Saari, Christopher A - DNR

From: Dusty Tazelaar <Dusty.Tazelaar@obg.com>
Sent: Tuesday, October 31, 2017 2:32 PM
To: Saari, Christopher A - DNR; Fassbender, Judy L - DNR; Fitzpatrick, William - DNR
Cc: CMC.Co.Inc@gmail.com; Parsons, Laurie
Subject: CMC Co. Phelps Site
Attachments: Appendix D_TEQ Backup Caclulations_171018.pdf

Good afternoon,

As requested, please see the attached PDF file for your review. This file includes the tables used to calculate summed TEQs for dioxins and furans (D/Fs) that were detailed in the Site Investigation/Remedial Action Option Report for C.M. Christiansen Co. Inc. Former Pole Yard, Military Creek, Phelps, Wisconsin (WDNR BRRTS Activity #02-64-000068). Pages 1-14 detail the normalization of D/Fs to TEQs using the USEPA 1989 toxic equivalency factors (TEFs). Pages 15-28 detail the normalization of D/Fs to TEQs using the WHO 1998-Fish TEFs. This file does not contain the calculations to normalize the data to 1% TOC, but was done so following the example in the Consensus-Based Sediment Quality Guidelines. Those values are located in Table 3 of the Site Investigation/Remedial Action Option Report.

Also, please use the link below to access many of the scientific literature resources referenced in the Site Investigation/Remedial Action Option Report.
https://naturalrt.sharefile.com/d-s1cc5cbdd8a24bb98

We will discuss the responses to the technical points raised in the October memo following your review of this supplemental information.

