	NA
330.4	4500-CI F		Chlorine Residual (Total)	Water	mg/L	0.100	0.0446	20	1/10	66-129	1/20	87-113	1/20	NA
110.2	2120B		Color (True)	Water	CU	5.0	NA	10	1/10	NA	NA	NA	NA	NA
120.1			Conductivity	Water	umhos/cm	NA	NA	20	1/20	NA	NA	90-110	1/10	NA
7196A	3500-Cr B		CR+6 Hexavalent Chromium	Water	mg/L	0.010	0.0011	20	1/10	85-115	1/10	90-109	1/20	90-110
218.6			CR+6 Hexavalent Chromium	Water	mg/L	0.010	0.0031	20	1/20	90-110	1/10	90-110	1/20	95-105
7199			CR+6 Hexavalent Chromium	Water	mg/L	0.010	0.0031	20	1/20	70-130	1/20	80-120	1/20	90-110
3060/7196A			CR+6 Hexavalent Chromium	Soil	mg/Kg	4.00	2.00	20	1/20	75-125	1/10	80-120	1/20	90-110
3060/7199			CR+6 Hexavalent Chromium	Soil	mg/Kg	0.40	0.101	20	1/20	75-125	1/20	80-120	1/20	90-110
		ILM05.3	Cyanide, Total	Water	mg/L	0.010		20	1/20	75-125	1/20	85-115	1/20	85-115
		ILM05.3	Cyanide, Total	Soil	mg/Kg	1.00		20	1/20	30-162	1/20	85-115	1/20	85-115
335.2/335.4			Cyanide, Total	Water	mg/L	0.010	0.0031	20	1/10	10-171	1/10	90-110	IL & LL 1/2	90-110
9012A			Cyanide, Total	Water	mg/L	0.010	0.0031	20	1/10	27-153	1/10	85-115	IL & LL 1/2	85-115
9012A			Cyanide, Total	Soil	mg/Kg	1.00	0.218	30	1/10	30-162	1/10	85-115	IL & LL 1/2	85-115
S. 7.3 SW846			Cyanide, Reactivity	Water	mg/Kg	20.0	0.082	20	1/20	1-100	1/20	1-100	1/20	85-115
S. 7.3 SW846			Cyanide, Reactivity	Soil	mg/Kg	20.0	0.082	30	1/20	1-100	1/20	1-100	1/20	85-115
D1298			Density / Specific Gravity	non-aq	kg/m3	NA	NA	10	1/10	NA	NA	0.002units	20/hydromer	NA
NYSDEC 89-9			Ethylene Glycol	Water	mg/L	1.0	0.0526	20	1/20	70-130	1/20	80-120	1/20	90-110
3500-FE D			Ferrous Iron	Water	mg/L	0.10	0.0417	20	1/10	82-123	1/10	86-114	1/20	90-110
3500-FE D			Ferrous Iron	Soil	mg/kg	10.0	2.5	30	1/10	30-161	1/10	81-120	1/20	90-110
340.2			Fluoride by ISE	Water	mg/L	0.100	0.0115	20	1/20	82-116	1/20	82-116	1/20	90-110
300.0/9056			Fluoride by IC	Water	mg/L	0.100	0.0060	20	1/10	85-129	1/10	90-110	1/20	90-110

WETCHEM QC LIMITS

Columbia Analytical Services Rochester, NY

METHOD			ANALYTE	MATRIX	UNITS	MRL	MDL	DUP		MS		LCS		ICV/CCV
EPA	SM	Other						(RPD)	Freq	(% REC)	Freq	(% Rec)	Frequency	
300.0M/9056			Fluoride by IC	Soil	mg/Kg	20.0	0.609	30	1/10	70-130	1/10	90-110	1/20	90-110
5050/9056			Fluoride for total halogens	NonAq/Soil	mg/kg	30.0		20	1/20	NA	NA	50-150	1/20	90-110
130.2	2340C		Hardness, Total	Water	mg/L	2.00	0.311	20	1/10	84-113	1/10	93-107	1/10	NA
1010			IGN- Pensky Martens Closed Cup	Water	degree C	NA	NA	10	1/20	NA	NA	24.3-29.7 C	1/20	NA
D92/1010.CC			IGN - Cleveland Open Cup	Soil	degree C	NA	NA	30	1/20	NA	NA	NA	NA	NA
300.0/9056			Iodide	Water	mg/L	0.20	0.041	20	1/10	70-130	1/10	90-110	1/20	90-110
5050/9056			Iodide - for total Halogens	NonAq/Soil	mg/kg	60		20	1/20	NA	NA	30-150	1/20	90-110
300.0/9056			Nitrate as N by IC	Water	mg/L	0.050	0.008	20	1/10	79-111	1/10	90-110	1/20	90-110
300.0M/9056			Nitrate as N by IC	Soil	mg/Kg	5.00	0.359	30	1/10	79-113	1/10	90-110	1/20	90-110
353.2			Nitrate/Nitrite as N	Water	mg/L	0.050	0.00284	20	1/10	69-123	1/10	90-110	1/20	90-110
300.0/9056			Nitrite as N by IC	Water	mg/L	0.050	0.001	20	1/10	70-130	1/10	90-110	1/20	90-110
353.2			Nitrite as N	Water	mg/L	0.010	0.00776	20	1/10	73-126	1/10	90-110	1/20	90-110
351.2			Nitrogen, Total Kjeldahl	Water	mg/L	0.200	0.075	20	1/10	70-117	1/10	72-108	1/20	-110()85-115()
351.2-M			Nitrogen, Total Kjeldahl	Soil	mg/Kg	20.0	12.1	30	1/10	13-162	1/10	13-162	1/20	-110()85-115()
351.2 LL			Nitrogen, Total Kjeldahl-LL	Water	mg/L	0.080	0.075	20	1/10	70-117	1/10	76-124	1/20	-110()85-115()
1664A			Oil and Grease by 1664A	Water	mg/L	5.00	0.84	20	1/20	78-114	1/20	78-114	1/20	NA
365.1			Orthophosphate -LL	Water	mg/L	0.0020	0.0018	20	1/10	33-150	1/10	90-110	1/20	90-110
365.1			Orthophosphate	Water	mg/L	0.010	0.0026	20	1/10	33-150	1/10	90-110	1/20	90-110
9095			Paint Filter test	Sludge	mg/Kg	NA	NA	30	1/20	NA	NA	NA	NA	NA
E203			Percent Water	Waste	%	0.1	0.0112	20	1/20	NA	NA	(MeOH)86-132	1/10	NA
150.1	4500-H <sup>1</sup> B		pH	Water	SU	NA	NA	±0.10	1/10	NA	NA	NA	NA	±0.05
9040/9045.			pH / Corrosivity	Water	SU	NA	NA	±0.10	1/20	NA	NA	NA	NA	±0.05
9040/9045.			pH / Corrosivity	Soil	SU	NA	NA	±0.10	1/20	NA	NA	NA	NA	±0.05
420.4			Phenolics, Total LL	Water	mg/L	0.002	0.00044	20	1/10	70-123	1/10	85-113	1/20	85-115
420.4			Phenolics, Total	Water	mg/L	0.005	0.00044	20	1/10	70-123	1/10	85-113	1/20	85-115
420.4			Phenolics, Manual Distillation	Water	mg/L	0.005		20	1/10	68-118	1/10	68-118	1/20	85-115
9066			Phenolics, Total	Water	mg/L	0.005	0.00044	20	1/10	70-123	1/10	85-113	1/20	85-115
9066			Phenolics, Total	Soil	mg/Kg	0.100	0.0177	30	1/10	66-108	1/10	75-112	1/20	85-115

WETCHEM QC LIMITS

Columbia Analytical Services Rochester, NY

METHOD			ANALYTE	MATRIX	UNITS	MRL	MDL	DUP		MS		LCS		ICV/CCV
EPA	SM	Other						(RPD)	Freq	(% REC)	Freq	(% Rec)	Frequency	
365.1 M			Phosphorus, Total - LL	Water	mg/L	0.003	0.0009	20	1/10	51-148	1/10	84-114	1/20	90-110
365.1			Phosphorus, Total	Water	mg/L	0.050	0.0158	20	1/10	51-148	1/10	90-110	1/20	90-110
365.1-M			Phosphorus, Total	Soil	mg/Kg	5.00	1.02	30	1/20	16-184	1/10	16-184	1/20	90-110
GEN-SILICON			Silicon, Percent	Soil/nonAq	%	0.0467		10	1/10	NA	NA	80-120	1/20	NA
370.1		1-2700-85	Silica, Dissolved	Water	mg/L	0.010	0.0031	20	1/10	80-117	1/10	90-117	1/20	90-110
160.3M			Solids, Dry Weight Percent (DWPS)	Soil	mg/Kg	1.0	NA	30	1/10	NA	NA	NA	NA	NA
160.5			Solids, Settleable	Water	mg/L	0.100	NA	20	1/20	NA	NA	NA	NA	NA
160.3	2540B		Solids, Total (TS)	Water	mg/L	10.0	NA	20	1/10	NA	NA	80-120	1/20	NA
160.1	2540C		Solids, Total Dissolved (TDS)	Water	mg/L	10.0	3.6	20	1/10	NA	NA	80-120	1/20	NA
160.2	2540D		Solids, Total Suspended (TSS)	Water	mg/L	1.00	NA	20	1/10	NA	NA	80-120	1/20	NA
160.4			Solids, Total Volatile (TVS)	Water	mg/L	10.0	NA	20	1/10	NA	NA	80-120	NA	NA
160.4D			Solids, Volatile Dissolved (VDS)	Water	mg/L	10.0	NA	20	1/10	NA	NA	NA	NA	NA
160.4S			Solids, Volatile Suspended (VSS)	Water	mg/L	1.00	NA	20	1/10	NA	NA	NA	NA	NA
	2540G		Solids, Percent Volatile	Soil	%	NA	NA	20	1/10	NA	NA	NA	NA	NA
375.4	426C		Sulfate, Turbidimetric	Water	mg/L	5.00	0.528	20	1/10	72-129	1/10	72-129	1/20	NA
300.0/9056			Sulfate by IC	Water	mg/L	0.200	0.007	20	1/10	61-128	1/10	90-110	1/20	90-110
300.0M/0956			Sulfate by IC	Soil	mg/Kg	30.0	0.518	30	1/10	25-151	1/10	90-110	1/20	90-110
AVS			Sulfide, Acid Volatile (AVS)	Soil	umoles/g	1.00	0.614	30	1/20	56-196	1/20	56-196	1/20	NA
S. 7.3 SW846			Sulfide Reactivity	Water	mg/Kg	100	65.2	20	1/20	0-235	NA	84-224	1/20	NA
S. 7.3 SW846			Sulfide Reactivity	Soil	mg/Kg	100	65.2	30	1/20	14-235	NA	14-235	1/20	NA
9030B			Sulfide, Acid Soluble	Water	mg/L	1.00	0.981	20	1/20	26-122	1/20	61-111	1/20	NA
9030B			Sulfide, Acid Soluble	Soil	mg/Kg	20.0	17.9	30	1/20	10-153	1/20	53-116	1/20	NA
376.1	4500-S F		Sulfide, Total	Water	mg/L	1.00	0.146	20	1/10	61-140	1/20	61-140	1/20	NA
300M			Sulfur- Alkaline Digestion	Soil	mg/kg	6.68	2.75	30	1/20	62-124	1/20	62-124	1/20	NA
425.1	5540C		Surfactants	Water	mg/L	0.02	0.00813	20	1/20	58-139	NA	58-139	1/20 HL	NA
415.1			TIC	Water	mg/L	1.00	0.0573	20	1/10	82-127	1/10	82-127	1/20	85-115
415.1	5310C		TOC - LL	Water	mg/L	0.05	0.0457	20	1/10	56-139	1/10	87-120	1/20	85-115
9060			TOC - LL	Water	mg/L	0.10	0.0457	20	1/10	56-139	1/10	87-120	1/20	85-115
415.1M/9060	5310C		TOC - RL	Water	mg/L	1.00	0.306	20	1/10	56-139	1/10	87-120	1/20	85-115
TOCLK			TOC - Lloyd Kahn	Soil	mg/Kg	300	39.8	30	1/20	29-163	1/20	55-133	1/20	85-115
TOCWB			TOC - Walkley-Black	Soil	mg/Kg	0.10	0.0262	30	1/20	69-105	1/20	83-98	1/10	NA
1664A			TPH by 1664A	Water	mg/L	5.00	1.43	20	1/20	64-132	1/20	64-132	1/20	NA
180.1			Turbidity	Water	NTU	0.10	0.035	10	1/20	NA	NA	90-110	3@run start	90-110

**METALS ANALYSES QC LIMITS 2005**

Method	Analyte	Matrix	Method Reporting Limit (MRL)	Method Detection Limit (MDL)	Precision (RPD)	Matrix Spike Accuracy (%REC)	LCS Accuracy (%REC)	ICV (%REC)	CCV (%REC)
200.7 (ICP) (ug/L)	Aluminum	Water	100	20.4	20	70-130	85-115	95-105	90-110
	Antimony		60 (LL 10)	32.6 (3.23)	20	70-130	85-115	95-105	90-110
	Arsenic		100 (LL 10)	39.1 (3.56)	20	70-130	85-115	95-105	90-110
	Barium		20	3.41	20	70-130	85-115	95-105	90-110
	Beryllium		5.0	0.238	20	70-130	85-115	95-105	90-110
	Boron		200	19.5	20	70-130	85-115	95-105	90-110
	Cadmium		5.0	3.36	20	70-130	85-115	95-105	90-110
	Calcium		500	15.4	20	70-130	85-115	95-105	90-110
	Chromium		10	1.87	20	70-130	85-115	95-105	90-110
	Cobalt		50	2.43	20	70-130	85-115	95-105	90-110
	Copper		20	10.0	20	70-130	85-115	95-105	90-110
	Iron		100	10.95	20	70-130	85-115	95-105	90-110
	Lead		50 (LL 5.0)	27.9 (1.39)	20	70-130	85-115	95-105	90-110
	Lithium		100	28.39	20	70-130	85-115	95-105	90-110
	Magnesium		500	18.13	20	70-130	85-115	95-105	90-110
	Manganese		10	0.382	20	70-130	85-115	95-105	90-110
	Molybdenum		25	7.79	20	70-130	85-115	95-105	90-110
	Nickel		40	4.25	20	70-130	85-115	95-105	90-110
	Potassium		2000	48.8	20	70-130	85-115	95-105	90-110
	Selenium		100 (LL 10)	54.5 (4.23)	20	70-130	85-115	95-105	90-110
	Silicon		1000	17.39	20	70-130	85-115	95-105	90-110
	Silver		10	0.915	20	70-130	85-115	95-105	90-110
	Sodium		500	452	20	70-130	85-115	95-105	90-110
	Strontium		100	1.06	20	70-130	85-115	95-105	90-110
Thallium	10	4.39	20	70-130	85-115	95-105	90-110		
Tin	500	19.5	20	70-130	85-115	95-105	90-110		
Titanium	50	0.336	20	70-130	85-115	95-105	90-110		
Vanadium	50	6.52	20	70-130	85-115	95-105	90-110		
Zinc	20	5.24	20	70-130	85-115	95-105	90-110		
1631 (CVAF) ng/L	Mercury	Water	1.00	0.084	20	70-130	80-120	80-120	80-120
245.1 (CVAA) ug/L	Mercury	Water	0.300	0.008	20	70-130	85-115	95-105	90-110
206.2 (GFAA) ug/L	Arsenic	Water	10.0	1.711	20	75-125	85-115	90-110	90-110
239.2 (GFAA) ug/L	Lead	Water	5.00	0.814	20	75-125	85-115	90-110	90-110
239.2 (GFAA) ug/L	Lead - DW	Water	1.00	0.384	20	75-125	85-115	90-110	90-110
270.2 (GFAA) ug/L	Selenium	Water	5.00	1.504	20	75-125	85-115	90-110	90-110
279.2 (GFAA) ug/L	Thallium	Water	10.0	2.975	20	75-125	85-115	90-110	90-110
6010B (ICP) (ug/L)	Aluminum	Water	100	20.4	20	75-125	80-120	90-110	90-110
	Antimony		60 (LL 10)	32.6 (3.23)	20	75-125	80-120	90-110	90-110
	Arsenic		100 (LL 10)	39.1 (3.56)	20	75-125	80-120	90-110	90-110
	Barium		20	3.41	20	75-125	80-120	90-110	90-110
	Beryllium		5.0	0.238	20	75-125	80-120	90-110	90-110
	Boron		200	19.5	20	75-125	80-120	90-110	90-110
	Cadmium		5.0	3.36	20	75-125	80-120	90-110	90-110
	Calcium		500	15.4	20	75-125	80-120	90-110	90-110
	Chromium		10	1.87	20	75-125	80-120	90-110	90-110
	Cobalt		50	2.43	20	75-125	80-120	90-110	90-110
	Copper		20	10.0	20	75-125	80-120	90-110	90-110
	Iron		100	10.95	20	75-125	80-120	90-110	90-110
	Lead		50 (LL 5.0)	27.9 (1.39)	20	75-125	80-120	90-110	90-110
	Lithium		100	28.39	20	75-125	80-120	90-110	90-110
	Magnesium		500	18.13	20	75-125	80-120	90-110	90-110
	Manganese		10	0.382	20	75-125	80-120	90-110	90-110
Molybdenum	25	7.79	20	75-125	80-120	90-110	90-110		

