

Table 1  
2018 Husky Superior Refinery  
Surface Water Data Summary  
Superior, WI

Parameter	Units	Newton Creek Mouth																											
		Date		Location																									
		Depth	Sample Type	4/27/2018	4/28/2018	4/29/2018	4/30/2018	5/02/2018	5/04/2018	5/06/2018	5/08/2018	5/10/2018	5/15/2018	5/21/2018	5/23/2018	5/29/2018	6/04/2018	6/12/2018	6/18/2018	7/23/2018	7/30/2018	8/06/2018	8/13/2018	9/04/2018	9/17/2018	10/01/2018	10/15/2018	10/29/2018	11/12/2018
General Parameters																													
Hardness, as CaCO <sub>3</sub>	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Nitrogen, ammonia, as N	mg/l	0.18	0.086 j	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Oil and Grease	mg/l	1.6 j	< 1.4	< 1.5	< 1.4	< 1.4	< 1.5	< 1.4	< 1.5	< 1.4	< 1.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Sulfate, as SO <sub>4</sub>	mg/l	12.9	12.4	11.6	12.4	10.1	10.6	10.4	10.4	9.5	9.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Total Metals																													
Aluminum	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Antimony	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Arsenic	ug/l	< 4.1	< 4.1	< 5.2	< 5.2	5.4 j	< 5.2	< 5.2	< 5.2	< 5.2	< 5.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Barium	ug/l	48.3	47.6	43.8	63.6	46.7	25.8	26.3	31.7 b	46.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Beryllium	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Boron	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Cadmium	ug/l	< 0.64	< 0.64	< 0.46	< 0.46	< 0.46	< 0.46	< 0.46	< 0.46	< 0.46	< 0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Calcium	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Chromium	ug/l	< 1.4	< 1.4	0.85 j	5.0	1.9	0.89 j	0.67 j	0.98 j	0.96 j	1.0 j	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Cobalt	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Copper	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Iron	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Lead	ug/l	< 3.3	< 3.3	< 3.0	8.2 j	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Magnesium	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Manganese	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Mercury	ug/l	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Molybdenum	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Nickel	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Potassium	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Selenium	ug/l	< 4.7	< 4.7	< 6.4	< 6.4	< 6.4	< 6.4	< 6.4	< 6.4	< 6.4	< 6.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Silver	ug/l	< 0.38	< 0.38	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Sodium	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Thallium	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Tin	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Titanium	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Vanadium	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Zinc	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Semivolatile Organic Compounds																													
1,2,4-Trichlorobenzene	ug/l	< 222	< 4.1	< 22.6	< 43.9	< 21.0	< 22.2	< 4.2	< 4.4	< 4.4	< 4.3	--	--	< 4.6	< 0.84 h	< 0.80 h	< 0.80	< 0.80	< 0.79	< 0.82	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	ug/l	< 186	< 3.4	< 19.																									

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Sky Superior Refinery  
Water Data Summary  
Superior, WI**