Thank you,

Dusty L. Tazelaar

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Appendix D - Sediment TEQ Calculations with EPA 1989 TEFs
Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	**Toxic Equivalency Factors EPA 1989**	102016035			102016036		
		Station Name:		SED-01					
		Station / Sample Name:		SED-01	ng TEQ/kg	% contribution	SED-01	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/20/2016			10/20/2016		
GEO	Percent Moisture	(%)		90.3			85.5		
Organic	Carbon, Total Organic	(mg/kg)		268,000			353,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	3.6	0.036	3.53	1	0.01	1.09
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	0.27	0.027	2.65	0.32	0.032	3.49
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	0.29	0.029	2.85	0.32	0.032	3.49
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	0.26	0.026	2.55	0.25	0.025	2.73
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	0.3	0.15	14.72	0.26	0.13	14.18
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.34	0.34	33.36	0.34	0.34	37.08
Dioxin	OCDD	(ng/Kg)	0.001	29	0.029	2.85	6.2	0.0062	0.68
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	1	0.01	0.98	0.47	0.0047	0.51
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	0.32	0.0032	0.31	0.24	0.0024	0.26
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	0.21	0.021	2.06	0.16	0.016	1.74
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.23	0.023	2.26	0.16	0.016	1.74
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.27	0.027	2.65	0.23	0.023	2.51
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.45	0.0225	2.21	0.34	0.017	1.85
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.28	0.028	2.75	0.22	0.022	2.40
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.25	0.125	12.26	0.22	0.11	12.00
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	1.2	0.12	11.77	1.3	0.13	14.18
Furan	OCDF	(ng/Kg)	0.001	2.6	0.0026	0.26	0.66	0.00066	0.07
	SUM OF TEQ				1.02			0.92	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	**Toxic Equivalency Factors EPA 1989**	101916027			101916028		
		Station Name:		SED-02					
		Station / Sample Name:		SED-02	ng TEQ/kg	% contribution	SED-02	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/19/2016			10/19/2016		
GEO	Percent Moisture	(%)		91.9			87.2		
Organic	Carbon, Total Organic	(mg/kg)		317,000			216,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	6,500	65	21.12	470	4.7	19.88
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	47	4.7	1.53	3.9	0.39	1.65
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	260	26	8.45	18	1.8	7.61
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	100	10	3.25	7.2	0.72	3.05
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	11	5.5	1.79	1.1	0.55	2.33
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	2.3	2.3	0.75	0.65	0.65	2.75
Dioxin	OCDD	(ng/Kg)	0.001	72,000	72	23.39	5,700	5.7	24.11
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	2,200	22	7.15	150	1.5	6.35
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	200	2	0.65	14	0.14	0.59
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	250	25	8.12	17	1.7	7.19
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	110	11	3.57	9	0.9	3.81
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	76	7.6	2.47	5.8	0.58	2.45
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	29	1.45	0.47	2.2	0.11	0.47
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	110	11	3.57	8.3	0.83	3.51
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	67	33.5	10.88	5.3	2.65	11.21
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	7.2	0.72	0.23	1.8	0.18	0.76
Furan	OCDF	(ng/Kg)	0.001	8,000	8	2.60	540	0.54	2.28
	SUM OF TEQ				307.77			23.64	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	Toxic Equivalency Factors EPA 1989	101916024			101916025		
		Station Name:		SED-03					
		Station / Sample Name:		SED-03	ng TEQ/kg	% contribution	SED-03	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/19/2016			10/19/2016		
GEO	Percent Moisture	(%)		46.3			55.4		
Organic	Carbon, Total Organic	(mg/kg)		19,300			30,900		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	17,000	170	21.75	75,000	750	23.89
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	100	10	1.28	370	37	1.18
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	740	74	9.47	2,800	280	8.92
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	230	23	2.94	780	78	2.48
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	27	13.5	1.73	89	44.5	1.42
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	2.1	2.1	0.27	9.3	9.3	0.30
Dioxin	OCDD	(ng/Kg)	0.001	170,000	170	21.75	570,000	570	18.16
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	5,700	57	7.29	27,000	270	8.60
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	570	5.7	0.73	2,500	25	0.80
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	620	62	7.93	2,500	250	7.96
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	230	23	2.94	1,000	100	3.19
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	250	25	3.20	1,100	110	3.50
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	77	3.85	0.49	270	13.5	0.43
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	280	28	3.58	1,200	120	3.82
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	190	95	12.15	820	410	13.06
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	15	1.5	0.19	71	7.1	0.23
Furan	OCDF	(ng/Kg)	0.001	18,000	18	2.30	65,000	65	2.07
	SUM OF TEQ				781.65			3139.40	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	**Toxic Equivalency Factors EPA 1989**	101916021			101916022		
		Station Name:		SED-04					
		Station / Sample Name:		SED-04	ng TEQ/kg	% contribution	SED-04	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/19/2016			10/19/2016		
GEO	Percent Moisture	(%)		91.4			75.4		
Organic	Carbon, Total Organic	(mg/kg)		245,000			128,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	7,800	78	21.64	31,000	310	24.96
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	48	4.8	1.33	160	16	1.29
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	340	34	9.43	960	96	7.73
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	110	11	3.05	310	31	2.50
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	15	7.5	2.08	42	21	1.69
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.97	0.97	0.27	2.4	2.4	0.19
Dioxin	OCDD	(ng/Kg)	0.001	73,000	73	20.25	310,000	310	24.96
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	2,600	26	7.21	12,000	120	9.66
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	210	2.1	0.58	960	9.6	0.77
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	290	29	8.04	890	89	7.17
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	110	11	3.05	360	36	2.90
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	110	11	3.05	190	19	1.53
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	41	2.05	0.57	76	3.8	0.31
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	130	13	3.61	390	39	3.14
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	93	46.5	12.90	170	85	6.84
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	9.9	0.99	0.27	11	1.1	0.09
Furan	OCDF	(ng/Kg)	0.001	9,600	9.6	2.66	53,000	53	4.27
	SUM OF TEQ				360.51			1241.90	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	Toxic Equivalency Factors EPA 1989	101916018			101916019		
		Station Name:		SED-05					
		Station / Sample Name:		SED-05	ng TEQ/kg	% contribution	SED-05	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/19/2016			10/19/2016		
GEO	Percent Moisture	(%)		35.8			16.9		
Organic	Carbon, Total Organic	(mg/kg)		19,400			649		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	1,600	16	21.68	11	0.11	14.17
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	10	1	1.35	0.16	0.016	2.06
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	65	6.5	8.81	0.47	0.047	6.05