**METALS ANALYSES QC LIMITS 2005**

Method	Analyte	Matrix	Method Reporting Limit (MRL)	Method Detection Limit (MDL)	Precision (RPD)	Matrix Spike Accuracy (%REC)	LCS Accuracy (%REC)	ICV (%REC)	CCV (%REC)
	Nickel		40	4.25	20	75-125	80-120	90-110	90-110
	Potassium		2000	48.8	20	75-125	80-120	90-110	90-110
	Selenium		100 (LL 10)	54.5 (4.23)	20	75-125	80-120	90-110	90-110
	Silicon		1000	17.39	20	75-125	80-120	90-110	90-110
	Silver		10	0.915	20	75-125	80-120	90-110	90-110
	Sodium		500	452	20	75-125	80-120	90-110	90-110
	Strontium		100	1.06	20	75-125	80-120	90-110	90-110
	Thallium		10	4.39	20	75-125	80-120	90-110	90-110
	Tin		500	19.5	20	75-125	80-120	90-110	90-110
	Titanium		50	0.336	20	75-125	80-120	90-110	90-110
	Vanadium		50	6.52	20	75-125	80-120	90-110	90-110
Zinc	20	5.24	20	75-125	80-120	90-110	90-110		
7470A (CVAA) ug/L	Mercury	Water	0.300	0.00806	20	75-125	80-120	90-110	80-120
7060A (GFAA) ug/L	Arsenic	Water	10	1.711	20	75-125	80-120	90-110	80-120
7421 (GFAA) ug/L	Lead	Water	5.0	0.814	20	75-125	80-120	90-110	80-120
7740 (GFAA) ug/L	Selenium	Water	5.0	1.504	20	75-125	80-120	90-110	80-120
7841 (GFAA) ug/L	Thallium	Water	10	2.975	20	75-125	80-120	90-110	80-120
6010B (ICP) (mg/Kg)	Aluminum	Soil	10	6.72	20	75-125	C of A	90-110	90-110
	Antimony		6.0 (1.0 LL)	2.61 (0.28 LL)	20	75-125	C of A	90-110	90-110
	Arsenic		10 (1.0 LL)	3.89 (0.20 LL)	20	75-125	C of A	90-110	90-110
	Barium		2.00	0.262	20	75-125	C of A	90-110	90-110
	Beryllium		0.5	0.0356	20	75-125	C of A	90-110	90-110
	Boron		20	0.988	20	75-125	C of A	90-110	90-110
	Cadmium		0.5	0.303	20	75-125	C of A	90-110	90-110
	Calcium		50	11.1	20	75-125	C of A	90-110	90-110
	Chromium		1.00	0.122	20	75-125	C of A	90-110	90-110
	Cobalt		5.0	0.249	20	75-125	C of A	90-110	90-110
	Copper		2.0	0.568	20	75-125	C of A	90-110	90-110
	Iron		10	2.11	20	75-125	C of A	90-110	90-110
	Lead		5.0 (0.5 LL)	1.66 (0.097 LL)	20	75-125	C of A	90-110	90-110
	Lithium		10	3.22	20	75-125	C of A	90-110	90-110
	Magnesium		50	1.31	20	75-125	C of A	90-110	90-110
	Manganese		1.00	0.0247	20	75-125	C of A	90-110	90-110
	Molybdenum		2.5	0.837	20	75-125	C of A	90-110	90-110
	Nickel		4.00	0.473	20	75-125	C of A	90-110	90-110
	Potassium		200	3.43	20	75-125	C of A	90-110	90-110
	Selenium		10 (1.0 LL)	3.39 (0.31 LL)	20	75-125	C of A	90-110	90-110
	Silicon		100	2.33	20	75-125	C of A	90-110	90-110
Silver	1.00	0.078	20	75-125	C of A	90-110	90-110		
Sodium	50	34.9	20	75-125	C of A	90-110	90-110		
Strontium	10	1.64	20	75-125	C of A	90-110	90-110		
Thallium	1.00	0.397	20	75-125	C of A	90-110	90-110		
Tin	50	1.93	20	75-125	C of A	90-110	90-110		
Titanium	5.0	0.066	20	75-125	C of A	90-110	90-110		
Vanadium	5.0	0.801	20	75-125	C of A	90-110	90-110		
Zinc	2.0	0.844	20	75-125	C of A	90-110	90-110		
7471A (CVAA) mg/Kg	Mercury	Soil	0.05	0.0017	35	75-125	C of A	90-110	80-120
7060A (GFAA) mg/Kg	Arsenic	Soil	1.0	0.120	35	75-125	C of A	90-110	80-120
7421 (GFAA) mg/Kg	Lead	Soil	0.5	0.043	35	75-125	C of A	90-110	80-120
7740 (GFAA) mg/Kg	Selenium	Soil	0.5	0.156	35	75-125	C of A	90-110	80-120
7841 (GFAA) mg/Kg	Thallium	Soil	1.0	0.192	35	75-125	C of A	90-110	80-120

**METALS ANALYSES QC LIMITS 2005**

Method	Analyte	Matrix	Method Reporting Limit (MRL)	Method Detection Limit (MDL)	Precision (RPD)	Matrix Spike Accuracy (%REC)	LCS Accuracy (%REC)	ICV (%REC)	CCV (%REC)
200.7 CLP-M or ILM 4.1 (ILM 5.3) (ug/L)	Aluminum	Water	200	17	20	75-125	85-115	90-110	90-110
	Antimony		60	3.09	20	75-125	85-115	90-110	90-110
	Arsenic		10	6.06	20	75-125	85-115	90-110	90-110
	Barium		200	1.44	20	75-125	85-115	90-110	90-110
	Beryllium		5	0.168	20	75-125	85-115	90-110	90-110
	Cadmium		5	0.168	20	75-125	85-115	90-110	90-110
	Calcium		5000	24.1	20	75-125	85-115	90-110	90-110
	Chromium		10	0.938	20	75-125	85-115	90-110	90-110
	Cobalt		50	0.625	20	75-125	85-115	90-110	90-110
	Copper		25	3.23	20	75-125	85-115	90-110	90-110
	Iron		100	21.4	20	75-125	85-115	90-110	90-110
	Lead		3 (10)	1.53	20	75-125	85-115	90-110	90-110
	Magnesium		5000	3.69	20	75-125	85-115	90-110	90-110
	Manganese		15	0.283	20	75-125	85-115	90-110	90-110
	Nickel		40	0.574	20	75-125	85-115	90-110	90-110
	Potassium		5000	13.7	20	75-125	85-115	90-110	90-110
	Selenium		10 (35)		20	75-125	85-115	90-110	90-110
	Silver		10	0.536	20	75-125	85-115	90-110	90-110
	Sodium		5000	329	20	75-125	85-115	90-110	90-110
	Thallium		10 (25)	2.35	20	75-125	85-115	90-110	90-110
Vanadium	50	0.119	20	75-125	85-115	90-110	90-110		
Zinc	20 (60)	3.81	20	75-125	85-115	90-110	90-110		

200.7 CLP additional analytes upon request (ug/L)	Boron	Water	200	15.6	20	75-125	85-115	90-110	90-110
	Molybdenum		25	0.54	20	75-125	85-115	90-110	90-110
	Titanium		50	0.238	20	75-125	85-115	90-110	90-110
	Tin		500	18.8	20	75-125	85-115	90-110	90-110
	245.1 CLP-M(CVAA) ug/L		Mercury	Water	0.2	0.0086	20	75-125	80-120

206.2 CLP-M (GFAA) ug/L	Arsenic	Water	10	1.71	20	75-125	85-115	90-110	80-120
239.2 CLP-M (GFAA) ug/L	Lead	Water	3	0.814	20	75-125	85-115	90-110	80-120
270.2 CLP-M (GFAA) ug/L	Selenium	Water	5	1.504	20	75-125	85-115	90-110	80-120
279.2 CLP-M (GFAA) ug/L	Thallium	Water	10	2.92	20	75-125	85-115	90-110	80-120

200.7 CLP-M or ILM 4.1 (ILM 5.3) (mg/Kg)	Aluminum	Soils	40 (20)	7.73	20	75-125	C of A	90-110	90-110
	Antimony		12 (6)	0.504	20	75-125	C of A	90-110	90-110
	Arsenic		2 (1)	0.371	20	75-125	C of A	90-110	90-110
	Barium		40 (20)	0.0788	20	75-125	C of A	90-110	90-110
	Beryllium		1 (0.5)	0.0307	20	75-125	C of A	90-110	90-110
	Cadmium		1 (0.5)	0.0495	20	75-125	C of A	90-110	90-110
	Calcium		1000 (500)	14.5	20	75-125	C of A	90-110	90-110
	Chromium		2 (1)	0.147	20	75-125	C of A	90-110	90-110
	Cobalt		10 (5)	0.099	20	75-125	C of A	90-110	90-110
	Copper		5 (2.5)	0.541	20	75-125	C of A	90-110	90-110
	Iron		20 (10)	2.85	20	75-125	C of A	90-110	90-110
	Lead		0.6 (1)	0.261	20	75-125	C of A	90-110	90-110
	Magnesium		1000 (500)	0.906	20	75-125	C of A	90-110	90-110
	Manganese		3 (1.5)	0.057	20	75-125	C of A	90-110	90-110
	Nickel		8 (4)	0.153	20	75-125	C of A	90-110	90-110
	Potassium		1000 (500)	3.43	20	75-125	C of A	90-110	90-110
	Selenium		1 (3.5)	0.863	20	75-125	C of A	90-110	90-110
	Silver		2 (1)	0.12	20	75-125	C of A	90-110	90-110
	Sodium		1000 (500)	52.7	20	75-125	C of A	90-110	90-110
	Thallium		2 (2.5)	0.855	20	75-125	C of A	90-110	90-110
Vanadium	10 (5)	0.14	20	75-125	C of A	90-110	90-110		
Zinc	4 (6)	0.918	20	75-125	C of A	90-110	90-110		

200.7 CLP additional analytes upon request (mg/Kg)	Boron	Soil	40	2.17	20	75-125	85-115	90-110	90-110
	Molybdenum		5	0.133	20	75-125	85-115	90-110	90-110
	Titanium		5	0.031	20	75-125	85-115	90-110	90-110
	Tin		100	1.67	20	75-125	85-115	90-110	90-110
	245.5 CLP-M (CVAA) mg/Kg		Mercury	Soil	0.1	0.0017	20	75-125	C of A

**METALS ANALYSES QC LIMITS 2005**

Method	Analyte	Matrix	Method Reporting Limit (MRL)	Method Detection Limit (MDL)	Precision (RPD)	Matrix Spike Accuracy (%REC)	LCS Accuracy (%REC)	ICV (%REC)	CCV (%REC)
200.8 (ICP-MS) ug/L	Aluminum	Water	10	1.6	20	70-130	85-115	90-110	90-110
	Arsenic		1.0	0.19	20	70-130	85-115	90-110	90-110
	Antimony		1.0	0.0757	20	70-130	85-115	90-110	90-110
	Barium		1.0	0.0478	20	70-130	85-115	90-110	90-110
	Beryllium		1.0	0.072	20	70-130	85-115	90-110	90-110
	Cadmium		1.0	0.0368	20	70-130	85-115	90-110	90-110
	Chromium		1.0	0.203	20	70-130	85-115	90-110	90-110
	Cobalt		1.0	0.0857	20	70-130	85-115	90-110	90-110
	Copper		1.0	0.77	20	70-130	85-115	90-110	90-110
	Lead		1.0	0.0521	20	70-130	85-115	90-110	90-110
	Manganese		1.0	0.123	20	70-130	85-115	90-110	90-110
	Molybdenum		1.0	0.067	20	70-130	85-115	90-110	90-110
	Nickel		1.0	0.281	20	70-130	85-115	90-110	90-110
	Selenium		2.0	0.307	20	70-130	85-115	90-110	90-110
	Silver		1.0	0.0452	20	70-130	85-115	90-110	90-110
	Thallium		1.0	0.0424	20	70-130	85-115	90-110	90-110
Vanadium	1.0	0.0996	20	70-130	85-115	90-110	90-110		
Zinc	5.0	0.63	20	70-130	85-115	90-110	90-110		
6020 (ICP-MS) ug/L	Aluminum	Water	10	1.6	20	75-125	80-120	90-110	90-110
	Arsenic		1.0	0.19	20	75-125	80-120	90-110	90-110
	Antimony		1.0	0.0757	20	75-125	80-120	90-110	90-110
	Barium		1.0	0.0478	20	75-125	80-120	90-110	90-110
	Beryllium		1.0	0.072	20	75-125	80-120	90-110	90-110
	Cadmium		1.0	0.0368	20	75-125	80-120	90-110	90-110
	Chromium		1.0	0.203	20	75-125	80-120	90-110	90-110
	Cobalt		1.0	0.0857	20	75-125	80-120	90-110	90-110
	Copper		1.0	0.77	20	75-125	80-120	90-110	90-110
	Lead		1.0	0.0521	20	75-125	80-120	90-110	90-110
	Manganese		1.0	0.123	20	75-125	80-120	90-110	90-110
	Molybdenum		1.0	0.067	20	75-125	80-120	90-110	90-110
	Nickel		1.0	0.281	20	75-125	80-120	90-110	90-110
	Selenium		2.0	0.307	20	75-125	80-120	90-110	90-110
	Silver		1.0	0.0452	20	75-125	80-120	90-110	90-110
	Thallium		1.0	0.0424	20	75-125	80-120	90-110	90-110
Vanadium	1.0	0.0996	20	75-125	80-120	90-110	90-110		
Zinc	5.0	0.63	20	75-125	80-120	90-110	90-110		
6020 (ICP-MS) ug/g	Aluminum	Soil	2.0	1.44	20	75-125	C of A	90-110	90-110
	Arsenic		0.1	0.0225	20	75-125	C of A	90-110	90-110
	Antimony		0.2	0.044	20	75-125	C of A	90-110	90-110
	Barium		0.1	0.0855	20	75-125	C of A	90-110	90-110
	Beryllium		0.1	0.0085	20	75-125	C of A	90-110	90-110
	Cadmium		0.1	0.005	20	75-125	C of A	90-110	90-110
	Chromium		0.1	0.0315	20	75-125	C of A	90-110	90-110
	Cobalt		0.5	0.0044	20	75-125	C of A	90-110	90-110
	Copper		4.0	0.062	20	75-125	C of A	90-110	90-110
	Lead		0.1	0.0845	20	75-125	C of A	90-110	90-110
	Manganese		0.1	0.025	20	75-125	C of A	90-110	90-110
	Molybdenum		0.2	0.0145	20	75-125	C of A	90-110	90-110
	Nickel		0.1	0.034	20	75-125	C of A	90-110	90-110
	Selenium		0.2	0.084	20	75-125	C of A	90-110	90-110
	Silver		0.1	0.0114	20	75-125	C of A	90-110	90-110
	Thallium		0.1	0.07	20	75-125	C of A	90-110	90-110
Vanadium	0.1	0.015	20	75-125	C of A	90-110	90-110		
Zinc	4.0	3.08	20	75-125	C of A	90-110	90-110		

METALS ANALYSES QC LIMITS 2005									
Method	Analyte	Matrix	Method Reporting Limit (MRL)	Method Detection Limit (MDL)	Precision (RPD)	Matrix Spike Accuracy (%REC)	LCS Accuracy (%REC)	ICV (%REC)	CCV (%REC)
200.8 CLP-M (ICP-MS) ILM 5.3 (ug/L)	Aluminum	Water	--	1.6	20	70-130	85-115	90-110	90-110
	Arsenic		1.0	0.19	20	70-130	85-115	90-110	90-110
	Antimony		2.0	0.0757	20	70-130	85-115	90-110	90-110
	Barium		10.0	0.0478	20	70-130	85-115	90-110	90-110
	Beryllium		1.0	0.072	20	70-130	85-115	90-110	90-110
	Cadmium		1.0	0.0368	20	70-130	85-115	90-110	90-110
	Chromium		2.0	0.203	20	70-130	85-115	90-110	90-110
	Cobalt		1.0	0.0857	20	70-130	85-115	90-110	90-110
	Copper		2.0	0.77	20	70-130	85-115	90-110	90-110
	Lead		1.0	0.0521	20	70-130	85-115	90-110	90-110
	Manganese		1.0	0.123	20	70-130	85-115	90-110	90-110
	Molybdenum		--	0.067	20	70-130	85-115	90-110	90-110
	Nickel		1.0	0.281	20	70-130	85-115	90-110	90-110
	Selenium		5.0	0.307	20	70-130	85-115	90-110	90-110
	Silver		1.0	0.0452	20	70-130	85-115	90-110	90-110
	Thallium		1.0	0.0424	20	70-130	85-115	90-110	90-110
	Vanadium		1.0	0.0996	20	70-130	85-115	90-110	90-110
Zinc	2.0	0.63	20	70-130	85-115	90-110	90-110		

LL Low Level Analysis

C of A Certificate of Analysis QC Limits Provided per manufacturer.