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		Location		Date		Depth		Sample Type		N		N		N		N		N		N		N		N		N		N				
		4/27/2018	4/28/2018	4/29/2018	4/30/2018	5/02/2018	5/04/2018	5/06/2018	5/08/2018	5/10/2018	5/15/2018	5/21/2018	5/29/2018	6/04/2018	6/12/2018	6/18/2018	7/23/2018	7/30/2018	8/06/2018	8/13/2018	9/04/2018	9/17/2018	10/01/2018	10/15/2018	10/29/2018	11/12/2018	12/3/2018					
Xylene, total	ug/l	8.1	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	--	< 0.24 h	< 0.24 h	< 0.31	< 0.31	< 0.31	--	--	--	--	--	--	--	--	--			
Total Petroleum Hydrocarbons																																
Sum of total petroleum hydrocarbon range C6-C28 (Barr Calc)	mg/l	--	--	0.76 a	0.73	0.15	ND a	0.098 a	0.11	0.17 a	0.14	ND a	ND a	0.09 a	--	0.0162 a	0.0158 a	ND a	ND a	ND a	ND a	--	--	--	--	--	--	--	--	--	--	
Gasoline Range Organic C6-C10	ug/l	182	66.7 j	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Petroleum Hydrocarbons C6-C9	ug/l	--	--	15.6 j	< 8.9	< 8.9	15.6 j b	< 8.9	23.6 j	< 8.9	26.2 j b	9.2 j b	11.0 j	--	16.2 j h	15.6 j h	< 8.9	< 8.9	10.7 j b	< 8.9	--	--	--	--	--	--	--	--	--	--		
Diesel Range Organics, C10-C28	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Petroleum Hydrocarbons C10-C28	mg/l	--	--	0.74	0.73	0.15	0.11 b	0.098	0.11	0.15	0.14	0.14 b	0.073 b	0.075	--	0.12 b h	0.12 b h	0.081 b	0.088 b	0.062 b	0.063 b	--	--	--	--	--	--	--	--	--	--	
DRO-modified, C10-C36	mg/l	6.4	3.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Petroleum Hydrocarbons C10-C36	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Petroleum Hydrocarbons C24-C36	mg/l	--	--	0.25	0.53	0.096	0.079	0.11	0.12	0.11	0.13	0.12 b	0.082 b	0.085	--	0.11 b h	0.11 b h	0.072	0.083	0.085 b	0.074	--	--	--	--	--	--	--	--	--	--	
Per- and Polyfluoroalkyl Substances																																
4:2 Fluorotelomer sulfonate (4:2 FTS)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	
6:2 Fluorotelomer sulfonate (6:2 FTS)	ng/l	--	--	5430	4780	1370	480 *	420	570	950	1000	90	80	--	660	510	200	210	40	70	< 10	< 10	20 *	< 10	< 10	10	50	< 10	60	40		
8:2 Fluorotelomer sulfonate (8:2 FTS)	ng/l	--	--	3040	700	260	120 *	140 *	120 *	100	190	130	10	< 10	--	120	100	60	60	< 10	20	20 *	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
n-Ethyl perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
n-Methyl perfluorooctanesulfonamidoacetic acid (MeFOSAA)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
Perfluorobutane sulfonate (PFBS)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	10	10	10	10	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
Perfluorobutanoic acid (PFBA)	ng/l	--	--	170	110	50	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	--	40 b	40 b	< 20	< 20	< 20	< 20	< 20	< 20	< 20	30	20	50	30	< 20	< 20		
Perfluorodecane sulfonate (PFDS)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
Perfluorodecanoic acid (PFDA)	ng/l	--	--	70	20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
Perfluorododecanoic acid (PFDoA / PFDoDA)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
Perfluorohexane sulfonate (PFHPS)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
Perfluorohexanoic acid (PFHpA)	ng/l	--	--	90	70	30	10	10	20	40	60	< 10	< 10	< 10	--	40	40	20	20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10			
Perfluorohexane sulfonate (PFHxS)	ng/l	--	--	40	4																											

Table 1  
Husky Superior Refinery  
Ice Water Data Summary  
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**Note**  
QA/QC in-progress; data updated as QA/QC review has been completed