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	25	2.5	3.39	0.21	0.021	2.71
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	2.6	1.3	1.76	0.08	0.04	5.15
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.16	0.16	0.22	0.12	0.12	15.46
Dioxin	OCDD	(ng/Kg)	0.001	17,000	17	23.03	120	0.12	15.46
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	580	5.8	7.86	4.6	0.046	5.93
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	52	0.52	0.70	0.38	0.0038	0.49
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	58	5.8	7.86	0.4	0.04	5.15
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	24	2.4	3.25	0.23	0.023	2.96
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	20	2	2.71	0.15	0.015	1.93
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	8	0.4	0.54	0.11	0.0055	0.71
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	25	2.5	3.39	0.21	0.021	2.71
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	15	7.5	10.16	0.24	0.12	15.46
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	1.3	0.13	0.18	0.12	0.012	1.55
Furan	OCDF	(ng/Kg)	0.001	2,300	2.3	3.12	16	0.016	2.06
	SUM OF TEQ				73.81			0.78	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	**Toxic Equivalency Factors EPA 1989**	101816008			101816009		
		Station Name:		SED-06					
		Station / Sample Name:		SED-06	ng TEQ/kg	% contribution	SED-06	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/18/2016			10/18/2016		
GEO	Percent Moisture	(%)		92			77.3		
Organic	Carbon, Total Organic	(mg/kg)		350,000			95,900		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	18,000	180	22.44	25,000	250	24.71
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	110	11	1.37	140	14	1.38
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	690	69	8.60	810	81	8.01
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	220	22	2.74	280	28	2.77
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	26	13	1.62	33	16.5	1.63
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	2.1	2.1	0.26	2.1	2.1	0.21
Dioxin	OCDD	(ng/Kg)	0.001	190,000	190	23.69	270,000	270	26.69
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	7,900	79	9.85	11,000	110	10.87
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	680	6.8	0.85	920	9.2	0.91
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	460	46	5.74	300	30	2.97
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	300	30	3.74	400	40	3.95
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	200	20	2.49	160	16	1.58
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	63	3.15	0.39	67	3.35	0.33
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	300	30	3.74	370	37	3.66
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	130	65	8.10	110	55	5.44
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	9.9	0.99	0.12	5.6	0.56	0.06
Furan	OCDF	(ng/Kg)	0.001	34,000	34	4.24	49,000	49	4.84
	SUM OF TEQ				802.04			1011.71	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	Toxic Equivalency Factors EPA 1989	102016032			102016033		
		Station Name:		SED-101					
		Station / Sample Name:		SED-101	ng TEQ/kg	% contribution	SED-101	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/20/2016			10/20/2016		
GEO	Percent Moisture	(%)		90.6			87.8		
Organic	Carbon, Total Organic	(mg/kg)		146,000			165,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	39	0.39	13.77	20	0.2	9.37
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	0.46	0.046	1.62	0.24	0.024	1.12
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	2.1	0.21	7.42	0.82	0.082	3.84
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	0.92	0.092	3.25	0.4	0.04	1.87
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	0.42	0.21	7.42	0.35	0.175	8.20
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.41	0.41	14.48	0.6	0.6	28.10
Dioxin	OCDD	(ng/Kg)	0.001	370	0.37	13.07	230	0.23	10.77
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	12	0.12	4.24	7.1	0.071	3.33
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	1.3	0.013	0.46	0.6	0.006	0.28
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	1.5	0.15	5.30	0.87	0.087	4.07
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.73	0.073	2.58	0.52	0.052	2.44
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.71	0.071	2.51	0.26	0.026	1.22
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.55	0.0275	0.97	0.48	0.024	1.12
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	1.1	0.11	3.88	0.26	0.026	1.22
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.73	0.365	12.89	0.65	0.325	15.22
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	1.4	0.14	4.94	1.4	0.14	6.56
Furan	OCDF	(ng/Kg)	0.001	34	0.034	1.20	27	0.027	1.26
	SUM OF TEQ				2.83			2.14	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	**Toxic Equivalency Factors EPA 1989**	102016030			102016031		
		Station Name:		SED-102					
		Station / Sample Name:		SED-102	ng TEQ/kg	% contribution	SED-102	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/20/2016			10/20/2016		
GEO	Percent Moisture	(%)		92.2			88.2		
Organic	Carbon, Total Organic	(mg/kg)		279,000			226,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	27	0.27	11.90	2	0.02	2.34
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	0.55	0.055	2.42	0.26	0.026	3.05
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	1.4	0.14	6.17	0.29	0.029	3.40
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	0.64	0.064	2.82	0.26	0.026	3.05
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	0.45	0.225	9.91	0.23	0.115	13.48
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.36	0.36	15.86	0.28	0.28	32.82
Dioxin	OCDD	(ng/Kg)	0.001	230	0.23	10.13	13	0.013	1.52
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	10	0.1	4.41	0.7	0.007	0.82
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	1.1	0.011	0.48	0.29	0.0029	0.34
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	1.4	0.14	6.17	0.23	0.023	2.70
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.52	0.052	2.29	0.17	0.017	1.99
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.47	0.047	2.07	0.16	0.016	1.88
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.31	0.0155	0.68	0.49	0.0245	2.87
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.71	0.071	3.13	0.22	0.022	2.58
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.62	0.31	13.66	0.24	0.12	14.07
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	1.5	0.15	6.61	1.1	0.11	12.89
Furan	OCDF	(ng/Kg)	0.001	29	0.029	1.28	1.7	0.0017	0.20
	SUM OF TEQ				2.27			0.85	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	Toxic Equivalency Factors EPA 1989	101816012			101816013		
		Station Name:		SED-103					
		Station / Sample Name:		SED-103	ng TEQ/kg	% contribution	SED-103	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/18/2016			10/18/2016		
GEO	Percent Moisture	(%)		28			21.6		
Organic	Carbon, Total Organic	(mg/kg)		17,800			38,300		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	950	9.5	20.93	5.8	0.058	13.44
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	5.3	0.53	1.17	0.083	0.0083	1.92
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	39	3.9	8.59	0.18	0.018	4.17
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	11	1.1	2.42	0.091	0.0091	2.11
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	1.5	0.75	1.65	0.078	0.039	9.04
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.16	0.16	0.35	0.083	0.083	19.23
Dioxin	OCDD	(ng/Kg)	0.001	11,000	11	24.23	65	0.065	15.06
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	360	3.6	7.93	2.7	0.027	6.26
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	35	0.35	0.77	0.21	0.0021	0.49
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	35	3.5	7.71	0.14	0.014	3.24
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	17	1.7	3.74	0.14	0.014	3.24
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	16	1.6	3.52	0.084	0.0084	1.95