**APPENDIX D**  
**DATA QUALIFIERS**

March 29, 2006



## ORGANIC QUALIFIERS

- U - Indicates compound was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture.
- J - Indicates an estimated value. The flag is used either when estimating a concentration for tentatively identified compounds, or when the data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit and greater than the MDL. This flag is also used for DoD instead of "P" as indicated below.
- N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search.
- P - This flag is used for a pesticide/Aroclor target analyte when there is a greater than 40% (25% for CLP) difference for detected concentrations between the two GC columns. The concentration is reported on the Form I and flagged with a "P" ("J" for DoD).
- Q - for DoD only – indicates a pesticide/Aroclor target is not confirmed. This flag is used when there is  $\geq 100\%$  difference for the detected concentrations between the two GC columns.
- C - This flag applies to pesticide results where the identification has been confirmed by GC/MS.
- B - This flag is used when the analyte is found in the associated blank as well as in the sample.
- E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
- D - This flag identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is re-analyzed at a higher dilution factor, as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and ALL concentration values reported on that Form I are flagged with the "D" flag.
- A - This flag indicates that a TIC is a suspected aldol-condensation product.
- X - As specified in Case Narrative.
- \* - This flag identifies compounds associated with a quality control parameter which exceeds laboratory limits.

### **CAS/Rochester Lab ID # for State Certifications**

NELAP Accredited  
Delaware Accredited  
Connecticut ID # PH0556  
Florida ID # E87674  
Illinois ID #200047  
Maine ID #NY0032  
Massachusetts ID # M-NY032  
Navy Facilities Engineering Service Center Approved

Nebraska Accredited  
New Jersey ID # NY004  
New York ID # I0145  
New Hampshire ID # 294100 A/B  
Pennsylvania ID# 68-786  
Rhode Island ID # 158  
West Virginia ID # 292



## INORGANIC QUALIFIERS

### C (Concentration) qualifier –

- B - if the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but was greater than or equal to the Instrument Detection Limit (IDL). This qualifier may also be used to indicate that there was contamination above the reporting limit in the associated blank. See Narrative for details.
- U - if the analyte was analyzed for, but not detected

### Q qualifier - Specified entries and their meanings are as follows:

- D - Spike was diluted out
- E - The reported value is estimated because the serial dilution did not meet criteria.
- J - Estimated Value
- M - Duplicate injection precision not met.
- N - Spiked sample recovery not within control limits.
- S - The reported value was determined by the Method of Standard Additions (MSA).
- W - Post-digestion spike for Furnace AA Analysis is out of control limits (85-115), while sample absorbance is less than 50% of spike absorbance.
- \* - Duplicate analysis not within control limits.
- + - Correlation coefficient for the MSA is less than 0.995.

### M (Method) qualifier:

- "P" for ICP
- "A" for Flame AA
- "F" for Furnace AA
- "PM" for ICP when Microwave Digestion is used
- "AM" for Flame AA when Microwave Digestion is used
- "FM" for Furnace M when Microwave Digestion is used
- "CV" for Manual Cold Vapor AA
- "AV" for Automated Cold Vapor AA
- "AF" for Automated Cold Vapor Atomic Fluorescence Spectrometry
- "CA" for Midi-Distillation Spectrophotometric
- "AS" for Semi-Automated Spectrophotometric
- "C" for Manual Spectrophotometric
- "T" for Titrimetric
- " " where no data has been entered
- "NR" if the analyte is not required to be analyzed.

### CAS/Rochester Lab ID # for State Certifications

NELAP Accredited  
Delaware Accredited  
Connecticut ID # PH0556  
Florida ID # E87674  
Illinois ID #200047  
Maine ID #NY0032  
Massachusetts ID # M-NY032  
Navy Facilities Engineering Service Center Approved

Nebraska Accredited  
New Jersey ID # NY004  
New York ID # 10145  
New Hampshire ID # 294100 A/B  
Pennsylvania ID # 68-786  
Rhode Island ID # 158  
West Virginia ID # 292

**APPENDIX E**  
**PREVENTIVE MAINTENANCE PROCEDURES**

March 29, 2006

### Preventive Maintenance Procedures

Instrument	Activity	Frequency
Refrigerators and Coolers	Record temperatures	Daily
	Clean coils	As needed
	Check coolant	As needed or if temperature outside limit
Fume Hoods	Face velocity measured	Quarterly
	Sash operation	As needed
Ovens	Clean	As needed or if temperature outside limit
Incubators	Record temperatures	Daily, morning and evening
Water Baths	Wash with disinfectant solution	When water is murky, dirty, or growth appears
Autoclave	Check temperature	Every month
	Clean	When mold or growth appears
Top Loading Balances	Check calibration	Before every use
Analytical Balances	Check alignment	Before every use
	Check calibration	Before every use
	Clean pans and compartment	After every use
Dissolved Oxygen Meter	Change membrane	When fluctuations occur
pH probes	Condition probe	When fluctuations occur
UV-visible Spectrophotometer	Wavelength check	Annually
Total Organic Carbon Analyzers	Check IR zero	Weekly
	Check digestion/condensation vessels	Each use
	Clean digestion chamber	Every 2000 hours, or as needed
	Clean permeation tube	Every 2000 hours, or as needed
	Clean six-port valves	Every 200 - 2000 hours, or as needed
	Clean sample pump	Every 200 - 2000 hours, or as needed
	Clean carbon scrubber	Every 200 - 2000 hours, or as needed
Clean IR cell	Every 2000 - 4000 hours, or as needed	
Total Organic Halogen Analyzers	Change cell electrolyte	Daily, or as needed
	Change electrode fluids	Daily, or as needed
	Change pyrolysis tube	As needed
	Change inlet and outlet tubes	As needed
	Change electrodes	As needed
Flow Injection Analyzer	Check valve flares	Monthly
	Check valve ports	Monthly
	Check pump tubing	Daily
	Check flow cell flares	Quarterly
	Change bulb	Every six months
	Check manifold tubing	Every six months
	Check T's and connectors	Every six months

### Preventive Maintenance Procedures

Instrument	Activity	Frequency
Ion Chromatograph	Change column bed supports	Monthly or as needed
	Clean column	Monthly or as needed
	Change column	Every six months or as needed
	Change valve port face & hex nut	Every six months or as needed
	Clean valve slider	Every six months or as needed
	Change tubing	Annually or as needed
	Eluent pump	Annually
Atomic Absorption Spectrophotometers - FAA and CVAA	Check gases	Daily
	Clean burner head	Daily
	Check aspiration tubing	Daily
	Clean optics	Every three months
	Empty waste container	Weekly
Atomic Absorption Spectrophotometers - GFAA	Check gases	Daily
	Check argon dewar	Daily, or as needed
	Change graphite tube	Daily, or as needed
	Clean furnace windows	Monthly
ICP	Check argon dewar	Daily
	Replace peristaltic pump tubing	Daily, or as needed
	Empty waste container	Daily, or as needed
	Clean nebulizer, spray chamber, and torch	Every two weeks, or as needed
	Replace water filter	Quarterly
	Replace vacuum air filters	Monthly
Infrared Spectrophotometer, Fourier Transform	Clean sample cells	Daily, or as needed
Gel-Permeation Chromatographs	Clean and repack column	As needed
	Backflush valves	As needed
Gas Chromatographs, Semivolatiles	Check gas supplies	Daily, replace when pressure reaches 250 psi
	Change in-line filters	Quarterly or after 30 tanks of gas
	Change injection port liner	Daily or as needed
	Clip first foot of capillary column	As needed
	Change guard column	As needed
	Replace analytical column	As needed when peak resolution fails
	Check system for gas leaks	After changing columns
	Clean FID	As needed
Leak test ECD	Annually	

Preventive Maintenance Procedures

Instrument	Activity	Frequency
Gas Chromatograph/Mass Spectrometers, Semivolatiles	Check gas supplies	Daily, replace when pressure reaches 50 psi
	Change in-line filters	Quarterly or after 30 tanks of gas
	Change septum	Daily
	Change injection port liner	Weekly or as needed
	Clip first foot of capillary column	As needed
	Change guard column	As needed
	Replace analytical column	As needed when peak resolution fails
	Clean jet separator	As needed
	Clean source	As needed when tuning problems
	Change pump oil	Every six months
Purge and Trap Concentrators	Oil wick	Every six months
	Change trap	As needed
	Change transfer lines	As needed
Gas Chromatographs, Volatiles	Clean purge vessel	Daily
	Check gas supplies	Daily, replace when pressure reaches 200 psi
	Change in-line filters	Quarterly or after 30 tanks of gas
	Change septum	As needed
	Clip first foot of capillary column	As needed
	Change guard column	As needed
	Replace analytical column	As needed when peak resolution fails
	Check system for gas leaks	After changing columns or as needed
	Replenish ELCD solvents	Weekly
	Clean PID lamp	As needed
Clean FID	As needed	
Gas Chromatograph/Mass Spectrometers, Volatiles	Change ion exchange resin	Quarterly
	Replace nickel tubing	Quarterly or as needed
	Check gas supplies	Weekly, replace when pressure reaches 200 psi
	Change in-line filters	Quarterly or after 30 tanks of gas
	Change septum	Daily
	Clip first foot of capillary column	As needed
	Change guard column	As needed
	Replace analytical column	As needed when peak resolution fails
	Clean jet separator	As needed
	Clean source	As needed when tuning problems
Change pump oil	Every six months per HP	
Oil wick	Every six months per HP	

### Preventive Maintenance Procedures

Instrument	Activity	Frequency
HPLC	Check gas supplies	Daily, replace when pressure reaches 200 psi
	Change guard column	As needed
	Change analytical column	As needed
	Change inlet filters	As needed
TCLP/SPLP Extractors	Monitor Room Temperature	Daily
	Monitor RPM of Rotators	Bi-weekly
	Grease fittings	As needed
	O-ring replacement	As needed

# **APPENDIX F**

## **CERTIFICATIONS/ACCREDITATIONS/CONTRACTS**

## CAS/Rochester Certifications/Accreditations/Contracts

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### Federal and National Programs

- NELAP Accreditation, since January 2001.  
Primary Accreditation with New York and Florida (see below).  
Secondary Accreditation with Florida, New Jersey, New Hampshire, Pennsylvania and Illinois (see below).
- NYS DEC Analytical Services Protocol Organic and Inorganic Contract (current).
- Naval Facilities Engineering Service Center (NFESC), Approved. Expires 11/15/2007.

### State and Local Programs

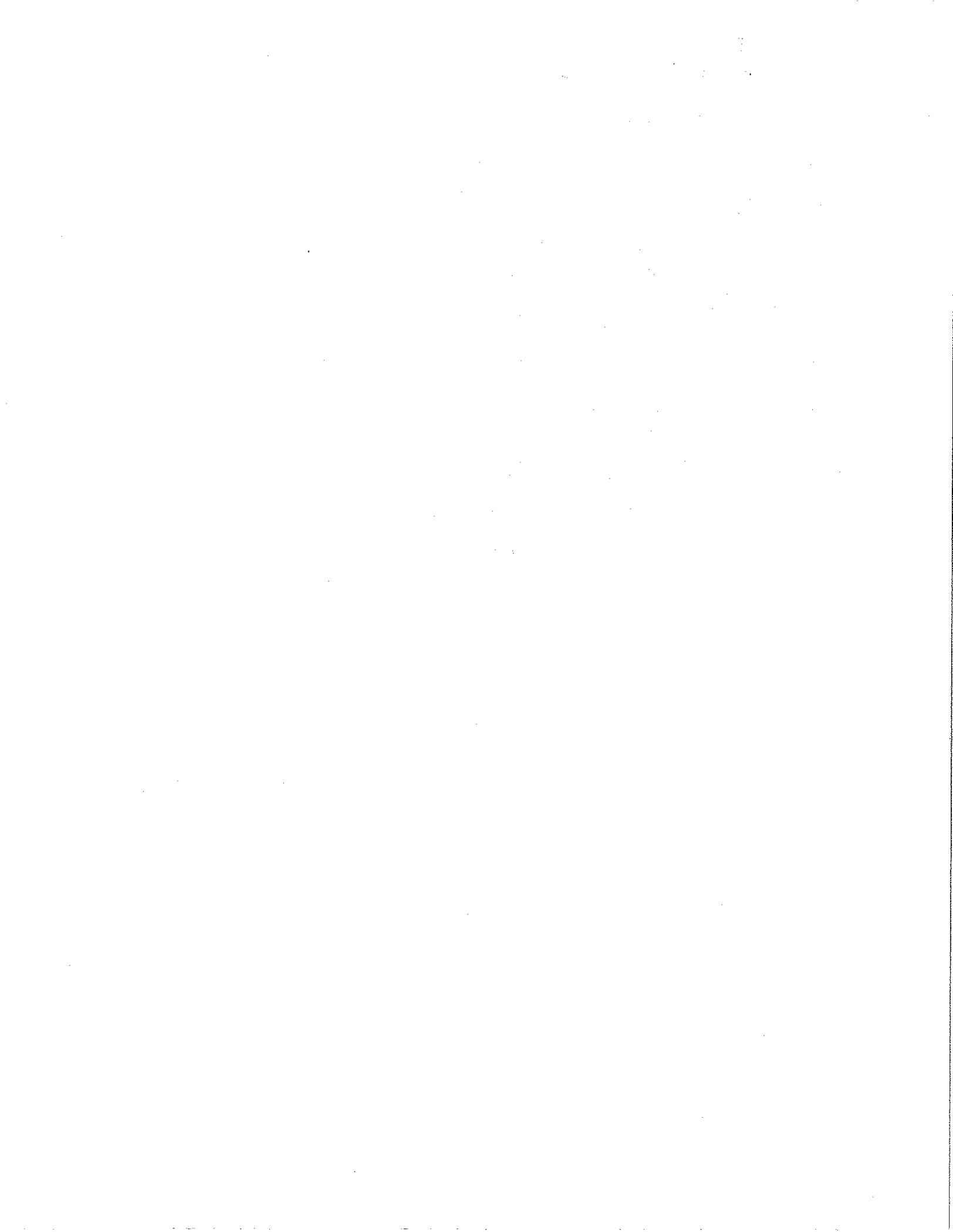
- State of Connecticut, Department of Health Services, Approved Public Health Laboratory.  
Certified Laboratory for Potable Water, Waste Water, Solid Waste and Soil.  
Examination for Inorganic Chemicals and Organic Chemicals. Registration No. PH-0556.  
Exp. 06/30/2008.
- The Commonwealth of Massachusetts, Department of Environmental Protection  
Certified Laboratory for Potable Water and Non-Potable Water  
Certification No. M-NY032. Exp. 06/30/2008.
- State of New Jersey, Department of Environmental Protection  
State Certified Environmental Laboratory for Drinking Water and Water Pollution.  
Certification No. NY004. Exp. 06/30/2008.
- State of New York, Department of Health, Environmental Laboratory Approval Program.  
Potable Water, Non-Potable Water, Solid and Hazardous Waste, and ASP Certification.  
Certification No. 10145. Exp. 04/01/2008.
- State of New Hampshire, Department of Environmental Services  
Full Certification for Non-Potable Water. Certification No. 294102. Exp. 10/14/2007.
- State of Rhode Island, Department of Health  
Approved for Surface Water, WasteWater, and Sewage. License No. 158. Exp. 12/30/2007.
- West Virginia Division of Environmental Protection  
Certification for TCL/TAL, GRO, DRO, and TPH parameters in WasteWater and Solid Hazardous Waste.  
Certification No.292 Call Dan Arnold 304-926-0499 for confirmation of accreditation.
- State of Delaware, Department of Natural Resources and Environmental Control. Approved for Delaware  
Hazardous Substance Cleanup Act.
- State of Florida, Department of Health.  
Drinking water, Wastewater, Solid Hazardous Waste, CLP. Certification No. E87674. Expires 06/30/2008.
- Pennsylvania Department of Environmental Protection.  
Non-Potable Water and Solid and Chemical Materials. Lab ID No. 68-00786. Expires 6/30/2008.
- State of Illinois, Environmental Protection Agency.  
Inorganic and Organic Hazardous and Solid Waste. Certification No. 200047. Expires 11/17/2007.
- State of Maine, Department of Health and Human Services.  
Drinking Water and Wastewater. Certification No. NY0032. Expires 11/12/2008.