**Table 1**  
**Husky Superior Refinery**  
**Ice Water Data Summary**  
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Table 1  
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Surface Water Data Summary  
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Parameter	Units	Location												Location																
		Date						Depth						Date						Depth										
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N				
Xylene, total	ug/l	11.0	4.6	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	--	< 0.24 h	< 0.31	< 0.31	< 0.31	29.0	16.5	5.7	1.3 j	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24				
Total Petroleum Hydrocarbons																														
Sum of total petroleum hydrocarbon range C6-C28 (Barr Calc)	mg/l	--	--	0.75 a	0.57 a	0.23 a	0.23 a	0.20 a	0.24 a	0.19	0.20 a	0.22 a	--	0.0278 a	0.0152 a	ND a	ND a	--	--	2.8	2.8	0.33 a	0.31 a	0.34 a	0.25 a	0.33 a	0.32 a	0.0172 a	0.23 a	
Gasoline Range Organic C6-C10	ug/l	227	150	--	--	--	--	--	--	--	--	--	--	--	--	--	510	330	--	--	--	--	--	--	--	--	--	--		
Total Petroleum Hydrocarbons C6-C9	ug/l	--	--	45.2 j	9.0 j	24.1 j*	19.2 j	32.0 jb	25.5 j	< 8.9	40.5 jb	32.1 jb	--	27.8 jh	15.2 j	15.4 jb	< 8.9	--	--	141	111	31.7 j*	21.8 j*	37.3 j	52.0 jb	54.4 j	49.7 j	17.2 j	16.9 j	
Diesel Range Organics, C10-C28	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
Total Petroleum Hydrocarbons C10-C28	mg/l	--	--	0.70	0.56	0.21	0.21	0.20	0.21	0.19	0.20	0.22	--	0.16 bh	0.11 b	0.24 b	0.070 b	--	--	2.7	2.7	0.30	0.29	0.30	0.25	0.28	0.27	0.22 b	0.21	
DRO-modified, C10-C36	mg/l	7.2	4.7	--	--	--	--	--	--	--	--	--	--	--	--	--	13.1	10.3	--	--	--	--	--	--	--	--	--			
Total Petroleum Hydrocarbons C10-C36	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
Total Petroleum Hydrocarbons C24-C36	mg/l	--	--	0.32	0.22	0.11	0.11	0.14	0.11	0.16	0.13	0.13	--	0.13 bh	0.084	0.15	0.081	--	--	0.55	0.95	0.16	0.17	0.18	0.18	0.15	0.15	0.18	0.18	
Per- and Polyfluoroalkyl Substances																														
4:2 Fluorotelomer sulfonate (4:2 FTS)	ng/l	--	--	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	--	--	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	
6:2 Fluorotelomer sulfonate (6:2 FTS)	ng/l	--	--	19890	6520	2220	2030	1650	1840	2260	1570	2020	--	1220	350	670	120	--	--	10260	14880	2980	2390	2370	1850	1270	1400	2710	3110	
8:2 Fluorotelomer sulfonate (8:2 FTS)	ng/l	--	--	1560	950	410	500 *	260 *	260	230	190	220	--	200	80	380	60	--	--	2380	2030	520	390	370 *	260 *	240	220	190	230	
n-Ethyl perfluoroctanesulfonamidoacetic acid (n-EtFOSAA)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	
n-Methyl perfluoroctanesulfonamidoacetic acid (MeFOSAA)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	
Perfluorobutane sulfonate (PFBS)	ng/l	--	--	10	10	10	< 10	20	20	20	20	30	--	20	20	< 10	< 10	--	--	20	30	20	20	20	30	30	30	30	30	
Perfluorobutanoic acid (PFBA)	ng/l	--	--	330	100	60	40	40	40	60	60	--	60 b	30	30	< 20	--	--	--	400	350	110	90	60	50	60	60	80	70	
Perfluorodecane sulfonate (PFDS)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	
Perfluorodecanoic acid (PFDA)	ng/l	--	--	50	30	10	20	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	--	--	70	60	20	< 10	10	< 10	< 10	< 10	< 10	< 10	
Perfluorododecanoic acid (PFDoA / PFDoDA)	ng/l	--	--	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	--	--	20	20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Perfluoroheptane sulfonate (PFHpS)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	
Perfluoroheptanoic acid (PFHpa)	ng/l	--	--	250	80	50	50	50	60	60	100	110	--	60	30	50	10	--	--	250	270	70	60	50	40	40	40	80	80	
Perfluorohexane sulfonate (PFHxS)	ng/l	--	--	70	80	50	50	60	70	100	100	110	--	110	150	50	40	--	--	120	180 *	80	80	60	100	140	140	150	160	
Perfluorohexane sulfonate (PFHxS) - Branched	ng/l	--	--	10	10	< 10	< 10	10	10	20	20	--	20	20	< 10	< 10	--	--	20	30	10	10	10	20	30	30	30	30		
Perfluorohexane sulfonate (PFHxS) - Linear	ng/l	--	--	60	60	40	40	50	60	80	90	--	90	130	40	40	--	--	100	150 *	70	60	50	80	80	110	120	130		
Perfluorohexanoic acid (PFHxA)	ng/l	--	--	1020	300	180	160	150	200	240	270	290	--	170	80	100	30	--	--	1140	1070	290	240	200	160	160	150	340	310	
Perfluoronananesulfonate (PFNS)	ng/l	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	--	--	< 10	< 10	< 10	< 10	<						

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Table 2  
2018 Husky Superior Refinery  
Treatment System Data Summary  
Superior, WI