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	5.4	0.27	0.59	0.085	0.00425	0.98
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	6.4	0.64	1.41	0.17	0.017	3.94
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	11	5.5	12.12	0.07	0.035	8.11
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	0.96	0.096	0.21	0.2	0.02	4.63
Furan	OCDF	(ng/Kg)	0.001	1,200	1.2	2.64	9.4	0.0094	2.18
	SUM OF TEQ				45.40			0.43	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	**Toxic Equivalency Factors EPA 1989**	101816011		
		Station Name:		SED-104		
		Station / Sample Name:		SED-104	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.4		
		Sample Date:		10/18/2016		
GEO	Percent Moisture	(%)		24.6		
Organic	Carbon, Total Organic	(mg/kg)		11,100		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	290	2.9	19.77
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	2.8	0.28	1.91
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	15	1.5	10.22
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	5.8	0.58	3.95
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	0.73	0.365	2.49
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.11	0.11	0.75
Dioxin	OCDD	(ng/Kg)	0.001	2,500	2.5	17.04
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	100	1	6.82
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	9.6	0.096	0.65
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	12	1.2	8.18
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	5	0.5	3.41
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	5	0.5	3.41
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	1.9	0.095	0.65
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	6.3	0.63	4.29
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	4.1	2.05	13.97
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	0.54	0.054	0.37
Furan	OCDF	(ng/Kg)	0.001	310	0.31	2.11
	SUM OF TEQ				14.67	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	Toxic Equivalency Factors EPA 1989	101816015			101816016			101816017		
		Station Name:		SED-105								
		Station / Sample Name:		SED-105	ng TEQ/kg	% contribution	SED-105	ng TEQ/kg	% contribution	SED-105 Duplicate	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.4			0.5-1.4		
		Sample Date:		10/18/2016			10/18/2016			10/18/2016		
GEO	Percent Moisture	(%)		8.6			58.7			38.7		
Organic	Carbon, Total Organic	(mg/kg)		5,310			76,100			43,500		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	110	1.1	20.43	45	0.45	19.48	38	0.38	19.72
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	1.1	0.11	2.04	0.4	0.04	1.73	0.41	0.041	2.13
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	5	0.5	9.29	1.7	0.17	7.36	1.6	0.16	8.30
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	1.6	0.16	2.97	0.72	0.072	3.12	0.63	0.063	3.27
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	0.32	0.16	2.97	0.11	0.055	2.38	0.092	0.046	2.39
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.091	0.091	1.69	0.2	0.2	8.66	0.12	0.12	6.23
Dioxin	OCDD	(ng/Kg)	0.001	970	0.97	18.02	510	0.51	22.08	360	0.36	18.68
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	41	0.41	7.62	21	0.21	9.09	15	0.15	7.78
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	3.7	0.037	0.69	1.6	0.016	0.69	1.2	0.012	0.62
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	3.4	0.34	6.32	1.3	0.13	5.63	1.2	0.12	6.23
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	1.6	0.16	2.97	0.56	0.056	2.42	0.46	0.046	2.39
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	1.4	0.14	2.60	0.36	0.036	1.56	0.44	0.044	2.28
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.61	0.0305	0.57	0.14	0.007	0.30	0.18	0.009	0.47
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	2.2	0.22	4.09	0.78	0.078	3.38	0.6	0.06	3.11
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	1.6	0.8	14.86	0.31	0.155	6.71	0.45	0.225	11.68
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	0.25	0.025	0.46	0.4	0.04	1.73	0.34	0.034	1.76
Furan	OCDF	(ng/Kg)	0.001	130	0.13	2.41	85	0.085	3.68	57	0.057	2.96
	SUM OF TEQ				5.38			2.31			1.93	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	Toxic Equivalency Factors EPA 1989	101716001			101716002		
		Station Name:		SED-106					
		Station / Sample Name:		SED-106	ng TEQ/kg	% contribution	SED-106	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.4		
		Sample Date:		10/17/2016			10/17/2016		
GEO	Percent Moisture	(%)		14.5			5.2		
Organic	Carbon, Total Organic	(mg/kg)		2,360			1,610		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	4	0.04	9.99	4.1	0.041	10.25
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	0.16	0.016	3.99	0.16	0.016	4.00
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	0.21	0.021	5.24	0.14	0.014	3.50
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	0.17	0.017	4.24	0.21	0.021	5.25
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	0.057	0.0285	7.12	0.052	0.026	6.50
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.095	0.095	23.72	0.1	0.1	24.99
Dioxin	OCDD	(ng/Kg)	0.001	38	0.038	9.49	51	0.051	12.75
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	1.4	0.014	3.50	1.3	0.013	3.25
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	0.15	0.0015	0.37	0.15	0.0015	0.37
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	0.16	0.016	3.99	0.13	0.013	3.25
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.13	0.013	3.25	0.13	0.013	3.25
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.16	0.016	3.99	0.072	0.0072	1.80
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.071	0.00355	0.89	0.054	0.0027	0.67
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.13	0.013	3.25	0.086	0.0086	2.15
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.093	0.0465	11.61	0.11	0.055	13.75
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	0.16	0.016	3.99	0.12	0.012	3.00
Furan	OCDF	(ng/Kg)	0.001	5.5	0.0055	1.37	5.1	0.0051	1.27
	SUM OF TEQ				0.40			0.40	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	Toxic Equivalency Factors EPA 1989	101716003			101716004		
		Station Name:		SED-107					
		Station / Sample Name:		SED-107	ng TEQ/kg	% contribution	SED-107	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-0.7		
		Sample Date:		10/17/2016			10/17/2016		
GEO	Percent Moisture	(%)		17.1			14.8		
Organic	Carbon, Total Organic	(mg/kg)		1,390			1,810		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	1.5	0.015	6.25	6.4	0.064	8.49
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	0.059	0.0059	2.46	0.27	0.027	3.58
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	0.077	0.0077	3.21	0.55	0.055	7.30
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	0.06	0.006	2.50	0.2	0.02	2.65
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	0.041	0.0205	8.55	0.14	0.07	9.29
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.085	0.085	35.43	0.26	0.26	34.49
Dioxin	OCDD	(ng/Kg)	0.001	11	0.011	4.59	30	0.03	3.98
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	0.7	0.007	2.92	1.4	0.014	1.86
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	0.14	0.0014	0.58	0.34	0.0034	0.45
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	0.1	0.01	4.17	0.2	0.02	2.65
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.088	0.0088	3.67	0.17	0.017	2.26
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.097	0.0097	4.04	0.27	0.027	3.58
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.05	0.0025	1.04	0.14	0.007	0.93
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.077	0.0077	3.21	0.19	0.019	2.52
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.04	0.02	8.34	0.17	0.085	11.28
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	0.2	0.02	8.34	0.33	0.033	4.38
Furan	OCDF	(ng/Kg)	0.001	1.7	0.0017	0.71	2.4	0.0024	0.32
	SUM OF TEQ				0.24			0.75	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