## CAS/Rochester Certifications/Accreditations/Contracts

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### Unregulated State Programs

- State of Minnesota  
Reciprocal Certification for all parameters certified under New York State.
- State of Georgia Environmental Protection Division  
Reciprocal Approval for Non-Potable/Environmental Waters and Wastes.
- State of Indiana Hazardous Waste Division  
Reciprocal Approval for Non-Potable/Environmental Waters and Wastes.
- State of Michigan - Reciprocal Approval for Non-Potable/Environmental Waters and Wastes.
- Commonwealth of Pennsylvania, Department of Environmental Resources  
Reciprocal Approval for Non-Potable/Environmental Waters and Wastes.  
PA Registration Number 68-786
- Commonwealth of Virginia, Department of General Services  
Reciprocal Approval for Non-Potable/Environmental Waters and Wastes.
- State of Mississippi - Reciprocal Approval for Non-Potable/Environmental Waters and Wastes.
- State of Maryland - Reciprocal Approval for Non-Potable/Environmental Waters and Wastes.



STANDARD OPERATING PROCEDURE

for

**VOLATILE ORGANIC COMPOUNDS IN AIR SAMPLES COLLECTED IN  
SPECIALLY PREPARED CANISTERS AND GAS COLLECTION BAGS BY  
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)**

SOP Code: VOC-TO15

Revision: 0

June 16, 2006

Approved by: \_\_\_\_\_  
Supervisor

\_\_\_\_\_  
Date

\_\_\_\_\_  
Quality Assurance Program Manager

\_\_\_\_\_  
Date

\_\_\_\_\_  
Laboratory Manager

\_\_\_\_\_  
Date

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1 Mustard Street, Suite 250  
Rochester, NY 14609-6925

Annual review of this SOP has been performed and  
the SOP still reflects current practice.

Initials: \_\_\_\_\_ Date: \_\_\_\_\_  
Initials: \_\_\_\_\_ Date: \_\_\_\_\_  
Initials: \_\_\_\_\_ Date: \_\_\_\_\_

DOCUMENT CONTROL

NUMBER: \_\_\_\_\_  
INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_  
EFFECTIVE DATE: \_\_\_\_\_

## 1. SCOPE AND APPLICATION

- 1.1. This SOP uses EPA Compendium Methods TO-15 and TO-14A to quantify a wide range of volatile organic compounds (VOCs) in gaseous matrices collected in gas collection bags (method modification) and specially prepared stainless steel canisters. This method typically applies to ambient concentrations of VOCs 0.5ppbv and above and typically requires VOC enrichment by concentrating up to one liter of a sample volume, with a virtually unlimited upper concentration range using dilutions from source level samples.
- 1.2. Table 2 lists compounds that can be determined by this procedure along with their method reporting limits (MRLs). The reported MRL may be adjusted higher; however, the capability of achieving lower MRLs for specific project requirements must be thoroughly demonstrated and documented. Additional compounds may be analyzed according to this procedure as described in the referenced methods as long as the requirements of this document are adhered to; however, if a compound is not listed in the TO-15 method, it should be reported as a modification. The number of samples that may be analyzed in a 24-hour period is about twenty. The number of sample results that may be reduced in an eight-hour day is approximately twenty.

## 2. METHOD SUMMARY

- 2.1. The analytical method involves using a high-resolution gas chromatograph (GC) coupled to a mass spectrometer (MS). The GC/MS utilizes a linear quadrupole system, which allows for it to be operated by continuously scanning a wide range of mass to charge ratios (SCAN mode) or by Select Ion Monitoring mode (SIM), which consists of monitoring a small number of ions from a specified compound list. At this time, the laboratory only operates in SCAN mode.
- 2.2. An aliquot of an air sample is concentrated on a solid adsorbent trap (either cryogenically cooled glass beads or stronger adsorbents at higher temperatures) to collect the analytes of interest. To remove co-collected water vapor, the concentrated sample then goes through a water removal (dry purge) step, during which the sample is transferred to a second cryogenically cooled trap to remove carbon dioxide. The trap is heated and the VOCs are thermally desorbed onto a refocusing cold trap. The VOCs are then thermally desorbed onto the head of a capillary column once the cold trap is heated. The oven temperature (programmed) increases and the VOCs elute and are detected by the mass spectrometer. Mass spectra for individual peaks in the total ion chromatogram are examined with respect to the fragmentation pattern of ions corresponding to various VOCs including the intensity of primary and secondary ions. The fragmentation pattern is compared with stored spectra taken under similar conditions, in order to identify the compound. For any given compound, the intensity of the primary fragment is compared with the system response to the primary fragment for known amounts of the compound and this establishes the compound concentration that exists in the sample.

### 3. DEFINITIONS

- 3.1. **Cryogen** - A refrigerant used to obtain sub-ambient temperatures in the VOC concentrator and/or on front of the analytical column. Liquid nitrogen (cryogen) is used for this purpose and it has a boiling point of  $-195.8^{\circ}\text{C}$ .
- 3.2. **Gauge Pressure** - Pressure measure with reference to the surrounding atmospheric pressure, usually expressed in units of psi. Zero gauge pressure is equal to atmospheric (barometric) pressure.
- 3.3. **Canisters** - specially prepared, leak-free, stainless steel pressure vessel (with valve) of desired volume (e.g., 6L)
- 3.4. **Sample collection bags** - Tedlar™ or equivalent
- 3.5. **MS-SCAN** - Mass spectrometric mode of operation in which the gas chromatograph (GC) is coupled to a mass spectrometer (MS) programmed to SCAN all ions repeatedly over a specified mass range.
- 3.6. **Neat Stock Standard** - A purchased, single component assayed reference material having a stated purity used to prepare working calibration standards.
- 3.7. **Initial Calibration Verification (ICV) Standard** - A solution prepared in the laboratory containing known concentration(s) of analytes of interest. The solution is prepared from neat stock standards and/or stock standards solutions which are from a different source than the standards used to prepare the working calibration standards to verify the calibration curve.
- 3.8. **Continuing Calibration Verification (CCV) Standard** - A working calibration standard which is analyzed at specific intervals in order to verify that the instrument continues to meet the calibration criteria.
- 3.9. **Field Sample** - A sample collected and delivered to the laboratory for analysis.
- 3.10. **QA/QC Samples**: Samples added to a sample preparation batch, or an analytical batch to provide quality assurance checks on the analysis.
- 3.10.1. **Laboratory Control Sample (LCS)** - also called **Audit Standard in TO-15** - a blank sample spiked with compounds representative of the target analytes. This is used to document laboratory performance.
- 3.10.2. **Laboratory Duplicates (DUP)**- Two aliquots of the same sample taken in the laboratory and analyzed separately with identical procedures. Analyses of duplicate sample

indicates precision associated with laboratory procedures, but not with sample collection, preservation, or storage procedures.

- 3.10.3. **Method Blank (MB)** - an analyte-free matrix (Zero-grade air) carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.
- 3.11. **Internal Standard Calibration** - Compares the instrument responses from the target compound in the sample to the responses of specific standards (called internal standards – not expected to be found in the samples), which are added to the sample or sample preparation prior to analysis. The ratio of the peak area (or height) of the target compound in the sample or sample preparation is compared to a similar ratio derived for each calibration standard.
- 3.12. **Surrogate** - an organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process. Surrogate compounds are added to every blank, sample, LCS, and standard. These are used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in environmental media
- 3.13. **Dynamic Dilution** – means of preparing calibration mixtures in which standard gases from pressurized cylinders are continuously blended with humidified zero air in a manifold so that a flowing stream of calibration mixture is available at the inlet of the analytical system.
- 3.14. **Percent Drift or Difference (%D)** - Used to compare two values, the percent difference indicates both the direction and the magnitude of the comparison, i.e., the percent difference may be either negative, positive, or zero. (In contrast, see relative percent difference).
- 3.15. **% Relative Standard Deviation (%RSD)**: statistical measure of variation. Used in this method to measure the relative variation of initial calibration standards. Calculated by dividing the standard deviation of the individual calibration factors by the average calibration factor and multiplying by 100 to express as a percentage
- 3.16. **Relative Percent Difference (RPD)** – The absolute value of the difference of two values divided by the average of the same two values. Used to compare the precision of the analysis. The result is always a positive number.
- 3.17. **Batch** - Samples processed together as a unit, not to exceed 20 investigative samples. See ADM-BATCH for further discussion.
- 3.18. **Method Detection Limit (MDL)**: a statistically derived value representing the lowest level of target analyte that may be measured by the instrument with 99% confidence that the value is greater than zero. MDL may also be called LoD (Limit of Detection).

- 3.19. **Method Reporting Limit (MRL):** The minimum amount of a target analyte that can be measured and reported quantitatively. The MRL is equivalent to Practical Quantitation Level (PQL) and Estimated Quantitation Level (EQL) or Limit of Quantitation (LoQ). Typically, the MRL is calculated as five times the MDL (although this is a rule of thumb and not intended to be a strict policy of establishing the MRL for a compound).

#### 4. INTERFERENCES

- 4.1. **Summa Canisters** - Canisters shall be stored in a contaminant free location and shall be capped tightly during shipment to prevent leakage and minimize any compromise of the sample. The pressure/vacuum is checked prior to shipment and upon receipt from the field. Any problems with the sample from the field are noted on the chain of custody and the Project Manager contacted. Canisters must be cleaned and certified to be free from target analytes before being shipped to the field for sample collection.
- 4.2. **Analytical System** - The analytical system must be demonstrated to be free from contamination under the conditions of the analysis by running humidified zero air blanks. The use of non-chromatographic grade stainless steel tubing, non-PTFE thread sealants, or flow controllers with buna-N rubber components must be avoided.
- 4.3. **Carbon Dioxide** - Excessive levels of carbon dioxide present in a sample may interfere with analysis by freezing up the cryogenic trap. A smaller aliquot must be analyzed to eliminate this problem, or the sample should be analyzed using the higher temperature multi-adsorbent trapping technique which allows carbon dioxide to pass.
- 4.4. **Gas Collection Bags** - This procedure covers the use of gas collection vessels such as Tedlar® or Mylar® bags. However, due to the nature of these types of bags it is not recommended that clients use this option for ambient air samples. Sample collection bags made out of ®Tedlar have contaminants that are inherent to the manufacturing process. The two main contaminants are phenol and N,N-Dimethylacetamide. However, this only becomes a problem when the concentration levels in the sample are low ppbv such as ambient air monitoring samples where more of the sample usually has to be concentrated and analyzed. To minimize the loss of sample integrity, a 72-hour hold time has been incorporated into the procedure.
- 4.5. **Glassware** - Interferences caused by contaminants in solvents, reagents, glassware, and other sample processing hardware results in discrete artifacts and/or elevated baselines in the detector profiles should be minimized. All glassware associated with this method must be scrupulously cleaned to avoid possible contamination. The use of high purity water, reagents, and solvents helps to minimize these problems.
- 4.6. Contamination by carryover can occur when high level samples immediately precede samples containing significantly lower levels of contamination. Pay close attention to samples which follow high level samples. Re-analyze if contamination is suspected.

## 5. SAFETY

- 5.1. Chemicals, reagents and standards must be handled as described in the CAS safety policies, approved methods and in MSDSs where available. Refer to the CAS Environmental, Health and Safety Manual and the appropriate MSDS prior to beginning this method.
- 5.2. Each compound, mixture of compounds, standards, and surrogates, as well as samples, should be treated as a potential health hazard. Exposure to these chemicals should be reduced to the lowest level possible through the use of gloves (to minimize absorption through the skin) and hoods (to minimize inhalation). Refer to the laboratory's Environmental, Health and Safety Manual as it makes reference to the safe handling of chemicals, MSDS location, and the laboratory waste management plan for the safe disposal of chemicals and samples.
- 5.3. **Material Safety Data Sheets (MSDS)** - The analyst should consult MSDS for compounds being handled in the course of this procedure, and be familiar with proper safety precautions to be followed when handling hazardous chemicals. Care should be taken when handling standard material in a neat or highly concentrated form.
- 5.4. **Liquid Nitrogen** - Liquid nitrogen can cause serious tissue damage (frostbite) with only a few seconds of contact. The valves on the cryogen dewars should be opened slowly so leaky fittings can be identified. Neoprene or leather gloves should be worn when turning valves and handling tubing and fittings that have been in contact with the cryogen.
- 5.5. **Protective Clothing** - Personal protective clothing (safety glasses, gloves and lab coat) are required when preparing standards and handling standard material in neat form.
- 5.6. **Pressurized Gases** - The use of pressurized gases is required for this procedure. Care should be taken when moving cylinders. All gas cylinders must be secured to a wall or an immovable counter with a chain or a cylinder clamp when not in use. Sources of flammable gases (i.e. pressurized hydrogen) should be clearly labeled.
- 5.7. **Syringes** - The proper use of syringes should be part of employee training for this SOP. Care should be taken to avoid personal injury as a result of improper handling techniques.
- 5.8. Refer to the Safety Manual for further discussion of general safety procedures and information.

## 6. SAMPLE COLLECTION, CONTAINERS, PRESERVATION, AND STORAGE

- 6.1. Air samples are collected in the field and delivered to the laboratory and shall be collected in either a specially prepared, leak-free, stainless steel pressure vessel (with valve) of desired volume (e.g., 6L) or a sample collection bag. Canister samples may either be grab or time integrated using a variable flow controller utilizing the canister vacuum to draw the sample. Bags require the use of an upstream pump or a "lung machine."
- 6.2. There are no special preservation requirements for either canisters or bags. However, bags should be stored in appropriately labeled boxes or by hanging them from clips to prevent puncture or other deterioration. Canisters should be stored on the appropriate shelves until they are to be analyzed.
- 6.3. Sample collection bags must be analyzed within 72 hours from confirmed time of sampling. Canisters do not have specific holding times; however, samples received by the laboratory shall be analyzed within 30 days of sampling or sooner if project specific requirements dictate.
- 6.4. Optional: Sample volume from a tedlar bag may be injected into a certified clean canister to maintain sample integrity and extend holding time to 30 days from the original sample collection, if necessary. Canisters may also be used in making sample dilutions.