			Parameter Units																																																	
			4:2 Fluorotelomer sulfonate (4:2 FTS)		6:2 Fluorotelomer sulfonate (6:2 FTS)		8:2 Fluorotelomer sulfonate (8:2 FTS)		n-Ethyl perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)		n-Methyl perfluorooctanesulfonamidoacetic acid (MeFOSAA)		Perfluorobutane sulfonate (PFBs)		Perfluorobutanoic acid (PFBA)		Perfluorodecane sulfonate (PFDS)		Perfluorodecanoic acid (PFDA)		Perfluorododecanoic acid (PFDoA / PFDoDA)		Perfluoroheptane sulfonate (PFH <sub>7</sub> S)		Perfluoroheptanoic acid (PFH <sub>7</sub> A)		Perfluorohexane sulfonate (PFH <sub>6</sub> S) - Branched		Perfluorohexane sulfonate (PFH <sub>6</sub> S) - Linear		Perfluorohexanoic acid (PFH <sub>6</sub> A)		Perfluorononanesulfonate (PFNS)		Perfluorononanoic acid (PFNA)		Perfluoroctanesulfonamide (PFOSA / FOSA)		Perfluoroctanesulfonate (PFOS) - Branched		Perfluoroctanesulfonate (PFOS) - Linear		Perfluoropentanoic acid (PFPA)		Perfluoropentanesulfonate (PFPeS)		Perfluorotetradecanoic acid (PFTA / PFTeDA / PFTeA)		Perfluorotridecanoic acid (PFTrDA / PFTrA)		Perfluoroundecanoic acid (PFUnA / PFUnDA)	
Location	Date	Sample Type	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l																		
FO Tank	5/08/2018	N	< 10	1970	260	< 10	< 10	80	< 10	< 10	< 10	< 10	60	< 210	< 70	< 125	210	< 10	10	< 10	150	40	60	100	100	< 60	< 10	< 10	< 10	< 10	< 10	< 10																				
	5/15/2018	N	120	25900	3510 *	< 10	< 10 *	4580 *	< 10	230	100	< 10	2200 *	170	30	130	7970 *	< 10	170	< 10	210	50	140	2630 *	5170 *	20	50 *	20	70																							
	5/18/2018	N	60	21800	1590 *	< 10	< 10	1710	< 10	70	30	< 10	1040 *	120	20	90	3540	< 10	100	< 10	120	40	60	1300	2410	< 15	10 *	< 10	30																							
	5/21/2018	N	50	23800	1230	< 10	< 10	20	< 10	50	20	< 10	1210	110	20	80	3190	< 10	80	< 10	120	60	50	970	4100	< 10	150 *	< 10	10																							
	5/23/2018	N	60	19610	1410	< 10	< 10	125	1090	< 10	60	10	< 15	670	170	30	130	2630	< 10	90	< 10	160	50	60	1280	1030	< 25	< 10 *	< 10	< 10																						
	5/25/2018	N	40	19680	1890	< 10	< 10	160	650	< 10	70	< 10	< 10	950	150	20	100	2880	< 10	160	< 10	150	50	60	1060	1210	< 10	< 10 *	< 10	10																						
	5/26/2018	N	60	25500	1310	< 10	< 10	115	1730	< 10	40	10	< 10	1280	120	30	90	2970	< 10	80	< 10	120	50	50	810	4480	20	< 10	< 10	< 10																						
	5/29/2018	N	150	61000	2460	< 10	< 10	1660	< 10	80	10	< 10	1590	130	20	110	5250	< 10	240	< 10	120	60	40	2240	2190	10	< 10	< 10	20																							
	5/30/2018	N	70	30500	2100	< 10	< 10	180	1110	< 10	60	< 10	< 10	1000	100	20	80	2860	< 10	120	< 10	130	60	60	1110	2350	20	< 10	< 10	< 10																						
	6/01/2018	N	80	21400	1950	< 10	< 10	15	960	< 10	50	< 10	< 10	1020	110	20	90	2800	< 10	120	< 10	160	70	80	1080	2140	10	< 10	< 10	< 10																						
	6/03/2018	N	130	42200	1590	< 10	< 10	1290 *	< 10	60	< 10	< 10	1130	100	10	80	4060	< 10	190	< 10	90	40	30	1670	1920	20	< 10	< 10	< 10																							
	6/04/2018	N	100	29100	2210	< 10	< 10	10	960 *	< 10	60	< 10	< 10	910	110	20	90	2960	< 10	170	< 10	160	70	80	1210	1830	20	< 10	< 10	< 10																						
	6/06/2018	N	90	29600	1640	< 10	< 10	220	910	< 10	50	< 10	< 25	850	190	40	160	2790	< 10	120	< 10	200	90	100	1090	1710	30	< 10	< 10	< 10																						
	6/08/2018	N	80	21000	1430	< 10	< 10	130	850 *	< 10	40	< 10	< 13	820	310	50	260	2560	< 10	120	< 10	270	120	130	990	1590	70	< 10	< 10	< 10																						
	6/10/2018	N	90	29500	1610	< 10	< 10	80	830	< 10	40	< 10	< 10	810	280	40	230	2710	< 10	140	< 10	290	140	150	1030	1730	40	< 10	< 10	< 10																						
	6/12/2018	N	70	24500	1290	< 10	< 10	30	810	< 10	40	< 10	< 10	780	260	40	220	2590	< 10	120	< 10	210	100	100	980	1740	40	< 10	< 10	< 10																						
	6/14/2018	N	80	22900	1240	< 10	< 10	30	770	< 10	40	< 10	< 10	740	230	30	200	2510	< 10	100	< 10	210	110	100	910	1710	40	< 10	< 10	< 10																						
	6/1																																																			