		Field Sample ID:	**Toxic Equivalency Factors EPA 1989**	101716005			101716006			101716007		
		Station Name:		SED-108								
		Station / Sample Name:		SED-108	ng TEQ/kg	% contribution	SED-108	ng TEQ/kg	% contribution	SED-108 Duplicate	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.4			0.5-1.4		
		Sample Date:		10/17/2016			10/17/2016			10/17/2016		
GEO	Percent Moisture	(%)		9			13.1			13.6		
Organic	Carbon, Total Organic	(mg/kg)		2,960			6,290			16,500		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.01	880	8.8	29.73	1.3	0.013	3.26	2.9	0.029	4.66
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.1	0.48	0.048	0.16	0.12	0.012	3.01	0.11	0.011	1.77
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.1	14	1.4	4.73	0.12	0.012	3.01	0.16	0.016	2.57
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.1	1.4	0.14	0.47	0.12	0.012	3.01	0.11	0.011	1.77
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	0.5	0.088	0.044	0.15	0.084	0.042	10.54	0.14	0.07	11.26
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.095	0.095	0.32	0.18	0.18	45.15	0.24	0.24	38.60
Dioxin	OCDD	(ng/Kg)	0.001	12,000	12	40.55	12	0.012	3.01	28	0.028	4.50
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	360	3.6	12.16	0.6	0.006	1.51	1.4	0.014	2.25
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	14	0.14	0.47	0.13	0.0013	0.33	0.2	0.002	0.32
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	2.5	0.25	0.84	0.093	0.0093	2.33	0.18	0.018	2.89
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	1.4	0.14	0.47	0.073	0.0073	1.83	0.15	0.015	2.41
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.33	0.033	0.11	0.1	0.01	2.51	0.13	0.013	2.09
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.1	0.005	0.02	0.079	0.00395	0.99	0.16	0.008	1.29
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	2.4	0.24	0.81	0.069	0.0069	1.73	0.12	0.012	1.93
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.27	0.135	0.46	0.09	0.045	11.29	0.22	0.11	17.69
Furan	2,3,7,8-TCDF	(ng/Kg)	0.1	0.26	0.026	0.09	0.24	0.024	6.02	0.19	0.019	3.06
Furan	OCDF	(ng/Kg)	0.001	2,500	2.5	8.45	1.9	0.0019	0.48	5.8	0.0058	0.93
	SUM OF TEQ				29.60			0.40			0.62	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs
Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	102016035			102016036		
		Station Name:		SED-01					
		Station / Sample Name:		SED-01	ng TEQ/kg	% contribution	SED-01	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/20/2016			10/20/2016		
GEO	Percent Moisture	(%)		90.3			85.5		
Organic	Carbon, Total Organic	(mg/kg)		268,000			353,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	3.6	0.0036	0.33	1	0.001	0.10
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.27	0.135	12.20	0.32	0.16	15.33
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	0.29	0.0029	0.26	0.32	0.0032	0.31
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	0.26	0.0026	0.23	0.25	0.0025	0.24
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.3	0.3	27.10	0.26	0.26	24.92
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.34	0.34	30.71	0.34	0.34	32.58
Dioxin	OCDD	(ng/Kg)	0.0001	29	0.0029	0.26	6.2	0.00062	0.06
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	1	0.01	0.90	0.47	0.0047	0.45
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	0.32	0.0032	0.29	0.24	0.0024	0.23
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	0.21	0.021	1.90	0.16	0.016	1.53
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.23	0.023	2.08	0.16	0.016	1.53
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.27	0.027	2.44	0.23	0.023	2.20
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.45	0.0225	2.03	0.34	0.017	1.63
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.28	0.028	2.53	0.22	0.022	2.11
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.25	0.125	11.29	0.22	0.11	10.54
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	1.2	0.06	5.42	1.3	0.065	6.23
Furan	OCDF	(ng/Kg)	0.0001	2.6	0.00026	0.02	0.66	0.00007	0.01
	SUM OF TEQ				1.11			1.04	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
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Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs
Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	101916027			101916028		
		Station Name:		SED-02					
		Station / Sample Name:		SED-02	ng TEQ/kg	% contribution	SED-02	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/19/2016			10/19/2016		
GEO	Percent Moisture	(%)		91.9			87.2		
Organic	Carbon, Total Organic	(mg/kg)		317,000			216,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	6,500	6.5	3.85	470	0.47	3.47
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	47	23.5	13.92	3.9	1.95	14.40
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	260	2.6	1.54	18	0.18	1.33
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	100	1	0.59	7.2	0.072	0.53
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	11	11	6.52	1.1	1.1	8.12
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	2.3	2.3	1.36	0.65	0.65	4.80
Dioxin	OCDD	(ng/Kg)	0.0001	72,000	7.2	4.27	5,700	0.57	4.21
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	2,200	22	13.03	150	1.5	11.07
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	200	2	1.18	14	0.14	1.03
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	250	25	14.81	17	1.7	12.55
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	110	11	6.52	9	0.9	6.64
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	76	7.6	4.50	5.8	0.58	4.28
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	29	1.45	0.86	2.2	0.11	0.81
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	110	11	6.52	8.3	0.83	6.13
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	67	33.5	19.84	5.3	2.65	19.56
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	7.2	0.36	0.21	1.8	0.09	0.66
Furan	OCDF	(ng/Kg)	0.0001	8,000	0.8	0.47	540	0.054	0.40
	SUM OF TEQ				168.81			13.55	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
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4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