## 7. APPARATUS AND EQUIPMENT

- 7.1. See Appendix A of the Quality Assurance Manual for configuration of specific components, serial numbers and receipt of the major components of the instrument(s).
- 7.2. **Gas Chromatograph (GC)** - Hewlett Packard 6890 Series or equivalent - An instrument capable of temperature programming, with a column oven that may be cooled to subambient temperature at the start of the gas chromatographic run to result in the resolution of the VOCs.
- 7.3. **Autosampler**  
  
Entech Instruments 7100 Preconcentrator  
Entech Instruments 7016CA Autosampler  
KNF Diaphragm Vacuum Pump or equivalent
- 7.4. **Mass Spectrometer (MS)** - Hewlett Packard 5973 Series Mass Selective Detector or equivalent- A MS capable of scanning from 34 to 350 amu every second or less, using 70 volts (nominal) electron energy in the electron impact ionization mode. The mass spectrometer must be capable of producing a mass spectrum for Bromofluorobenzene (BFB) which meets all of the criteria when 50ng or less of BFB is injected onto the GC/MS system.

7.5. **Ionization Gauge Controller** - Hewlett Packard 59864B Ionization Gauge Controller or equivalent.

7.6. **Analytical Column** - Any analytical column capable of separating the compounds of interest may be used. The capillary column should be directly coupled to the source of the mass spectrometer. The following are suggested columns; an alternative column may be used as long as sufficient peak resolution and separation is achieved.

Column:

Restek RTX-1 Fused Silica Capillary Column

60m x 0.32mm ID

1.5 micron film thickness

7.7. **Data Systems** - IBM-compatible PC with Windows 95/98/NT and Hewlett Packard Chemstation software including EnviroQuant with Extracted Ion Current Profile (EICP), National Institute of Standards and Technology (NIST) library or equivalent.

7.8. **Canister Pressurization Station** - Vacuum/Pressure Gauge [0 to -30 inHg; 0-100 psig]

7.9. **Canister Sampling Devices** - Critical Orifices and Flow Controllers –either laboratory manufactured or purchased.

7.10. **Gas Collection Devices** –

- 6.0L Summa Passivated Canisters or equivalent
- Restek Corporation, 6.0L Silco Canisters or equivalent
- Tedlar bags – 0.5L, 1L, 3L, 5L, 10L, 25L, and 40L (other sizes are available; however, the volumes that are listed encompass the majority of the bags supplied and the samples submitted to the laboratory.

7.11. **Dynamic Dilution System** - Custom assembled dilution system consisting of:

- MKS Instruments, 1359C series Mass Flow Controllers of various ranges
- MKS Instruments, 247C Digital Display
- Digital Vacuum/Pressure Gauge [0 to -30 inHg; 0-100 psig]
- Stainless Steel Humidification Vessel
- Miscellaneous regulators and valves

## 8. PREVENTIVE MAINTENANCE

A maintenance log will be kept documenting maintenance performed on each analytical system. The serial numbers of each instrument shall be recorded, and each log entry must include a description of the maintenance performed and be initialed by the analyst performing or observing/authorizing maintenance by an outside contractor.

The instrument maintenance log must be kept current. An entry shall be made in the appropriate log every time maintenance is performed (no matter the extent). The entry in the log must include:

- the date of maintenance
- who did the maintenance
- description of the maintenance
- proof that the maintenance activity was successful.

A notation of a successful tune and continuing calibration or initial calibration and the file number that accompanies the data will serve as proof that the maintenance is complete and the instrument is in working order.

The extent of the maintenance is not important, however, it is important that a notation be included for each maintenance activity such as changing a column, tuning the instrument, changing the pump oil, cleaning the source, ordering a part. In addition, a notation should be made in the logbook stating that no samples were analyzed during the days that the instrument was down and no active maintenance was being conducted (i.e., where no other notation was made in the logbook for those days).

- 8.1. **Concentrating Trap** - Routine maintenance includes periodic solvent cleaning of the Silcosteel lines in the valve oven if contamination is suspected. Periodic replacement of the multi-sorbent or partial replacement of the trap is required if analyte specific deterioration is detected. After repacking the trap it should be baked for a minimum of two hours (until a clean blank is generated), whereas a partial repacking requires baking the trap for a minimum of 20 minutes (or until a clean blank is generated).

## 8.2. GC System

- 8.2.1. Column performance is monitored by observing both peak shapes and column bleed. Over time, the column will exhibit a poor overall performance, as contaminated sample matrices are analyzed. The length of time for this to occur will depend on the samples analyzed. When a noticeable decrease in column performance is evident and other maintenance options do not result in improvement, the column should be replaced. Whenever GC maintenance is performed, care should be taken to minimize the introduction of air or oxygen into the column.
  - 8.2.2. Clipping off a small portion of the head of the column often improves chromatographic performance. When cutting off any portion of the column, make sure the cut is straight and "clean" (uniform, without fragmentation) by using the proper column-cutting tool. When removing any major portion of the column, which will affect the retention times and elution characteristics, a change in instrument conditions may be required to facilitate nominal analytical activity.
  - 8.2.3. Performance can also be due to ineffective column ferrules, which should be replaced when a tight seal around the column is no longer possible. This can be detected with the use of a leak detector.
- 8.3. **Mass Spectrometer** - The Mass Selective Detector (MSD) ion source requires periodic cleaning to maintain proper performance. Symptoms of a dirty ion source include difficulty keeping the MSD in tune and fluctuating internal standard areas. The vacuum system should be serviced at a minimum of every twelve months, including changing the pump oil and checking the molecular sieve in the backstreaming trap.
- 8.4. **Instrument Tuning** - The instrument is tuned with guidance from the procedure described in the HP Operations Manual, when necessary. The tune shall meet the tune criteria described in this document.

## 9. STANDARDS, REAGENTS, EQUIPMENT, AND CONSUMABLE MATERIALS

### 9.1. Reagents and Equipment

- 9.1.1. UHP Grade Helium (99.999%)(GC carrier gas and preconcentrator purge/sweep gas)
- 9.1.2. Cryogen - Liquid nitrogen in 50 psi dewars (used to cool preconcentrator traps)
- 9.1.3. UHP/Zero Grade Air
- 9.1.4. UHP/Zero Grade Nitrogen
- 9.1.5. ASTM Type II Water or equivalent
- 9.1.6. Dynamic Dilution system

## 9.2. Standards

### 9.2.1. General Information and Disclaimers

- 9.2.1.1. EPA Method TO-15 and Appendix A provide guides for preparing standards from neat chemicals. Neat standards that are used for making trace gas standards must be of high purity; generally a purity of 98 percent or better is commercially available. At this time, this lab does not use the Static Dilution Bottle technique. A modified version of the high-pressure cylinder technique is used (see Appendix A). A canister is used in place of the high-pressure cylinder and final pressures are reduced to less than 40 psi. Standards are purchased as mixes or prepared as mixes by Columbia Analytical Services in Simi Valley, CA. Any additional compounds to be added to these mixes are added by syringe during dilution.
- 9.2.1.2. Vendors and vendors' products are sometimes listed for the ease of the analyst using this SOP, but products and purchased concentrations are examples only and subject to change at any time. All purchased standards are certified by the vendor. Certificates of Analysis are kept in the department until the standards are no longer being used – at which time they are filed with QA. Certificates of Analysis are available upon request. Purchased standards are routinely checked against an independent source for both analyte identification and analyte concentration.
- 9.2.1.3. The initial calibration curves given are typical, but also subject to variation due to targets and detection levels needed. The curves will always be at least 5 points. The lowest concentration level shall be at the method reporting level. The remaining levels should define the working linear range of the analytical system. Any other standard concentrations listed may be changed at any time.
- 9.2.1.4. All Standards must be traceable using the CAS lot system (ADM-DATANTRY).
- 9.2.2. Instrument Performance Check, Internal Standard and Surrogate Spiking Mixture (also known as Monitoring Standard) - p-Bromofluorobenzene (BFB-used as both a tune check and surrogate compound), bromochloromethane, chlorobenzene-d5, and 1,4-difluorobenzene in humidified zero air.
- 9.2.2.1. An Intermediate Monitoring Standard is prepared from neat compounds in a canister. After the volume of the canister is determined, calculate the mass of each compound to be spiked to achieve the final concentration. Then use the density of each neat compound to calculate the microliter amount to be spiked into the canister. Heat the injection area and inject the compounds while

pressurizing the canister with zero nitrogen. Allow the contents to equilibrate for approximately 24 hours before using.

- 9.2.2.2. The amount required to achieve the desired concentration is determined through the use of the following equation.

$$A = \frac{C * M * V}{D * 24.46}$$

Where:

- A Amount of each compound required to achieve the desired concentration of the standard in the SDB ( $\mu\text{L}$ )  
 C Desired concentration of SDB (ppmv)  
 M Molecular weight of the compound (g/mole)  
 V Actual volume of the SDB (L)  
 D Density of the compound in question ( $\mu\text{g}/\mu\text{L}$ )  
 24.46 is the molar volume of an ideal gas (l/mol) at 298 K (25 °C) and 760 mmHg (1 atm).

Example:

Calculate the amount of neat bromochloromethane needed to achieve the final concentration of 500ppmv of that compound in a 6L canister pressurized to 29.4 psi.

$$V = 18\text{L}$$

$$D = 1934.4\mu\text{g}/\mu\text{L}$$

$$C = 500\text{ppmv}$$

$$A = \frac{(500\text{ppmv})(129.38\text{g / mole})(18\text{L})}{1934.4 \frac{\mu\text{g}}{\mu\text{L}} * 24.46 \frac{\text{L}}{\text{mole}}} = 24.6\mu\text{L}$$

Molecular Weight (g/mole)	Density ( $\mu\text{g}/\mu\text{L}$ )	Compound
129.38	1934.4	Bromochloromethane
114.09	1170.1	1,4-Difluorobenzene
117.59	1157	Chlorobenzene-d5
175.00	1593	BFB

- 9.2.2.3. The Working Monitoring Standard is prepared in a Summa canister by spiking an aliquot of the Intermediate Stock Standard using a gastight syringe. Connect a cleaned, evacuated Summa canister to a source of pure diluent gas (humidified zero air) using a teflon line with a stainless steel tee directly above the canister valve. One port of the tee is fitted with a septum. Spike the intermediate stock through the septum and follow with a small flow of diluent gas to flush the spike into the can. Pressurize the can to the target pressure with humid zero air, and allow the contents to equilibrate for approximately 24 hours before using.

If the final pressure of the 15L canister is 14.7psig, the pressurized volume is 30L through the use of the following equation.

$$V_p = \frac{P_{atm} + P_f}{P_{atm} + P_i} (V)$$

Where:

$V_p$	Pressurized canister volume (L)
$P_f$	Final Canister Pressure
$P_i$	Initial Canister Pressure
$V$	Volume of canister @ 1atm
$P_{atm}$	Atmospheric Pressure = 14.7psig

Example:

$$\frac{14.7 + 14.7}{14.7 + 0} (15L) = 30L$$

To determine how much of the intermediate standard is required:

$$A = \frac{(F)(V_p)}{(C) \left( 1000 \frac{ppb}{ppm} \right)}$$

Where:

F	Desired concentration of working standard (ppb)
$V_p$	Pressurized Volume of receiving Canister (L)
C	Concentration of intermediate standard (ppm)
A	Amount of standard (mL) of the intermediate standard required to obtain the desired working standard concentration

Example: if a 25 ppb standard is desired and the concentration of the intermediate standard is 500 ppm, the amount to add to the 30L standard volume is 1.5 mL as shown:

$$A = \frac{(25 \text{ ppb})(30 \text{ L})(1000 \text{ mL/L})}{(500 \text{ ppm})(1000 \text{ ppb/ppm})} = 1.5 \text{ mL}$$

### 9.2.3. Initial Calibration (ICAL) Standard

9.2.3.1. The primary source calibration standard is purchased commercially as a mixture in a cylinder. This standard is diluted to the working standard concentration by the dynamic dilution technique. Compounds may be added individually during dilution to expand the compound list. A “cocktail” or “soup” may be made according to Attachment A and an intermediate standard prepared.

9.2.3.2. Intermediate Standard Preparation (Gaseous Compounds) If compounds need to be analyzed in addition to the existing list add them into an intermediate standard prepared in a Summa canister. After the volume of the Summa canister is determined, calculate the mass of each compound to be spiked to achieve a final concentration of 100ppm. Then use the molecular weight and density (Table 3) of each gaseous compound to calculate the microliter amount to be spiked into the Summa canister. The required spike volume of this intermediate standard, to be added during the dilution of the working standard, is calculated as in the previous example.

9.2.3.2.1. The microliter spike amount is determined by using the following equation.

$$S = \frac{C * V * M}{d * 24.46}$$

S Spike amount required in order to obtain the desired concentration (μl)

C Desired concentration (ppm)

V Final Volume of the pressurized Summa canister (L)

M Molecular Weight of the compound

d Density of the compound (ug/ul)

Molar Volume of gas at 25°C, 1atm

9.2.3.3. Working standards are prepared in Summa canisters using the Dynamic Diluter. Most compounds will be prepared at nominal concentrations of 0.5, 1.0, 2.0, 5.0, 10, 20, and 50 ppbv. The actual concentrations are documented in the 1CAL file. Turn on the power to the diluter one hour prior to using to allow for the components to come to thermal equilibrium. Zero all flow controllers without pressure applied prior to use. Connect Zero Air source to the humidification chamber (flow controller #1). Set the supply pressure to 20psi. Back purge standard flow controllers with humid air prior to use, when switching from one controller to another, and after the dilution of all standards is complete. Connect the stock standard cylinder or Summa canister to the appropriate flow controller depending upon the standard flow required. Open the valves. The inlet pressure of the standard regulator is set to 25psi. The backpressure regulator should be at a maximum of 10 psi. Purge each connection to minimize room air contamination and to deliver fresh standard to the flow controller. One or more working standards may be prepared depending on reporting limits and linear range.

9.2.3.3.1. Step 1: Determine the required flow rate of the stock standard. When choosing these flows, keep in mind that the flow rate range of the standard and diluent gas must be from 10% to 100% of the selected flow controller.

9.2.3.3.2. Step 2: Determine the required dilution factor for each stock.

$$\text{Dilution factor} = \text{Stock Conc. (ppb)} / \text{Desired Standard Conc. (ppb)}$$

9.2.3.3.3. Step 3: Calculate Total Flow

$$\text{Total Flow} = (\text{Sum of stock std. flows}) * (\text{Dilution Factor})$$

Choose stock flows that will give a total flow of less than 10000ml/min, since this would represent the maximum possible flow of diluent gas.

9.2.3.3.4. **Step 4:** Calculate Diluent Air Flow

Air Flow=Total Flow-(Sum of stock std. flows)

*Example:* Prepare a 10ppb working standard. The concentration of each stock standard is 1000ppb.

Choosing stock flows of 60ml/min,

$$DilutionFactor = \frac{1000\text{ppb}}{10\text{ppb}} = 100$$

Total Flow=60ml/min\*100 = 6000ml/min

Air Flow=6000ml/min-60ml/min = 5940ml/min

9.2.3.3.5. **Step 5:** Set the flow rates for each of the appropriate flow controllers. Start the air flow first and then the standard gas flow. Allow flows to equilibrate for at least five minutes or until a minimum of 20ml have passed through the standard gas flow controller. Attach an empty canister to the outlet port, allowing the standard gas to flush the connection. Close the manifold valve and note the pressure. Check the pressure gauge for fifteen seconds to make sure there is no leak. Reopen the manifold valve and slowly open the canister valve to avoid rapid pressure changes in the standard manifold.

9.2.3.3.6. **Step 6:** If additional components are to be added by syringe dilution, spike the calculated volume of intermediate standard through the septum port while the canister is filling

9.2.3.3.7. **Step 7:** Close the canister valve when the pressure reaches 10 psig. The back pressure regulator will open when it reaches 10 psig, so the canister will still be usable if the valve is not closed in time. Use the purchased stock concentrations to determine the final analyte concentrations in the standard.