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Parameter			4:2 Fluorotelomer sulfonate (4:2 FTS)		6:2 Fluorotelomer sulfonate (6:2 FTS)		8:2 Fluorotelomer sulfonate (8:2 FTS)		n-Ethyl perfluoroctanesulfonamidoacetic acid (N-EtFOSSAA)		n-Methyl perfluoroctanesulfonamidoacetic acid (MeFOSSAA)		Perfluorobutane sulfonate (PFBS)		Perfluorobutanoic acid (PFBA)		Perfluorodecane sulfonate (PFDS)		Perfluorodecanoic acid (PFDoA / PFDoDA)		Perfluorodecanoic acid (PFDA)		Perfluorohexane sulfonate (PFHxS)		Perfluorohexane sulfonate (PFHxS) - Branched		Perfluorohexane sulfonate (PFHxS) - Linear		Perfluorohexanoic acid (PFHxA)		Perfluorononanesulfonate (PFNS)		Perfluorononoic acid (PFNA)		Perfluoroctanesulfonamide (PFOSA / FOSA)		Perfluoroctanesulfonate (PFOS) - Branched		Perfluoroctanesulfonate (PFOS) - Linear		Perfluoropentanoic acid (PPPeA)		Perfluoropentansulfonate (PPPeS)		Perfluorotetradecanoic acid (PFTeDA / PFTeA)		Perfluorotridecanoic acid (PFTeDA / PFTeIA)		Perfluoroundecanoic acid (PFUnDA / PFUnDA)	
Location	Date	Sample Type	Units	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l															
SP-0A	6/01/2018	N	30	32780	450	< 10	< 10	10	2680	< 10	10	< 10	< 10	2650	100	20	80	4150	< 10	70	< 10	50	30	10	820	10880	< 30	< 10 *	< 10	< 10	< 10																			
	6/03/2018	N	40	32600	490	< 10	< 10	20	2170 *	< 10	10	< 10	< 10	3210	100	20	80	4280	< 10	90	< 10	40	30	< 10	1020	9970	20	< 10	< 10	< 10	< 10																			
	6/04/2018	N	50	31800	520	< 10	< 10	20	2400 *	< 10	10	< 10	< 10	3430	110	20	80	4730	< 10	80	< 10	40	30	20	970	10390	20	< 10	< 10	< 10	< 10																			
	6/06/2018	N	50	40200	460	< 10	< 10	20	2150	< 10	20	< 10	< 10	3720	120	20	90	4420	< 10	90	< 10	40	30	10	1220	9290	20	< 10	< 10	< 10	< 10																			
	6/08/2018	N	50	34300	550	< 10	< 10	30	1870	< 10	20	< 10	< 10	3220	210	30	160	3930	< 10	120	< 10	70	50	20	1140	8360	40	< 10	< 10	< 10	< 10																			
	6/10/2018	N	40	34200	700	< 10	< 10	30	1870	< 10	20	< 10	< 10	2990	280	40	230	3780	< 10	120	< 10	100	70	30	1100	7970	40	< 10	< 10	< 10	< 10																			
	6/12/2018	N	30	36000	720	< 10	< 10	30	1730	< 10	10	< 10	< 10	2560	200	30	170	3440	< 10	100	< 10	90	60	30	940	7600	30	< 10	< 10	< 10	< 10																			
	6/12/2018	FD	40	27700	940 *	< 10	< 10	30	1930	< 10	20	< 10	< 10	2840	220	30	180	3930	< 10	110	< 10	80	50	20	1000	8580	40	< 10	< 10	< 10	< 10																			
	6/14/2018	N	< 10	21300	350	< 10	< 10	20	1790	< 10	10	< 10	< 10	2580	170	30	140	3260	< 10	80	< 10	70	40	20	720	8040	30	< 10	< 10	< 10	< 10																			
	6/16/2018	N	20	32300	520	< 10	< 10	30	2200	< 10	10	< 10	< 10	3670	300	40	260	4260	< 10	130	< 10	120	80	30	1150	10000	40	< 10	< 10	< 10	< 10																			
	6/18/2018	N	10	22400	510	< 10	< 10	20	1540	< 10	10	< 10	< 10	2910	230	30	200	3230	< 10	90	< 10	80	50	20	860	7520	30	< 10	< 10	< 10	< 10																			
	6/20/2018	N	< 10	17600	850	< 10	< 10	20	1100	< 10	20	< 10	< 10	2750	200	30	160	2580	< 10	130	< 10	140	90	40	870	6130	30	< 10	< 10	< 10	< 10																			
	6/22/2018	N	< 10	10960	1180	< 10	< 10	20	1050	< 10	30	< 10	< 10	4000	160	20	140	2660	< 10	160	< 10	110	60	40	1060	6010	20	< 10	< 10	< 10	< 10																			
	6/25/2018	N	< 10	17040 *	2660	< 10	< 10	20	970	< 10	50	< 10	< 14	3990	240	30	210	2470	< 10	310	< 10	290	190	100	1120	5530	20	< 10	< 10	< 10	< 10																			
	6/27/2018	N	< 10	17830 *	4100	< 10	< 10	20	960	< 10	80	< 10	< 10	20	3890	250	30	220	2420	< 10	380	< 10	480	330	160	1180	5300	30	< 10	< 10	< 10	< 10																		
	6/29/2018	N	10	11260	1400	< 10	< 10	20	960	< 10	30	< 10	< 10	2670	230	40	190	2560	< 10	150	< 10	170	90	70	590	5110	30	< 10	< 10	< 10	< 10																			
	7/02/2018	N	< 10	8730	1920	< 10	< 10	30	1090	< 10	40	< 10	< 10	3000	220	30	190	2670	< 10	160	< 10	230	110	100	590	5060	40	< 10	< 10	< 10	< 10																			
	7/04/2018	N	< 10	4800	1170	< 10	< 10	20	950	< 10	30	< 10	< 10	3280	170	30	140	2210	< 10	120	< 10	140	70	60	430	4380	20	< 10	< 10	< 10	< 10																			
	7/06/2018	N	< 10	6050	1150	< 10	< 10	20	910	< 10	20	< 10	< 10	2920	160	30	140	2060	< 10	110	< 10	140	60	60	410	4040	20	< 10	< 10	< 10	< 10																			
	7/11/2018	N	< 10	6750	1730	< 10	< 10	20	920	< 10	40	< 10	< 10	2550	180	30	160	1920	< 10	150	< 10	260	130	130	470	3840	20	< 10	< 10	< 10	< 10																			
	7/16/2018	N	< 10	7490	3190	< 10	< 10	20	1370	< 10	50	< 10	< 10	3780	280	40	250	3000	< 10	270	< 10	390	190	190	750	5790	30	< 10	< 10	< 10	< 10																			
	7/18/2018	N	< 10	5370	1700	< 10	< 10	20	1090	< 10	30	< 10	< 10	2990	180	20	150	2330	< 10	150	< 10	210	100	110	470	4470	20	< 10	< 10	< 10	< 10																			
	7/20/2018	N	< 10	5040	1900	< 10	< 10	20	1020	< 10	30	< 10	< 10	2800	160	20	140	2150	< 10	160	< 10	230	110	120	490	4180	20	< 10	< 10	< 10	< 10																			
	7/23/2018	N	< 10	5990	1950	< 10	< 10	10	690	< 10	30	< 10	< 10	1980	150	20	130	1540	< 10	190	< 10	260	130	130	440	2980	20	< 10	< 10	< 10	< 10																			
	8/01/2018	N	< 10	8740	2350	< 10	< 10	10	930	< 10	30	< 10	< 10	2370	150	20	120	2120	< 10	200	< 10	240	110	130	450	4480	20	< 10	< 10	< 10	< 10																			
	8/06/2018	N	< 10	6630 *	1810 *	< 10	< 10	10	860	< 10	20	< 10	< 10	2160	130	20	110	2010	< 10	90	< 10	190	80	100	290	4170	10	< 10	< 10	< 10	< 10																			
	8/08/2018	N	< 10	6090	1490	< 10	< 10	10	890	< 10	20	< 10	< 10	2090	130	20	110	2000	< 10	90	< 10	210																												