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Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	101916024			101916025		
		Station Name:		SED-03					
		Station / Sample Name:		SED-03	ng TEQ/kg	% contribution	SED-03	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/19/2016			10/19/2016		
GEO	Percent Moisture	(%)		46.3			55.4		
Organic	Carbon, Total Organic	(mg/kg)		19,300			30,900		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	17,000	17	4.00	75,000	75	4.26
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	100	50	11.77	370	185	10.51
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	740	7.4	1.74	2,800	28	1.59
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	230	2.3	0.54	780	7.8	0.44
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	27	27	6.35	89	89	5.06
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	2.1	2.1	0.49	9.3	9.3	0.53
Dioxin	OCDD	(ng/Kg)	0.0001	170,000	17	4.00	570,000	57	3.24
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	5,700	57	13.41	27,000	270	15.34
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	570	5.7	1.34	2,500	25	1.42
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	620	62	14.59	2,500	250	14.21
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	230	23	5.41	1,000	100	5.68
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	250	25	5.88	1,100	110	6.25
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	77	3.85	0.91	270	13.5	0.77
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	280	28	6.59	1,200	120	6.82
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	190	95	22.36	820	410	23.30
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	15	0.75	0.18	71	3.55	0.20
Furan	OCDF	(ng/Kg)	0.0001	18,000	1.8	0.42	65,000	6.5	0.37
	SUM OF TEQ				424.90			1759.65	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
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Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	101916021			101916022		
		Station Name:		SED-04					
		Station / Sample Name:		SED-04	ng TEQ/kg	% contribution	SED-04	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/19/2016			10/19/2016		
GEO	Percent Moisture	(%)		91.4			75.4		
Organic	Carbon, Total Organic	(mg/kg)		245,000			128,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	7,800	7.8	3.87	31,000	31	5.11
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	48	24	11.90	160	80	13.19
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	340	3.4	1.69	960	9.6	1.58
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	110	1.1	0.55	310	3.1	0.51
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	15	15	7.44	42	42	6.93
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.97	0.97	0.48	2.4	2.4	0.40
Dioxin	OCDD	(ng/Kg)	0.0001	73,000	7.3	3.62	310,000	31	5.11
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	2,600	26	12.89	12,000	120	19.79
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	210	2.1	1.04	960	9.6	1.58
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	290	29	14.38	890	89	14.68
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	110	11	5.45	360	36	5.94
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	110	11	5.45	190	19	3.13
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	41	2.05	1.02	76	3.8	0.63
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	130	13	6.45	390	39	6.43
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	93	46.5	23.06	170	85	14.02
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	9.9	0.495	0.25	11	0.55	0.09
Furan	OCDF	(ng/Kg)	0.0001	9,600	0.96	0.48	53,000	5.3	0.87
	SUM OF TEQ				201.68			606.35	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
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Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	101916018			101916019		
		Station Name:		SED-05					
		Station / Sample Name:		SED-05	ng TEQ/kg	% contribution	SED-05	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/19/2016			10/19/2016		
GEO	Percent Moisture	(%)		35.8			16.9		
Organic	Carbon, Total Organic	(mg/kg)		19,400			649		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	1,600	1.6	4.08	11	0.011	1.86
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	10	5	12.76	0.16	0.08	13.52
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	65	0.65	1.66	0.47	0.0047	0.79
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	25	0.25	0.64	0.21	0.0021	0.35
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	2.6	2.6	6.64	0.08	0.08	13.52
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.16	0.16	0.41	0.12	0.12	20.28
Dioxin	OCDD	(ng/Kg)	0.0001	17,000	1.7	4.34	120	0.012	2.03
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	580	5.8	14.81	4.6	0.046	7.77
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	52	0.52	1.33	0.38	0.0038	0.64
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	58	5.8	14.81	0.4	0.04	6.76
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	24	2.4	6.13	0.23	0.023	3.89
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	20	2	5.11	0.15	0.015	2.54
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	8	0.4	1.02	0.11	0.0055	0.93
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	25	2.5	6.38	0.21	0.021	3.55
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	15	7.5	19.14	0.24	0.12	20.28
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	1.3	0.065	0.17	0.12	0.006	1.01
Furan	OCDF	(ng/Kg)	0.0001	2,300	0.23	0.59	16	0.0016	0.27
	SUM OF TEQ				39.18			0.59	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
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C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	101816008			101816009		
		Station Name:		SED-06					
		Station / Sample Name:		SED-06	ng TEQ/kg	% contribution	SED-06	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/18/2016			10/18/2016		
GEO	Percent Moisture	(%)		92			77.3		
Organic	Carbon, Total Organic	(mg/kg)		350,000			95,900		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	18,000	18	4.36	25,000	25	5.28
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	110	55	13.32	140	70	14.78
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	690	6.9	1.67	810	8.1	1.71
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	220	2.2	0.53	280	2.8	0.59
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	26	26	6.29	33	33	6.97
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	2.1	2.1	0.51	2.1	2.1	0.44
Dioxin	OCDD	(ng/Kg)	0.0001	190,000	19	4.60	270,000	27	5.70
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	7,900	79	19.13	11,000	110	23.22
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	680	6.8	1.65	920	9.2	1.94
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	460	46	11.14	300	30	6.33
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	300	30	7.26	400	40	8.44
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	200	20	4.84	160	16	3.38
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	63	3.15	0.76	67	3.35	0.71
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	300	30	7.26	370	37	7.81
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	130	65	15.74	110	55	11.61
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	9.9	0.495	0.12	5.6	0.28	0.06
Furan	OCDF	(ng/Kg)	0.0001	34,000	3.4	0.82	49,000	4.9	1.03
	SUM OF TEQ				413.05			473.73	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
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Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	102016032			102016033		
		Station Name:		SED-101					
		Station / Sample Name:		SED-101	ng TEQ/kg	% contribution	SED-101	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/20/2016			10/20/2016		
GEO	Percent Moisture	(%)		90.6			87.8		
Organic	Carbon, Total Organic	(mg/kg)		146,000			165,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	39	0.039	1.80	20	0.02	1.10
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.46	0.23	10.60	0.24	0.12	6.61
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	2.1	0.021	0.97	0.82	0.0082	0.45
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	0.92	0.0092	0.42	0.4	0.004	0.22
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.42	0.42	19.36	0.35	0.35	19.28
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.41	0.41	18.90	0.6	0.6	33.06
Dioxin	OCDD	(ng/Kg)	0.0001	370	0.037	1.71	230	0.023	1.27
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	12	0.12	5.53	7.1	0.071	3.91
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	1.3	0.013	0.60	0.6	0.006	0.33
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	1.5	0.15	6.92	0.87	0.087	4.79
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.73	0.073	3.37	0.52	0.052	2.87
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.71	0.071	3.27	0.26	0.026	1.43
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.55	0.0275	1.27	0.48	0.024	1.32
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	1.1	0.11	5.07	0.26	0.026	1.43
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.73	0.365	16.83	0.65	0.325	17.91
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	1.4	0.07	3.23	1.4	0.07	3.86
Furan	OCDF	(ng/Kg)	0.0001	34	0.0034	0.16	27	0.0027	0.15
	SUM OF TEQ				2.17			1.81	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs
Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	102016030			102016031		
		Station Name:		SED-102					
		Station / Sample Name:		SED-102	ng TEQ/kg	% contribution	SED-102	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/20/2016			10/20/2016		
GEO	Percent Moisture	(%)		92.2			88.2		
Organic	Carbon, Total Organic	(mg/kg)		279,000			226,000		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	27	0.027	1.36	2	0.002	0.21
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.55	0.275	13.89	0.26	0.13	13.88
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	1.4	0.014	0.71	0.29	0.0029	0.31
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	0.64	0.0064	0.32	0.26	0.0026	0.28
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.45	0.45	22.73	0.23	0.23	24.56
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.36	0.36	18.18	0.28	0.28	29.90
Dioxin	OCDD	(ng/Kg)	0.0001	230	0.023	1.16	13	0.0013	0.14
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	10	0.1	5.05	0.7	0.007	0.75
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	1.1	0.011	0.56	0.29	0.0029	0.31
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	1.4	0.14	7.07	0.23	0.023	2.46
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.52	0.052	2.63	0.17	0.017	1.82
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.47	0.047	2.37	0.16	0.016	1.71
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.31	0.0155	0.78	0.49	0.0245	2.62
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.71	0.071	3.59	0.22	0.022	2.35
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.62	0.31	15.66	0.24	0.12	12.82
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	1.5	0.075	3.79	1.1	0.055	5.87
Furan	OCDF	(ng/Kg)	0.0001	29	0.0029	0.15	1.7	0.00017	0.02
	SUM OF TEQ				1.98			0.94	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
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4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs
Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	101816012			101816013		
		Station Name:		SED-103					
		Station / Sample Name:		SED-103	ng TEQ/kg	% contribution	SED-103	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.5		
		Sample Date:		10/18/2016			10/18/2016		
GEO	Percent Moisture	(%)		28			21.6		
Organic	Carbon, Total Organic	(mg/kg)		17,800			38,300		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	950	0.95	3.93	5.8	0.0058	1.66
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	5.3	2.65	10.96	0.083	0.0415	11.85
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	39	0.39	1.61	0.18	0.0018	0.51
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	11	0.11	0.45	0.091	0.00091	0.26
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	1.5	1.5	6.20	0.078	0.078	22.27
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.16	0.16	0.66	0.083	0.083	23.70
Dioxin	OCDD	(ng/Kg)	0.0001	11,000	1.1	4.55	65	0.0065	1.86
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	360	3.6	14.88	2.7	0.027	7.71
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	35	0.35	1.45	0.21	0.0021	0.60
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	35	3.5	14.47	0.14	0.014	4.00
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	17	1.7	7.03	0.14	0.014	4.00
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	16	1.6	6.61	0.084	0.0084	2.40
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	5.4	0.27	1.12	0.085	0.00425	1.21
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	6.4	0.64	2.65	0.17	0.017	4.85
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	11	5.5	22.74	0.07	0.035	9.99
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.96	0.048	0.20	0.2	0.01	2.86
Furan	OCDF	(ng/Kg)	0.0001	1,200	0.12	0.50	9.4	0.00094	0.27
	SUM OF TEQ				24.19			0.35	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs
Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	**Toxic Equivalency Factors WHO 1998 (Fish)**	101816011		
		Station Name:		SED-104		
		Station / Sample Name:		SED-104	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.4		
		Sample Date:		10/18/2016		
GEO	Percent Moisture	(%)		24.6		
Organic	Carbon, Total Organic	(mg/kg)		11,100		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	290	0.29	3.18
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	2.8	1.4	15.36
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	15	0.15	1.65
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	5.8	0.058	0.64
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.73	0.73	8.01
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.11	0.11	1.21
Dioxin	OCDD	(ng/Kg)	0.0001	2,500	0.25	2.74
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	100	1	10.97
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	9.6	0.096	1.05
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	12	1.2	13.16
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	5	0.5	5.48
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	5	0.5	5.48
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	1.9	0.095	1.04
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	6.3	0.63	6.91
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	4.1	2.05	22.49
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.54	0.027	0.30
Furan	OCDF	(ng/Kg)	0.0001	310	0.031	0.34
	SUM OF TEQ			9.12		