9.2.4. Initial Calibration Verification (ICV) - (Laboratory Control Sample - LCS) This standard is prepared at Columbia Analytical Services in Simi Valley, CA from a secondary source standard (either a different manufacturer or different lot from the same manufacturer as the initial calibration standard) by dilution of a purchased cylinder mix. The ICV/LCS working standard should contain all of the target analytes in the calibration working standard. Differing injection volumes will account for differing concentrations. Most targets will be at a nominal concentration of 5 ppbv and the

monitoring compounds at 10 ppbv, though these concentrations may vary. The actual concentrations are documented.

9.2.5. Continuing Calibration Verification Standard The CCV is the same canister as the ICAL standard diluted to a concentration approximately midpoint of the ICAL.

9.2.6. Canister Quality Control Check and Method Blank  
Pressurize a cleaned canister with humidified zero grade air prior to analysis. Analyze an aliquot of one liter along with the same volume of internal standard and surrogate as standards and samples.

### 9.3. Storage and Expiration Dates

- Neat Stock Liquids – are stored @ -10°C to -20°C for a period of five years or as specified by the manufacturer.
- Purchased Stock Standards Cylinders must be stored at room temperature for a period of 2 years or as specified by the manufacturer.
- Prepared Stock / Intermediate Calibration Standards (ppm) prepared in canisters in a nitrogen matrix may be stored at laboratory conditions for up to twelve months in an atmosphere free of potential contaminants. This expiration time may be decreased for reactive components that are not typically available as purchased stock standards. Upon preparation, canister standards should be allowed to sit for approximately 24 hours prior to use in order for equilibration to take place. Shorter equilibration periods may be necessary and acceptable as long as performance criteria are met.
- Calibration or Working Calibration Standards prepared in canisters in a humidified air matrix may be stored at laboratory conditions for one month in an atmosphere free of potential contaminants. Upon preparation, canister standards should be allowed to sit for approximately 24 hours prior to use in order for equilibration to take place. Shorter equilibration periods may be necessary and acceptable as long as performance criteria are met.

## 10. RESPONSIBILITIES

It is the responsibility of the analyst to perform the analysis according to this SOP and to complete all documentation required for data review. Personnel in the laboratory who have demonstrated the ability to generate acceptable results utilizing this SOP may perform analysis, interpretation and peer review of the results. The supervisor/manager must also ensure that method proficiency is documented initially and whenever significant changes in the instrument type, personnel, matrix or test method are made. The department supervisor/manager or designee shall perform final review and sign-off of the data.

## 11. PROCEDURE

11.1. Be sure the system has a current MDL and the analyst has a current demonstration of capability.

### 11.2. Sample Preparation

11.2.1. The pressure/vacuum is checked and the canister pressurized as needed prior to analysis by the laboratory. Samples collected in canisters shall be pressurized with humidified zero grade air.

11.2.2. Canister Pressurization Samples may be pressurized to approximately 1.0psig up to approximately 3.5psig. If pressurization occurs, humidified zero air must be utilized. This may be accomplished by connecting the sample canister to a source of pure diluent gas (zero air) using a teflon line with a stainless steel tee directly above the canister valve. One port of the tee is fitted with a septum and injecting 100 $\mu$ L of water into the can through the septum and allowed to vaporize for approximately 10 minutes. Alternatively, pressurize at a fill station with humidified zero air. Both of these procedures shall utilize ASTM Type II water or equivalent.

11.2.3. Initial and final pressures are recorded on the back of the sample identification tag and in the run log. The dilution factor created by filling the sample canister is calculated using the equation in Section 13.

### 11.3. Screening

11.3.1. The analyst must screen a sample or subset of samples if the source is of unknown origin. Typically, if the source is known to be indoor or ambient outdoor air, no screening is necessary. However, if screening is required, inject a 1mL or smaller aliquot of each sample into a GC/flame ionization detector (FID) system that has been calibrated with a standard containing a subset of the target analytes. This subset represents the most commonly found compounds in air samples, such as acetone, trichloroethylene, and toluene. A single point calibration is sufficient.

11.3.2. Alternately a sample screen may be performed on the GC/MS system by injecting an aliquot of the sample into the GC/MS injection port while running a modified TO-15 method. The results shall be quantified by an external calibration method. A dilution factor will be calculated based on sample volume and split ratio. The results are to be used for screening purposes only.

11.3.3. Use the results to determine the maximum volume of sample to be analyzed by TO-15 by utilizing the following equation. Dilutions may be prepared as necessary.

$$I = \frac{C}{H}$$

Where:

- I Injection volume (mL)
- C Maximum calibration level (ppbv)
- H Compound screening concentration (ppbv)

*Example:* Select the compound with the highest concentration (toluene = 500ppbv). If the upper calibration level is 50 ppbv, then the following calculation determines the maximum injection volume to analyze, based upon a normal injection volume of 500mL.

$$\frac{50 \text{ ppbv}}{500 \text{ ppbv}} * 500 \text{ mL} = 50 \text{ mL maximum injection volume}$$

## 11.4. Analytical Sequence and Data System Setup

### 11.4.1. Data System

- 11.4.1.1. For the Entech 7100, fill in the sequence log of the SmartLab program with the appropriate information.
- 11.4.1.2. For the HP Chemstation, load the appropriate acquisition method for the GC/MS in the top window of the Chemstation program

#### 11.4.2. Analytical Sequence

- 11.4.2.1. For this internal standard calibration method analysis, a CCV standard is to be analyzed every 24 hours. That is, the last analysis in the sequence must be started within 24 hours from the time of the initiation of the sequence. The initiation is considered to be the injection of the BFB tune standard.
- 11.4.2.2. The analytical sequence must be completed for the analysis of  $\leq 20$  (19 samples including dilutions with one laboratory duplicate) field samples. A method blank (MB) shall be run to monitor for laboratory introduced contamination. There must be at a minimum a laboratory duplicate (DUP) analyzed in each batch to access batch precision. A laboratory control sample (LCS) shall be analyzed at a rate of at least one per batch of twenty or fewer samples. The concentration of the LCS (ICV standard) should be at the lower end of the calibration curve as an indication that the system allows for good recovery at those concentrations. The following generalized analytical sequence is to be followed:

#### Analytical Sequence Guideline

With Calibration                      Tune Check<sup>1</sup>  
    Calibration Standards (5 Standards Minimum)  
    ICV Standard<sup>2</sup> (Acts as the ICV and LCS)  
    QC Canister Checks<sup>6</sup>  
    MB<sup>7</sup>  
    Sample(s) – 1-19  
    Laboratory Duplicate<sup>4</sup>

With Continuing  
    Calibration                      Tune Check<sup>1</sup>  
    CCV Standard<sup>5</sup>  
    QC Canister Checks<sup>6</sup>  
    MB<sup>7</sup>  
    LCS<sup>3</sup>  
    Sample(s) – 1-19  
    Laboratory Duplicate<sup>4</sup>

<sup>1</sup> The introduction of the tune check standard is the start of the 24 hour analysis window. The instrument performance check solution must be analyzed initially and once per 24 hour time period of operation.

<sup>2</sup> In this scenario, the ICV may also be evaluated as the LCS.

<sup>3</sup> An LCS shall be analyzed at a rate of 1 in 20 or fewer samples. The LCS is the second source calibration check standard analyzed at the lower end of the calibration curve.

<sup>4</sup> A laboratory duplicate must be analyzed at a rate of 1 per 20 or fewer samples. The duplicate must be rotated among clients, whenever possible

<sup>5</sup> A CCV must be analyzed at the beginning of every analytical sequence

<sup>6</sup>Any number of QC check canisters may be analyzed in the sequence to determine a canister cleaning batch or batches acceptability.

<sup>7</sup>Any of the QC Check Canisters may serve as the method blank as long as the minimum requirements detailed in this document are met. A method blank shall be analyzed at a rate of 1 in 20 or fewer samples.

**Note:** Client project batch specifications may require certain modifications to the analytical sequence; however, a batch may not be more lenient than that which is specified in this document.

## 11.5. Conditions

### 11.5.1. Sample Collection Conditions

The suggested settings and system parameters are as follows:

Stream: Sample  
Preflush (sec): 10  
Trap (cc/min): 100  
Volume (cc): 25 to 1000

Stream: Internal Standard  
Preflush (sec): 10  
Trap (cc/min): 100  
Volume (cc): 25 to 1000

Stream: Analytical Standard  
Preflush (sec): 5  
Trap (cc/min): 100  
Volume (cc): 0

Stream: Sweep/Purge  
Preflush (sec): 5  
Trap (cc/min): 100  
Volume (cc): 75

Stream: M1 -> M2  
Preflush (sec):  
Trap (cc/min): 10  
Volume (cc): 40

Module1:

Trap temp(C): -150 Preheat? Yes

Preheat temp(C): 10

Desorb temp(C): 10

Bake temp(C): 150

Bake time(Min): 5

Bulk1:

Trap temp(C): 10

Desorb temp(C): 10

Bake temp(C): 150

Module2:

Trap temp(C): -30 Preheat? No

Preheat temp(C): 50

Desorb temp(C): 180

Bake temp(C): 190

Desorb time(C): 3.5

Bulk2:

Trap temp(C): 30

Desorb temp(C): 150

Bake temp(C): 150

Module3:

Trap temp(C): -160 Focus? Yes

Inject temp(C): 100

Inject time(Min): 2

Bake temp(C): 100

Bake time(Min): 15

Bake on EventEx# : 3

Total Time (Min) : 33

Misc:

Sample Xfer temp(C): 80

GC Xfer temp(C): 100

MPOS Valve temp(C): 100

Wait for GC before injecting

Active GC: GC1

Pressure: 100

MPOS Valve temp(C): 100

### 11.5.2. GC/MS System

Optimize GC conditions for compound separation and sensitivity.

<u>Item</u>	<u>Condition</u>
<i>Carrier Gas</i>	Helium
<i>Flow Rate</i>	1.0-1.5mL/minute
<i>Temperature Program</i>	Initial Temperature: 40°C Initial Hold Temperature: 5 minutes Ramp Rate: 4°C/min to 130°C 2 <sup>nd</sup> Ramp: 20°C/min to 200°C for 9 min hold
<i>Detector B (MSD Interface):</i>	280°C
<i>Electron Energy</i>	70 Volts (nominal)
<i>Mass Range</i>	33 to 300 amu (SCAN mode)
<i>Scan Time</i>	To give at least 10 scans per peak, not to exceed 1 second per scan.

### 11.6. Instrument Performance Check (Tuning)

Inject 50ng or less (on column). The internal/surrogate standard containing BFB is typically used at an injection volume of 100 mL. The GC/MS system must meet the BFB ion abundance criteria shown in Table 1 and 1A. The Analysis may not proceed until the tune meets these criteria. The mass spectrum of BFB is acquired as follows: Three scans (the peak apex scan and the scans immediately preceding and following the apex) are acquired and averaged. When background subtraction is required, subtraction is accomplished using a single scan no more than 20 scans prior to the elution of BFB. No part of the BFB peak may be used to background subtract.

If tune is not met, perform auto tune or manual tune and then re-analyze BFB. If the BFB acceptance criteria are still not met, the MS must be retuned according to the procedure outlined in the instrument users manual. Perform necessary maintenance and make notations in the instrument maintenance logbook. It may be necessary to clean the ion source, or quadrupole, or take other necessary actions to achieve the acceptance criteria

### 11.7. Initial Calibration

11.7.1. Follow the requirements for initial calibration in ADM-ICAL.

11.7.2. Frequency - Each GC/MS system must be initially calibrated upon instrument set-up and recalibrated following any instrument maintenance which may change or effect the sensitivity or linearity of the instrument or if the continuing calibration verification acceptance criteria have not been met.

### 11.7.3. ICAL Procedure -

- 11.7.3.1. Attach the calibration standard and internal standard/surrogate canisters to the designated inlets on the preconcentrator and open the canister valves. Analyzing different volume aliquots of the calibration standards produces differing concentrations. Internal standards/surrogates must be added at the same volume for every standard, sample and QC sample.
- 11.7.3.2. Analyte responses (target ion areas) are tabulated and recorded using the Enviroquant program. Quantitation ions for the target compounds are shown in Table 2 and the primary ion should be used unless interferences are present, in which case the secondary ion may be used.

11.7.4. Calculate the RRF for each target compound relative to the appropriate internal standard

#### **Relative Response Factor (RRF):**

$$\text{RRF} = \frac{A_x C_{is}}{A_{is} C_x}$$

where:

- $A_x$  is the area response of the analyte quantitation ion.  
 $A_{is}$  is the area response of the corresponding internal standard quantitation ion.  
 $C_{is}$  Internal standard concentration, ng.  
 $C_x$  Analyte concentration, ng.

*Note: The equation above is valid under the condition that the volume of internal standard spiking mixture added in all field and QC samples is the same from run to run.*

11.7.5. Using RRFs from the initial calibration, calculate the %RSD for all target compounds

**Standard Deviation, SD:**

$$SD = \sqrt{\frac{\sum_{i=1}^N (RRF_i - \overline{RRF})^2}{N-1}}$$

where:

$RRF_i$  are the individual RRFs from each concentration level in the initial calibration curve.

$\overline{RRF}$  Average (or Mean) RRF of all concentration levels in the initial calibration curve.

N total number of calibration concentration levels

**Percent Relative Standard Deviation, %RSD:**

$$\%RSD = \frac{SD}{\overline{RRF}}(100)$$

where:

$SD$  Standard Deviation calculated in equation number 3

$\overline{RRF}$  Average or Mean RRF

11.7.6. Calculate the RRT for each compound over the initial calibration range

**Relative Retention Time (RRT)**

$$RRT = \frac{RT_C}{RT_{is}}$$

where:

$RT_C$  Retention time of the target compound, seconds.

$RT_{is}$  Retention time of the internal standard, seconds.

- 11.7.7. Calculate the mean RRT for each analyte target compound over the initial calibration range:

**Mean Relative Retention Time ( $\overline{RRT}$ )**

$$\overline{RRT} = \sum_{i=1}^n \frac{RRT_i}{n}$$

where:

$\overline{RRT}$  Mean relative retention time (seconds) for the target compound for all initial calibration levels.

$RRT_i$  Relative retention time for the target compound in level i.

$n$  Number of calibration levels

- 11.7.8. Calculate the mean area response  $\overline{Y}$  for each internal standard compound over the initial calibration range

**Mean Area Response ( $\overline{Y}$ ) for Internal Standard**

$$\overline{Y} = \sum_{i=1}^n \frac{Y_i}{n}$$

where:

$Y_i$  Area response for the primary quantitation ion for the internal standard for each initial calibration standard.

$N$  number of calibration concentration levels

- 11.7.9. Calculate the mean of the retention times for each internal standard over the initial calibration range

**Mean Retention Times ( $\overline{RT}$ )**

$$\overline{RT} = \sum_{i=1}^n \frac{RT_i}{n}$$

Where:

$\overline{RT}$  Mean retention time, seconds

$RT_i$  Retention time for the internal standard for each initial calibration standard, seconds.

n        number of initial calibration levels

#### 11.7.10. Acceptance criteria –

- The RRT for each target compound at each calibration level must be within 0.06RRT units of the mean RRT for the compound.
- The calculated %RSD for the RRF for each compound in the calibration standard must be less than 30% with at most two exceptions up to a limit of 40% (this may not be true for all projects).
- For each Internal Standard the area response (Y) at each calibration level must be within 40% of the mean area response  $\bar{Y}$  over the initial calibration range.
- The retention time shift for each of the internal standards at each calibration level must be within 20s of the mean retention time over the initial calibration range for each internal standard.
- All of the following information must be retained to permit reconstruction of the initial instrument calibration: calibration date, test method, instrument, analysis date, analyte identification, analyst's initials, concentration and responses, and response factors.

#### 11.8. Initial Calibration Verification Standard

Verify the initial calibration by analyzing an initial calibration verification standard (ICV). This standard shall be obtained or prepared from materials acquired from a different manufacturer or lot from that of the initial calibration. The ICV must be 70-130% recovery for all target compounds.