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			Parameter Units		4:2 Fluorotelomer sulfonate (4:2 FTS)		6:2 Fluorotelomer sulfonate (6:2 FTS)		8:2 Fluorotelomer sulfonate (8:2 FTS)		n-Ethyl perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)		n-Methyl perfluorooctanesulfonamidoacetic acid (MeFOSAA)		Perfluorobutane sulfonate (PFBs)		Perfluorobutanoic acid (PFBA)		Perfluorodecane sulfonate (PFDS)		Perfluorodecanoic acid (PFDA)		Perfluorododecanoic acid (PFDoA / PFDoDA)		Perfluoroheptane sulfonate (PFH <sub>7</sub> S)		Perfluoroheptanoic acid (PFH <sub>7</sub> A)		Perfluoroheptane sulfonate (PFH <sub>7</sub> S) - Branched		Perfluoroheptane sulfonate (PFH <sub>7</sub> S) - Linear		Perfluorohexane sulfonate (PFHxS)		Perfluorohexanoic acid (PFHxA)		Perfluorononanesulfonate (PFNS)		Perfluorononanoic acid (PFNA)		Perfluoroctanesulfonamide (PFOSA / FOSA)		Perfluoroctanesulfonate (PFOS) - Branched		Perfluoroctanesulfonate (PFOS) - Linear		Perfluoropentane sulfonate (PFPeS)		Perfluoropentanoic acid (PFPeA)		Perfluoropentanesulfonate (PFPeS)		Perfluorotetradecanoic acid (PFTeA / PFTeDA)		Perfluorotridecanoic acid (PFTriA)		Perfluoroundecanoic acid (PFUnDA) / PFUnA	
Location	Date	Sample Type																																																								
	9/17/2018	N	< 10	1510	470	< 10	< 10	20	880	< 10	10	< 10	< 10	2150	130	20	100	2100	< 10	120	< 10	170	60	110	370	3920	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																				
	9/24/2018	N	10	5590	1020	< 10	< 10	< 40	790	< 10	30	< 10	< 10	1800	160	20	140	2010	< 10	170	< 10	200	70	120	550	3900	20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																				
	10/08/2018	N	< 10	1970	420	< 10	< 10	20	470	< 10	10 b	< 10	< 10	670	140	20	120	1170	< 10	40	< 10	110	40	70	150	2220	20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																				
	10/10/2018	N	< 10	2100	380 *	< 10	< 10	20	480	< 10	20	< 10	< 10	1050	170 *	30	140	1690	< 10	40	< 10	140 *	50	80	200 *	2850	20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																				
	10/17/2018	N	< 10	2630	650	< 10	< 10	20	460	< 10	< 10	< 10	< 10	1010	170	30	150	1290	< 10	50	< 10	230	90	140	210	2260	10	< 10 *	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																				
	10/24/2018	N	< 10	660	230	< 10	< 10	10	400	< 10	< 10	< 10	< 10	830	110	20	100	920	< 10	50	< 10	130	40	80	130	1840	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																				
	10/29/2018	N	< 10	280	170	< 10	< 10	< 10	350	< 10	< 10 *	< 10	< 10	550	90	10	70	600	< 10	30	< 10	120	40	70	100	1430	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																					
	11/05/2018	N	< 10	240	80	< 10	< 10	< 10	450	< 10	< 10	< 10	< 10	750	80	< 10	60	820	< 10	40	< 10	80	30	50	120	1730	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																					
	11/07/2018	N	< 10	80	50	< 10	< 10	< 10	400	< 10	< 10	< 10	< 10	780	50	< 10	50	580	< 10	30	< 10	60	20	40	110	1330	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																					
	11/12/2018	N	< 10	80	40	< 10	< 10	< 10	730	< 10	< 10	< 10	< 10	1230	50	< 10	40	900	< 10	50	< 10	60	20	40	160	1790	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																					
	11/19/2018	N	< 10	400	90 *	< 10	< 10	10	610	< 10	< 10	< 10	< 10	590	90	20	70	750	< 10	30	< 10	90	30	50	80	2020	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																					
	11/26/2018	N	< 10	250	100	< 10	< 10	10	440	< 10	< 10	< 10	< 10	960	110	20	90	710	< 10	30	< 10	120	50	70	80	1620	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																					
	12/03/2018	N	< 10	160	80	< 10	< 10	< 10	520	< 10	< 10	< 10	< 10	1010	140	30	100	740	< 10	40	< 10	140	70	60	80	1750	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																					
SP-0B	7/9/2018	N	< 10	7380	1230	< 10	< 10	20	930	< 10	30	< 10	< 10	2700	170	30	150	1980	< 10	120	< 10	190	100	90	420	3910	30	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																				
	7/13/2018	N	< 10	7940	1590	< 10	< 10	20	1080	< 10	40	< 10	< 10	2620	220	30	190	2340	< 10	170	< 10	250	130	110	560	4340	20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																				
	7/25/2018	N	< 10	7890	2280	< 10	< 10	20	1050	< 10	30	< 10	< 10	2640	190	30	160	2150	< 10	190	< 10																																					