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs
Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	101816015			101816016			101816017		
		Station Name:		SED-105								
		Station / Sample Name:		SED-105	ng TEQ/kg	% contribution	SED-105	ng TEQ/kg	% contribution	SED-105 Duplicate	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.4			0.5-1.4		
		Sample Date:		10/18/2016			10/18/2016			10/18/2016		
GEO	Percent Moisture	(%)		8.6			58.7			38.7		
Organic	Carbon, Total Organic	(mg/kg)		5,310			76,100			43,500		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	110	0.11	3.24	45	0.045	3.34	38	0.038	3.16
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	1.1	0.55	16.19	0.4	0.2	14.85	0.41	0.205	17.05
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	5	0.05	1.47	1.7	0.017	1.26	1.6	0.016	1.33
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	1.6	0.016	0.47	0.72	0.0072	0.53	0.63	0.0063	0.52
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.32	0.32	9.42	0.11	0.11	8.17	0.092	0.092	7.65
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.091	0.091	2.68	0.2	0.2	14.85	0.12	0.12	9.98
Dioxin	OCDD	(ng/Kg)	0.0001	970	0.097	2.86	510	0.051	3.79	360	0.036	3.00
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	41	0.41	12.07	21	0.21	15.59	15	0.15	12.48
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	3.7	0.037	1.09	1.6	0.016	1.19	1.2	0.012	1.00
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	3.4	0.34	10.01	1.3	0.13	9.65	1.2	0.12	9.98
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	1.6	0.16	4.71	0.56	0.056	4.16	0.46	0.046	3.83
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	1.4	0.14	4.12	0.36	0.036	2.67	0.44	0.044	3.66
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.61	0.0305	0.90	0.14	0.007	0.52	0.18	0.009	0.75
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	2.2	0.22	6.48	0.78	0.078	5.79	0.6	0.06	4.99
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	1.6	0.8	23.55	0.31	0.155	11.51	0.45	0.225	18.72
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.25	0.0125	0.37	0.4	0.02	1.49	0.34	0.017	1.41
Furan	OCDF	(ng/Kg)	0.0001	130	0.013	0.38	85	0.0085	0.63	57	0.0057	0.47
	SUM OF TEQ				3.40			1.35			1.20	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs
Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	101716001			101716002		
		Station Name:		SED-106					
		Station / Sample Name:		SED-106	ng TEQ/kg	% contribution	SED-106	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.4		
		Sample Date:		10/17/2016			10/17/2016		
GEO	Percent Moisture	(%)		14.5			5.2		
Organic	Carbon, Total Organic	(mg/kg)		2,360			1,610		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	4	0.004	1.06	4.1	0.0041	1.12
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.16	0.08	21.29	0.16	0.08	21.91
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	0.21	0.0021	0.56	0.14	0.0014	0.38
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	0.17	0.0017	0.45	0.21	0.0021	0.58
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.057	0.057	15.17	0.052	0.052	14.24
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.095	0.095	25.29	0.1	0.1	27.38
Dioxin	OCDD	(ng/Kg)	0.0001	38	0.0038	1.01	51	0.0051	1.40
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	1.4	0.014	3.73	1.3	0.013	3.56
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	0.15	0.0015	0.40	0.15	0.0015	0.41
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	0.16	0.016	4.26	0.13	0.013	3.56
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.13	0.013	3.46	0.13	0.013	3.56
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.16	0.016	4.26	0.072	0.0072	1.97
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.071	0.00355	0.94	0.054	0.0027	0.74
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.13	0.013	3.46	0.086	0.0086	2.35
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.093	0.0465	12.38	0.11	0.055	15.06
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.16	0.008	2.13	0.12	0.006	1.64
Furan	OCDF	(ng/Kg)	0.0001	5.5	0.00055	0.15	5.1	0.00051	0.14
	SUM OF TEQ				0.38			0.37	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs
Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	101716003			101716004		
		Station Name:		SED-107					
		Station / Sample Name:		SED-107	ng TEQ/kg	% contribution	SED-107	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-0.7		
		Sample Date:		10/17/2016			10/17/2016		
GEO	Percent Moisture	(%)		17.1			14.8		
Organic	Carbon, Total Organic	(mg/kg)		1,390			1,810		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	1.5	0.0015	0.63	6.4	0.0064	0.84
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.059	0.0295	12.46	0.27	0.135	17.74
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	0.077	0.00077	0.33	0.55	0.0055	0.72
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	0.06	0.0006	0.25	0.2	0.002	0.26
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.041	0.041	17.32	0.14	0.14	18.40
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.085	0.085	35.90	0.26	0.26	34.16
Dioxin	OCDD	(ng/Kg)	0.0001	11	0.0011	0.46	30	0.003	0.39
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	0.7	0.007	2.96	1.4	0.014	1.84
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	0.14	0.0014	0.59	0.34	0.0034	0.45
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	0.1	0.01	4.22	0.2	0.02	2.63
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	0.088	0.0088	3.72	0.17	0.017	2.23
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.097	0.0097	4.10	0.27	0.027	3.55
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.05	0.0025	1.06	0.14	0.007	0.92
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	0.077	0.0077	3.25	0.19	0.019	2.50
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.04	0.02	8.45	0.17	0.085	11.17
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.2	0.01	4.22	0.33	0.0165	2.17
Furan	OCDF	(ng/Kg)	0.0001	1.7	0.00017	0.07	2.4	0.00024	0.03
	SUM OF TEQ				0.24			0.76	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.