If the initial calibration verification technical acceptance criteria are not met, reanalyze and if it still fails prepare a new canister and analyze. If the criteria are still not met inspect the system for possible sources and perform any necessary maintenance and make a notation in the maintenance logbook of any steps taken. It may be necessary to clean the ion source or change the column. Perform a new initial calibration if any performed maintenance has altered instrument linearity and/or sensitivity. A demonstration of an acceptable ICV is required.

### 11.9. Continuing Calibration Verification Standard –

- 11.9.1. Frequency - Verify the calibration each working day, where necessary (e.g., an ICAL was not analyzed or the 24-hour tune window has closed) by analyzing a continuing calibration verification (CCV) standard from the initial calibration standard canister. The concentration of the calibration verification may be varied within the established calibration range. It may be necessary to analyze more than one CCV standard when linear range limitation require different concentration levels for specific compounds. This will be determined based upon the initial calibration and will be applied to only those compounds with a modified linear range.
- 11.9.2. Acceptance Criteria - %D must be within 30% of the initial calibration average RRFs for all target compounds to be reported from the analytical batch.

The %D is used for evaluating CCV RRFs vs. the initial calibration  $\overline{RRF}$ :

$$\%D = \frac{RRF_{CCV} - \overline{RRF}}{\overline{RRF}} (100)$$

where, for any given analyte:

$RRF_{CCV}$  is the RRF from the CCV being evaluated.  
 $\overline{RRF}$  is the mean RRF from the current calibration curve.

### 11.9.3. Corrective Action –

- 11.9.3.1. If the continuing calibration verification technical acceptance criteria are not met, reanalyze and if it still fails prepare a new canister and analyze. If the criteria are still not met inspect the system for possible sources of the problem and perform any necessary maintenance and make a notation in the maintenance logbook of any steps taken. It may be necessary to clean the ion source or change the column.
- 11.9.3.2. If any corrective action and/or reanalysis fails to produce continuing calibration verification within acceptance criteria (analyzed immediately following the initial failure), then either two consecutive successful verifications must be performed following corrective action or a new initial calibration must be performed. However, sample data associated with an unacceptable calibration verification may be reported as qualified data under the following special conditions:

- When the acceptance criteria for the continuing calibration verification are exceeded high, i.e., high bias, and there are associated samples that are non-detects, then those non-detects may be reported. Otherwise the sample affected by the unacceptable CCV shall be reanalyzed after a new calibration curve has been established, evaluated and accepted. If the CCV is out of control (bias high or low) for any particular analyte and that analyte is detected in a sample then that sample must be re-analyzed.

#### 11.10. Sample Analysis –

- 11.10.1. Prior to analysis, bring all sample containers (canisters and bags) should be at temperature equilibrium with the laboratory.
- 11.10.2. Attach sample canisters Entech 7100 using a 9/16” wrench.
- 11.10.3. Before opening the valve, check for leaking fittings by running the leak check program in the SmartLab software.
- 11.10.4. If system is leak tight, perform the sample line flush routine.
- 11.10.5. If sample pressures/vacuums are to be checked, manually index the sample valve to each position and note the sample pressure/vacuum.
- 11.10.6. Index the sample position valve to the first sample position.
- 11.10.7. Perform the system bake out routine.
- 11.10.8. Open the canister valves and start the automated preconcentration procedure. Make sure the Chemstation data acquisition software has been readied.
- 11.10.9. Introduce the same volume of internal standards (surrogates included) as used for the standards and QC samples.

#### 11.11. Evaluation of Sample Analysis

- 11.11.1. Check all target compounds using the QEdit routine in Enviroquant, making sure all extracted ion chromatogram peaks are integrated properly. See ADM-INT for manual integration procedure and policies.

*Note: The secondary ion quantitation is only allowed if there is sample matrix interference with the primary ion. If the secondary ion quantitation is performed,*

*document the reasons in the instrument run logbook and/or on the quantitation report (initial and date any notation).*

11.11.2. Check the internal standard peak areas and retention times as well as applicable surrogate recoveries to see if they meet acceptance criteria (see Section 12).

11.11.3. Upon sample injection onto the column, the GC/MS system is operated so that the MS scans the atomic range from 33 to 300 amu. At least ten scans per eluting chromatographic peak should be acquired. Scanning allows identification of unknown compounds in the sample through searching of library spectra.

11.11.4. Each run is approximately 45 minutes long. Generate a quantitation report for each run.

#### 11.11.5. Sample Dilution

11.11.5.1. If any target analyte results are above the highest level of the initial calibration, a smaller sample aliquot should be analyzed. The dynamic range of volume aliquots for the automatic cryogenic concentrator is 25cc to 1L. If a volume smaller than 25cc is to be analyzed, a dilution should be made in a Tedlar bag, a Summa canister, or the sample directly injected using a gastight syringe. Note the method of dilution and the dilution gas used in the run log.

- Use results of the original analysis to determine the approximate dilution factor required and get the largest analyte peak within the initial calibration range.
- The dilution factor chosen should keep the response of the analyte peak for a reported target compound in the upper half of the initial calibration range of the instrument.
- All dilution factors must be documented and included in the final report.

11.11.5.2. Tedlar bag dilution:

- Make a dilution by filling a Tedlar bag with 1.0 liter of humidified zero air using a one-liter gas syringe.
- Calculate the volume of balance gas needed to obtain the required dilution.
- Remove the difference in the balance gas using a syringe.
- Add the calculated sample amount using a gastight syringe.

11.11.5.3. Direct injection:

- Make a direct injection by attaching a clean, humidified zero air filled Summa canister to the preconcentrator autosampler using 1/4" stainless steel or teflon tubing with a "tee" septum port. This canister should be the same canister

that may be used as the method blank. Alternatively, the humidified dilution air may be connected directly to the sampling system by means of a purged and blanked line.

- Inject the sample through the septum while the preconcentrator withdraws an aliquot from the canister.

#### 11.11.6. Tentatively Identified Compounds

11.11.6.1. When requested, a mass spectral library search may be made for the purpose of tentatively identifying sample components not associated with the calibration standards. The necessity to perform this type of identification will be determined by the purpose of the analyses being conducted. Data system mass spectral library search routines should not use normalization routines that would misrepresent the library or unknown spectra when compared to each other.

11.11.6.2. Certain programs may require the reporting of non-target analytes. Only after visual comparison of sample spectra with the nearest library searches may the analyst assign a tentative identification. The following guidelines are used for making tentative identifications.

- Relative intensities of major ions in the reference spectrum (ions greater than 10% of the most abundant ion) should be present in the sample spectrum.
- The relative intensities of the major ions should agree within  $\pm 20\%$ . For example, for an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance should be between 30 and 70%.
- Molecular ions present in the reference spectrum should be present in the sample spectrum.
- Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of co-eluting compounds.
- Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or co-eluting peaks. Data system library reduction programs can sometimes create these discrepancies.
- The concentration of the tentatively identified compound is estimated by assuming a response factor of 1.0 and comparing the response of the tentatively identified compound to the response of the nearest internal standard.

#### 11.12. **Storing Electronic Data**

The initial calibration data must be stored in a quantitation method (on the server) using a unique filename and may not be overwritten at any time in order to maintain an accurate audit trail. There are multiple quantitation methods, which are subsets of the compound list in Table 2. Therefore, files will be named with a notation indicating the compound list and the date of the corresponding initial calibration. In addition, all data files including method blanks, continuing calibration verification, laboratory control samples and client submitted samples files are saved in a unique sub-directory on the server.

## 12. QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

12.1. ICAL, ICV, CCV, Instrument Performance Check (**tune**), are discussed in the procedure (Section II)

### 12.2. Canister Cleanliness

12.2.1. Frequency – each canister must be checked for cleanliness prior to release to the field for sampling.

12.2.2. Acceptance Criteria –

12.2.2.1. A canister is considered “clean” if the analysis shows <0.2ppbv of any target analyte, except acetone and ethanol. These compounds are considered exceptions; the concentration requirement for these analytes is <1.0ppbv for acetone and <1.0ppbv for ethanol

12.2.2.2. If the batch of canisters are to be used for tentatively identified compounds (TIC) analysis, any non-target peaks present in the QC check canister analysis must be evaluated and determined to be less than the TIC reporting limit (<10% of the peak height of Internal Standard 2, as referenced in Table 2).

12.2.3. Corrective Action – return the canister for recleaning.

### 12.3. Method Blank

12.3.1. Frequency – One per batch. A cleanliness check may serve dual purpose as a method blank. Even if the blank fails criteria for cleanliness it may be used as a MB if it meets MB criteria.

12.3.2. Acceptance Criteria

- The area response for each internal standard in the blank must be within  $\pm 40$  percent of the area response for each internal standard in the mid-level standard of the ICAL if the method blank follows the ICAL. If the method blank follows a CCV then the

area response for each internal standard in the blank must be within  $\pm 40$  percent of the area response of the CCV.

- The retention time for each internal standard in the blank must be within  $\pm 0.33$  minutes of the retention time for each internal standard in the mid-level standard of the ICAL if the method blank follows the ICAL. If the method blank follows a CCV then the retention time for each internal standard in the blank must be within  $\pm 0.33$  minutes of the retention time of the CCV.
- The method blank result for any target analyte should not be greater than the reporting limit and should not contain additional compounds with elution characteristics and mass spectral features that would interfere with identification and measurement of a method analyte.

12.3.3. Corrective Action If the analyte concentration results in the blank do not meet the acceptance criteria repeat analysis with remaining QC canisters until results are acceptable or prepare a canister which has previously been checked as clean. If the analyte results in the blank still do not meet the acceptance criteria the source of the problem must be investigated and measures taken to eliminate the source. Determine whether the contamination is from the instrument or due to contamination in the blank container (if results from the new can are not acceptable then the system is probably contaminated). Regardless, appropriate corrective measures must be taken and documented before sample analysis proceeds. However, if this is not a possibility and the results must be reported follow the reporting requirements stated in Section 13.

#### 12.4. Laboratory Duplicate

12.4.1. Frequency – One per batch.

12.4.2. Acceptance Criteria Samples selected for duplicate analysis shall be rotated among client samples. The relative percent difference must fall within  $\pm 25\%$ .

12.4.3. Corrective Action If the duplicate results do not meet the technical acceptance criteria, perform another duplicate analysis. If the results are still unacceptable and the associated samples are not reanalyzed then all of the sample results in the associated batch must be flagged accordingly.

#### 12.5. Surrogates

- Frequency – added to all injections
- Acceptance Criteria – 70-140%
- Corrective Action – Analyze a smaller aliquot to reduce matrix interference.

## 12.6. Internal Standards

12.6.1. Frequency – added to all injections

12.6.2. Acceptance Criteria

12.6.2.1. The retention time for each internal standard must be within  $\pm 20$  seconds of the retention time of the internal standard in the most recent valid calibration. If the most recent valid calibration is an initial calibration, internal standard area responses and retention times in the sample are evaluated against the corresponding internal standard area responses and RTs in the mid level standard of the initial calibration.

12.6.2.2. The area response for any internal standard must be within the range of 60 - 140% of the area of the most recent valid calibration (CCV or mid-point from the initial calibration, whichever is most current).

12.6.3. Corrective Action –

12.6.3.1. Internal Standard Responses If the problem is with the instrument, perform maintenance. If the problem is with a sample, check for interferences. If the response is high, it is likely that interference is present. In this case, lower the volume or aliquot of the sample and re-analyze. If the problem persists, report the results with the best quality and qualify the results. If the problem is corrected with the lower volume analysis, report those results.

12.6.3.2. Internal Standard Retention Times If the retention time for any internal standard within the sample changes by more than 20 sec from the latest daily calibration or initial calibration mid-point standard, the GC/MS system must be inspected for malfunctions, and maintenance performed as required. Repeat sample analysis where required

## 12.7. Laboratory Control Sample

- Frequency – one per batch. It may be necessary to analyze more than one LCS standard when linear range limitations require different concentration levels for specific compounds. This will be determined based upon the initial calibration and will be applied to only those compounds with a modified linear range.
- Acceptance Criteria – the recovery of the LCS must be 70-130% of the true value for all target compounds reported from the analytical batch. Exception: If the LCS recovery is greater than 130%, samples which are <MRL are acceptable to report.
- Corrective Action - If the LCS criteria are not met, determine whether the cause is instrumentation or the result of a poor injection. If the problem is instrumentation, perform

maintenance (and recalibrate if necessary). If the problem is the injection, re-analyze the LCS.

## 12.8. Method Detection and Reporting Limits

- 12.8.1. Method detection limit studies shall be performed annually on each instrument for which this method is performed. The MDL shall be performed in accordance with the procedure outlined in the *SOP for the Determination of Method Detection Limits* and the higher detection limit (from all of the instruments where this method is to be performed) for each analyte must be selected and used as the uniform method detection limit for that analyte regardless of the instrument of analysis. The quantitation limit or reporting limit for this method shall be at or above the concentration of the lowest initial calibration standard.

## 13. DATA REDUCTION AND REPORTING

- 13.1.1. All data records must explicitly connect data to the initial instrument calibration. This includes all samples, continuing calibrations and QC samples.
- 13.1.2. The calculations for the Initial Calibration and Daily Calibration evaluations are given in the Section 11. The calculations for percent recovery and relative percent difference are given in the Quality Assurance Manual.
- 13.1.3. Sufficient raw data records must be retained of the analysis, instrument calibrations and method detection limit studies including: analysis/calibration date and time, test method, instrument, sample identification, analyte identification, analyst's initials, concentrations and responses, as well as standards used for the analysis and calibrations, all manual calculations including sample dilutions and manual integrations to permit reconstruction of analyses. Make sure that all information entered and reported on the quantitation report and instrument run log is complete and accurate. Retain all daily QC per sequence on file for future reference including tune checks, opening standards, method blanks, laboratory control samples, laboratory duplicates, and initial calibrations and initial calibration verifications. Additionally, all passing QC Canister checks must also be retained on file.
- 13.1.4. The essential information to be associated with analysis, such as computer data files, run logs, etc. shall include: Sample ID code, date and time of analysis, instrument operating conditions/parameters (or reference to such data), analysis type, all manual calculations including dilutions and manual integrations, analyst's initials, sample preparation (pressure readings and balance gas if pressurized with helium), standard and reagent origin, receipt, preparation, and use, as well as calibration criteria, frequency and acceptance criteria, data and statistical calculations, review, confirmation, interpretation, assessment and reporting conventions.

## 13.2. Calculations

13.2.1. The equations needed for initial and continuing calibration are in Section 11. The equations for calculating the concentrations and volumes of standards are in Section 9.

13.2.2. **Pressure Dilution Factor, PDF**, for samples collected in Summa canisters:

$$\text{PDF} = \frac{P_{\text{am}} + P_f}{P_{\text{am}} + P_i}$$

where:

$P_{\text{am}}$  is the ambient atmospheric pressure, 29.9 "Hg at sea level.

$P_f$  is the final sample canister pressure, in "Hg

$P_i$  is the initial sample canister pressure, in "Hg. This will most often be a negative value (sub-ambient initial pressure.)

13.2.3. For calculating analyte concentrations in a sample, the starting point is the ppbv concentration generated by the HP Enviroquant software, which appears on the quantitation report. The equation used:

$$C_x = \frac{A_x C_{is}}{A_{is} \overline{RRF}}$$

where:

$C_x$  is the concentration, in ppbv, of analyte  $x$ .

$A_x$  is the area response of the analyte's quantitation ion.

$A_{is}$  is the area response of the corresponding internal standard's quantitation ion.

$C_{is}$  is the internal standard concentration, in ppbv.

$\overline{RRF}$  is the average or mean RRFs

- 13.2.4. The final analyte concentration,  $FinalC_x$ , in units of parts per billion volume (ppbv), is then calculated from the following:

$$FinalC_x = C_x PDF \left( \frac{V_c}{V_s} \right)$$

where:

$V_c$  is the calibration standard sample volume analyzed, in liters.

$V_s$  is the sample volume analyzed, in liters.

$PDF$  is the sample canister pressure dilution factor.

- 13.2.5. To convert concentrations units between mass/volume and volume/volume units the equations are:

$$C_{ng/m^3} = C_{ppbv} \left( \frac{FW}{24.46} \right) \quad \text{or} \quad C_{ppbv} = C_{ng/m^3} \left( \frac{24.46}{FW} \right)$$

where:

$FW$  is the formula weight of the analyte, in g/mole.