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			Parameter Units		4:2 Fluorotelomer sulfonate (4:2 FTS)		6:2 Fluorotelomer sulfonate (6:2 FTS)		8:2 Fluorotelomer sulfonate (8:2 FTS)		n-Ethyl perfluoroctanesulfonamidoacetic acid (N-EtFOSAA)		n-Methyl perfluoroctanesulfonamidoacetic acid (MeFOSAA)		Perfluorobutane sulfonate (PFBs)		Perfluorobutanoic acid (PFBa)		Perfluorodecane sulfonate (PFDS)		Perfluorodecanoic acid (PFDoA / PFDoDA)		Perfluorododecanoic acid (PFHDoA / PFHDoDA)		Perfluoroheptane sulfonate (PFHps)		Perfluoroheptanoic acid (PFHpa)		Perfluorohexane sulfonate (PFHxs) - Branched		Perfluorohexane sulfonate (PFHxs) - Linear		Perfluorohexanoic acid (PFHxA)		Perfluorononanesulfonate (PFNS)		Perfluorononanoic acid (PFNA)		Perfluoroctanesulfonamide (PFOSA / FOsa)		Perfluoroctanesulfonate (PFOS) - Branched		Perfluoroctanesulfonate (PFOS) - Linear		Perfluorooctanoic acid (PFOA)		Perfluoropentanoic acid (PPPeA)		Perfluoropentansulfonate (PPPeS)		Perfluorotetradecanoic acid (PFTa / PFTeDa / PFTeA)		Perfluorotridecanoic acid (PFTrDA / PFTrIa)		Perfluoroundecanoic acid (PFUnA / PFUnDA)	
Location	Date	Sample Type																																																						
	11/12/2018	N	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	3200	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																					
	11/19/2018	N	--	--	--	--	--	--	--	--	700	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																						
	11/26/2018	N	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	700	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10																							