Appendix D - Sediment TEQ Calculations with WHO 1998 TEFs
Military Creek Site Investigation / Remedial Action Options
C.M. Christiansen Co. Inc. Former Pole Yard, Phelps, Wisconsin
WDNR BRRTS Activity #02-64-000068

		Field Sample ID:	Toxic Equivalency Factors WHO 1998 (Fish)	101716005			101716006			101716007		
		Station Name:		SED-108								
		Station / Sample Name:		SED-108	ng TEQ/kg	% contribution	SED-108	ng TEQ/kg	% contribution	SED-108 Duplicate	ng TEQ/kg	% contribution
		Sample Depth (feet):		0-0.5			0.5-1.4			0.5-1.4		
		Sample Date:		10/17/2016			10/17/2016			10/17/2016		
GEO	Percent Moisture	(%)		9			13.1			13.6		
Organic	Carbon, Total Organic	(mg/kg)		2,960			6,290			16,500		
Dioxin	1,2,3,4,6,7,8-HpCDD	(ng/Kg)	0.001	880	0.88	11.79	1.3	0.0013	0.30	2.9	0.0029	0.45
Dioxin	1,2,3,4,7,8-HxCDD	(ng/Kg)	0.5	0.48	0.24	3.22	0.12	0.06	13.93	0.11	0.055	8.52
Dioxin	1,2,3,6,7,8-HxCDD	(ng/Kg)	0.01	14	0.14	1.88	0.12	0.0012	0.28	0.16	0.0016	0.25
Dioxin	1,2,3,7,8,9-HxCDD	(ng/Kg)	0.01	1.4	0.014	0.19	0.12	0.0012	0.28	0.11	0.0011	0.17
Dioxin	1,2,3,7,8-PeCDD	(ng/Kg)	1	0.088	0.088	1.18	0.084	0.084	19.50	0.14	0.14	21.69
Dioxin	2,3,7,8-TCDD	(ng/Kg)	1	0.095	0.095	1.27	0.18	0.18	41.78	0.24	0.24	37.18
Dioxin	OCDD	(ng/Kg)	0.0001	12,000	1.2	16.08	12	0.0012	0.28	28	0.0028	0.43
Furan	1,2,3,4,6,7,8-HpCDF	(ng/Kg)	0.01	360	3.6	48.24	0.6	0.006	1.39	1.4	0.014	2.17
Furan	1,2,3,4,7,8,9-HpCDF	(ng/Kg)	0.01	14	0.14	1.88	0.13	0.0013	0.30	0.2	0.002	0.31
Furan	1,2,3,4,7,8-HxCDF	(ng/Kg)	0.1	2.5	0.25	3.35	0.093	0.0093	2.16	0.18	0.018	2.79
Furan	1,2,3,6,7,8-HxCDF	(ng/Kg)	0.1	1.4	0.14	1.88	0.073	0.0073	1.69	0.15	0.015	2.32
Furan	1,2,3,7,8,9-HxCDF	(ng/Kg)	0.1	0.33	0.033	0.44	0.1	0.01	2.32	0.13	0.013	2.01
Furan	1,2,3,7,8-PeCDF	(ng/Kg)	0.05	0.1	0.005	0.07	0.079	0.00395	0.92	0.16	0.008	1.24
Furan	2,3,4,6,7,8-HxCDF	(ng/Kg)	0.1	2.4	0.24	3.22	0.069	0.0069	1.60	0.12	0.012	1.86
Furan	2,3,4,7,8-PeCDF	(ng/Kg)	0.5	0.27	0.135	1.81	0.09	0.045	10.44	0.22	0.11	17.04
Furan	2,3,7,8-TCDF	(ng/Kg)	0.05	0.26	0.013	0.17	0.24	0.012	2.79	0.19	0.0095	1.47
Furan	OCDF	(ng/Kg)	0.0001	2,500	0.25	3.35	1.9	0.00019	0.04	5.8	0.00058	0.09
	SUM OF TEQ				7.46			0.43			0.65	

Notes

1. TEQ = Total 2,3,7,8-TCDD Equivalence
2. ng/Kg = nanograms per kilogram
3. mg/Kg = miligram per kilogram
4. Concentrations reported as Non Detect by the laboratory were replaced with the method detection limit.