24.46 is the molar volume of an ideal gas at 298 K (25 °C) and 760 mmHg (1 atm), in liters per mole (l/mol).

$C_{ng/m^3}$  the analyte concentration in micrograms per cubic meter.

$C_{ppbv}$  the analyte concentration in parts per billion by volume.

Refer to Table 3 for the appropriate molecular weights.

### 13.3. Data Review

- 13.3.1. The Initial Calibration will be reviewed by the analyst and a qualified peer using the ICAL checklist found in ADM-ICAL.

- 13.3.2. Daily sample data and associated QC data will be reviewed by the analyst and a qualified peer using a Data Review Checklist and validated by a supervisor as outlined in ADM-DREV. ADM-DREV also describes the subsequent reviews by the Project Manager and the Lab Director or QAPM.

- 13.4. Reporting** - Most reports are generated using STARLIMS. Data is transferred electronically from the instrument into STARLIMS.

#### **14. METHOD PERFORMANCE**

Reporting limits are based upon an MDL study performed according to ADM-MDL and filed in the MDL binders in the QA office.

Demonstration of Capability is performed upon instrument set-up, whenever a new analyst begins independent analysis, and annually thereafter according to ADM-TRANDOC and section 19 below. The documentation of this method performance is retained by the Quality Assurance office

#### **15. POLLUTION PREVENTION AND WASTE MANAGEMENT**

It is the laboratory's practice to minimize the amount of solvents, acids and reagent used to perform this method wherever feasible. Standards are prepared in volumes consistent with methodology and only the amount needed for routine laboratory use is kept on site. The threat to the environment from solvent and reagents used in this method can be minimized when disposed of properly.

The laboratory will comply with all Federal, State and local regulations governing waste management, particularly the hazardous waste identification rules and land disposal restrictions as specified in the CAS EH&S Manual.

#### **16. CORRECTIVE ACTIONS FOR OUT-OF-CONTROL DATA**

If data is produced that is out of control, the samples are to be re-analyzed with in-control QA whenever possible. See corrective actions in Sections 11 and 12 of this SOP and in the applicable Figures in Section 12 of the Quality Assurance Manual.

#### **17. CONTINGENCIES FOR HANDLING OUT-OF-CONTROL OR UNACCEPTABLE DATA**

If data is produced that is out of control and is not to be re-analyzed due to sample volume restrictions, holding times, or QC controls can not be met, follow the procedures throughout this SOP, Section 15 of the Quality Assurance Manual, and the flagging criteria in Appendix D of the Quality Assurance Manual.

## 18. REFERENCES

- EPA Method TO-14A, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA/625/R-96/010b, U.S. Environmental Protection Agency, Research Triangle Park, NC, January 1997.
- EPA Method TO-15, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA/625/R-96/010b, U.S. Environmental Protection Agency, Research Triangle Park, NC, January 1997.
- Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, January 1999.
- Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Addendum, January 17, 2002.

## 19. TRAINING OUTLINE

Read current SOP. Demonstrate a general understanding of the methodology and chemistry. Follow policies in ADM-TRANDOC.

Observe Sample Preparation and Analysis. Follow Training Plan Form (May be found on the Rochester CASLAB Intranet at <P:\INTRANET\QAQC\TRAINING\QAforms.HTM>.)

Participate in the methodology, documentation, and data reduction with guidance.

Perform Initial Demonstration of Capability by performing the analysis independently and analyzing a known standard four times. If recovery is within acceptable limits, complete Training Plan Form and IDC certificate and file with QA. Continuing proficiency shall be demonstrated annually using an outside PE source, an internal unknown, or a new 4 replicate study.

## 20. METHOD MODIFICATIONS

9.2 of the TO-15 Method described various procedures for standards preparation. CAS-R modifies the High Pressure Cylinder technique in 9.2.5 of TO-15 by using a canister instead of a cylinder and final pressures are reduced to less than 40psi.

9.2.2.3 of the TO-15 Method requires an internal standard concentration of 10 ppbv. CAS-R uses 1-10 ppbv as not to push the upper end of the linear range with internal standard. The internal standard is set depending upon the required analytical range and the injection volume utilized during the initial calibration.

## **21. INSTRUMENT-SPECIFIC ADDENDUM**

Instrument manuals are located near the instrument(s)

## **22. ATTACHMENTS**

Table 1: Instrument Tune Check Ion Abundance Criteria (TO-15)

Table IA: Instrument Tune Check Ion Abundance Criteria (TO-14A)

Table 2: Target Compounds, CAS Numbers, Quantitation Ions, MRLs, and Internal Standard Associations

Table 3: Molecular Weights and Densities

Attachment A - Preparation of Gas Phase Standards for Ambient Air Analysis

## **23. CHANGES FROM PREVIOUS REVISION**

- Not Applicable

**TABLE I**  
**Required BFB Key Ions and**  
**Ion Abundance Criteria for Method TO-15**

Mass	Ion Abundance Criteria
50	8.0 to 40.0 percent of m/e 95
75	30.0 to 66.0 percent of m/e 95
95	Base Peak, 100 Percent Relative Abundance
96	5.0 to 9.0 Percent of m/e 95
173	Less than 2.0 Percent of m/e 174
174	50.0 to 120.0 Percent of m/e 95
175	4.0 to 9.0 Percent of m/e 174
176	93.0 to 101.0 Percent of m/e 174
177	5.0 to 9.0 Percent of m/e 176

**TABLE 1A**  
**Required BFB Key Ions and**  
**Ion Abundance Criteria for Method TO-14A**

Mass	Ion Abundance Criteria
50	15 to 40 percent of m/e 95
75	30 to 60 percent of m/e 95
95	Base Peak, 100 Percent Relative Abundance
96	5 to 9 Percent of m/e 95
173	Less than 2 Percent of m/e 174
174	>50 Percent of m/e 95
175	5 to 9 Percent of m/e 174
176	>95 and <101 Percent of m/e 174
177	5 to 9 Percent of m/e 176

*Note:* The criteria listed in Tables 1 and 1A shall be met or exceeded in order for EPA Compendium Methods TO-15 or TO-14A to be referenced.

TABLE 2

Target Compounds, CAS Numbers, Quantitation Ions, MRLs, and Internal Standard Associations					
Compound <sup>1</sup>	CAS Number	Primary Ion <sup>2</sup>	Secondary Ion(s) <sup>2</sup>	MRL (ppbv) <sup>3</sup>	Internal Standards <sup>4</sup>
Bromochloromethane (IS1)	74-97-5	130	128, 132	1.0	Internal Standard 1
Propene	115-07-1	42	39,41	1.0	IS1
Dichlorodifluoromethane (CFC 12)	75-71-8	85	87	1.0	IS1
Chloromethane	74-87-3	50	52	1.0	IS1
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	76-14-2	135	137	1.0	IS1
Vinyl Chloride	75-01-4	62	64	1.0	IS1
1,3-Butadiene	106-99-0	54	39, 53	1.0	IS1
Bromomethane	74-83-9	94	96	1.0	IS1
Chloroethane	75-00-3	64	66	1.0	IS1
Ethanol	64-17-5	45	46	5.0	IS1
Acetone	67-64-1	58	43	5.0	IS1
Trichlorofluoromethane	75-69-4	101	103	1.0	IS1
Isopropyl Alcohol	67-63-0	45	43	1.0	IS1
1,1-Dichloroethene	75-35-4	96	61	1.0	IS1
Methylene Chloride	75-09-2	84	49	1.0	IS1
Trichlorotrifluoroethane	76-13-1	151	101	1.0	IS1
Carbon Disulfide	75-15-0	76	78	1.0	IS1
trans-1,2-Dichloroethene	156-60-5	61	96	1.0	IS1
1,1-Dichloroethane	75-34-3	63	65	1.0	IS1
Methyl tert-Butyl Ether	1634-04-4	73	57	1.0	IS1
Vinyl Acetate	108-05-4	86	43	1.0 <sup>7</sup>	IS1
2-Butanone (MEK)	78-93-3	72	43	1.0	IS1
cis-1,2-Dichloroethene	156-59-2	61	96	1.0	IS1
Ethyl Acetate	141-78-6	61	70	1.0	IS1
n-Hexane	110-54-3	57	86	1.0	IS1
Chloroform	67-66-3	83	85	1.0	IS1
Tetrahydrofuran	109-99-9	72	71,42	1.0	IS1
1,4-Difluorobenzene(IS2)	540-36-3	114	88	1.0	Internal Standard 2

**TABLE 2 (Continued)**

<b>Target Compounds, CAS Numbers, Quantitation Ions, MRLs, and Internal Standard Associations</b>					
<b>Compound<sup>1</sup></b>	<b>CAS Number</b>	<b>Primary Ion<sup>2</sup></b>	<b>Secondary Ion(s)<sup>2</sup></b>	<b>MRL (ppbv)<sup>3</sup></b>	<b>Internal Standards<sup>4</sup></b>
1,2-Dichloroethane	107-06-2	62	64	1.0	IS2
1,1,1-Trichloroethane	71-55-6	97	99, 61	1.0	IS2
Benzene	71-43-2	78	77	1.0	IS2
Carbon Tetrachloride	56-23-5	117	119	1.0	IS2
Cyclohexane	110-87-7	84	69,56	1.0	IS2
1,2-Dichloropropane	78-87-5	63	62	1.0	IS2
Bromodichloromethane	75-27-4	83	85	1.0	IS2
Trichloroethene	79-01-6	130	132	1.0	IS2
1,4-Dioxane	123-91-1	88	58	1.0	IS2
n-Heptane	142-82-5	71	57,100	1.0	IS2
cis-1,3-Dichloropropene	10061-01-5	75	77	1.0	IS2
4-Methyl-2-Pentanone	108-10-1	58	85	1.0	IS2
trans-1,3-Dichloropropene	10061-02-6	75	77	1.0	IS2
1,1,2-Trichloroethane	79-00-5	97	83	1.0	IS2
Toluene	108-88-3	91	92	1.0	IS2
2-Hexanone	591-78-6	43	58	1.0	IS2
Dibromochloromethane	124-48-1	129	127	1.0	IS2
1,2-Dibromoethane	106-93-4	107	109	1.0	IS2
Tetrachloroethene	127-18-4	166	164	1.0	IS2
Chlorobenzene-d5(IS3)	3114-55-4	82	117	1.0	Internal Standard 3
Chlorobenzene	108-90-7	112	114	1.0	IS3
Ethylbenzene	100-41-4	91	106	1.0	IS3
m-, p-Xylenes	1330-20-7	91	106	1.0	IS3
Bromoform	75-25-2	173	175	1.0	IS3
Styrene	100-42-5	104	78, 103	1.0	IS3
1,1,2,2-Tetrachloroethane	79-34-5	83	85	1.0	IS3
o-Xylene	95-47-6	91	106	1.0	IS3
4-Bromofluorobenzene(S)	460-00-4	174	176	1.0	IS3
4-Ethyltoluene	622-96-8	105	120	1.0	IS3
1,3,5-Trimethylbenzene	108-67-8	105	120	1.0	IS3

TABLE 2 (Continued)

Target Compounds, CAS Numbers, Quantitation Ions, MRLs, and Internal Standard Associations					
Compound <sup>1</sup>	CAS Number	Primary Ion <sup>2</sup>	Secondary Ion(s) <sup>2</sup>	MRL (ppbv) <sup>3</sup>	Internal Standards <sup>4</sup>
1,2,4-Trimethylbenzene	95-63-6	105	120	1.0	IS3
Benzyl Chloride	100-44-7	91	126	1.0	IS3
1,3-Dichlorobenzene	541-73-1	146	148	1.0	IS3
1,4-Dichlorobenzene	106-46-7	146	148	1.0	IS3
1,2-Dichlorobenzene	95-50-1	146	148	1.0	IS3
1,2,4-Trichlorobenzene	120-82-1	184	145, 182	1.0	IS3
Hexachlorobutadiene	87-68-3	225	227	1.0	IS3

(S) = Surrogate

(IS1) = Internal Standard 1

(IS2) = Internal Standard 2

(IS3) = Internal Standard 3

Note 1: Additional compounds may be reported as long as the minimum requirements of this document are met. The compounds listed in this table are reported using TO-15 SCAN. These compounds are included in the laboratories' standard 62 compound reporting list.

Note 2: These are suggested primary and secondary ions. However, any ions in the analyte spectra that are sufficient enough in response to reach the desired reporting limit and having a limited amount of interference, is acceptable for both the primary and secondary ion selection. Analyst experience should be utilized in determining appropriate ions.

Note 3: The method reporting limit listed is the standard SCAN limit (lowest concentration in the initial calibration curve), but may change with each new initial calibration performed. Therefore, current reporting limits should be reviewed.

Note 4: The listing of the internal standard by which the compounds are quantitated is for TO-15 SCAN only.

**Table 3**  
**Molecular Weight and Density**

Compound Name	Molecular Weight	Density (g/mL)
Propene	42.08	N/A
Dichlorodifluoromethane	120.9	1.329
Chloromethane	50.49	0.911
Freon 114	170.9	1.455
Vinyl Chloride	62.5	0.9106
1,3-Butadiene	54.09	0.6149
Bromomethane	94.94	1.6755
Chloroethane	64.52	0.8902
Ethanol	46.07	0.7893
Acetone	58.08	0.7845
Trichlorofluoromethane	137.4	N/A
Isopropyl Alcohol	60.1	0.7809
1,1-Dichloroethene	96.94	1.213
Methylene Chloride	84.94	1.3266
Trichlorotrifluoroethane	187.38	1.5635
Carbon Disulfide	76.14	1.2632
trans-1,2-Dichloroethene	96.94	1.2565
1,1-Dichloroethane	98.96	1.1757
Methyl tert-Butyl Ether	88.15	0.7402
Vinyl Acetate	86.09	0.9317
2-Butanone	72.11	0.7999
cis-1,2-Dichloroethene	96.94	1.2837
Ethyl Acetate	88.106	0.9003
n-Hexane	86.17	0.6548
Chloroform	119.4	1.4832
Tetrahydrofuran	72.11	0.8892
1,2-Dichloroethane	98.96	1.2351
1,1,1-Trichloroethane	133.4	1.339
Benzene	78.11	0.8765
Carbon Tetrachloride	153.8	1.594
Cyclohexane	84.16	0.7739
1,2-Dichloropropane	113	1.156
Bromodichloromethane	163.8	1.98
Trichloroethene	131.4	1.4642
1,4-Dioxane	88.11	1.0337
n-Heptane	100.2	0.6837
cis-1,3-Dichloropropene <sup>2</sup>	111	1.224

**Table 3**  
**Molecular Weight and Density**

<b>Compound Name</b>	<b>Molecular Weight</b>	<b>Density (g/mL)</b>
4-Methyl-2-Pentanone	100.2	0.7965
trans-1,3-Dichloropropene <sup>2</sup>	111	1.217
1,1,2-Trichloroethane	133.4	1.4397
Toluene	92.14	0.8669
2-Hexanone	100.16	0.8113
Dibromochloromethane	208.3	2.451
1,2-Dibromoethane	187.9	2.1791
Tetrachloroethene	165.8	1.6227
Chlorobenzene	112.6	1.1058
Ethylbenzene	106.2	0.867
m- & p-Xylene	106.2	0.8642,0.8611
Bromoform	252.8	2.899
Styrene	104.1	0.906
1,1,2,2-Tetrachloroethane	167.9	1.5953
o-Xylene	106.1	0.8802
4-Ethyltoluene	120.2	0.8614
1,3,5-Trimethylbenzene	120.2	0.8652
1,2,4-Trimethylbenzene	120.2	0.8758
Benzyl Chloride	126.59	1.1004
1,3-Dichlorobenzene	147	1.2884
1,4-Dichlorobenzene*	147	1.2475
1,2-Dichlorobenzene	147	1.3059
1,2,4-Trichlorobenzene	181.5	1.459
Hexachlorobutadiene	260.8	1.556

\* Indicates a solid at room temperature.

Note 1: The density for a mixture of cis- & trans-1,3-Dichloropropene is 1.2205g/mL.

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## Attachment A

# Preparation of Gas Phase Standards for Ambient Air Analysis