**Table 2**  
**2018 Husky Superior Refinery**  
**Treatment System Data Summary**  
**Superior, WI**

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Location/Sample ID	Sample Description
<b>EQ Tank</b>	Prior to normal WWTP
<b>TT-7</b>	Tank before temporary treatment system
<b>SP-0A</b>	Treatment system influent, before prefiltration
<b>SP-0B</b>	Treatment system influent, before prefiltration (alternate)
<b>SP-1</b>	Influent to the lead 10,000-lb GAC vessel (used prior to 05/30/2018)
<b>SP-2</b>	Between lead and lag 10,000-lb GAC vessels
<b>SP2-2</b>	Between lead and lag 10,000-lb GAC vessels
<b>SP-3</b>	After the lag 10,000-lb GAC vessel
<b>SP2-3</b>	After the lag 10,000-lb GAC vessel
<b>SP-4</b>	Before the lead 5,000-lb GAC vessel (sampling will only occur here if the lead 10,000-lb vessel is taken offline)
<b>SP-5</b>	After the lag 5,000-lb GAC vessel (sampling will only occur here if the lead 10,000-lb vessel is taken offline)
<b>SP-6</b>	After the ion exchange vessels, treatment system #1 effluent
<b>SP2-6</b>	After the ion exchange vessels, treatment system #2 effluent
<b>SP-6/SP2-6 Composite</b>	After the ion exchange vessels, combined treatment system #1 and #2 effluent

Data Footnotes and Qualifiers

--	Not analyzed/Not available.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
ND	Not detected.
*	Estimated value, QA/QC criteria not met.
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures. Concentrations identified as potential false positive are excluded from calculations.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
j	Estimated detected value. The reported value is less than the stated laboratory quantitation limit but greater than the laboratory method detection limit.