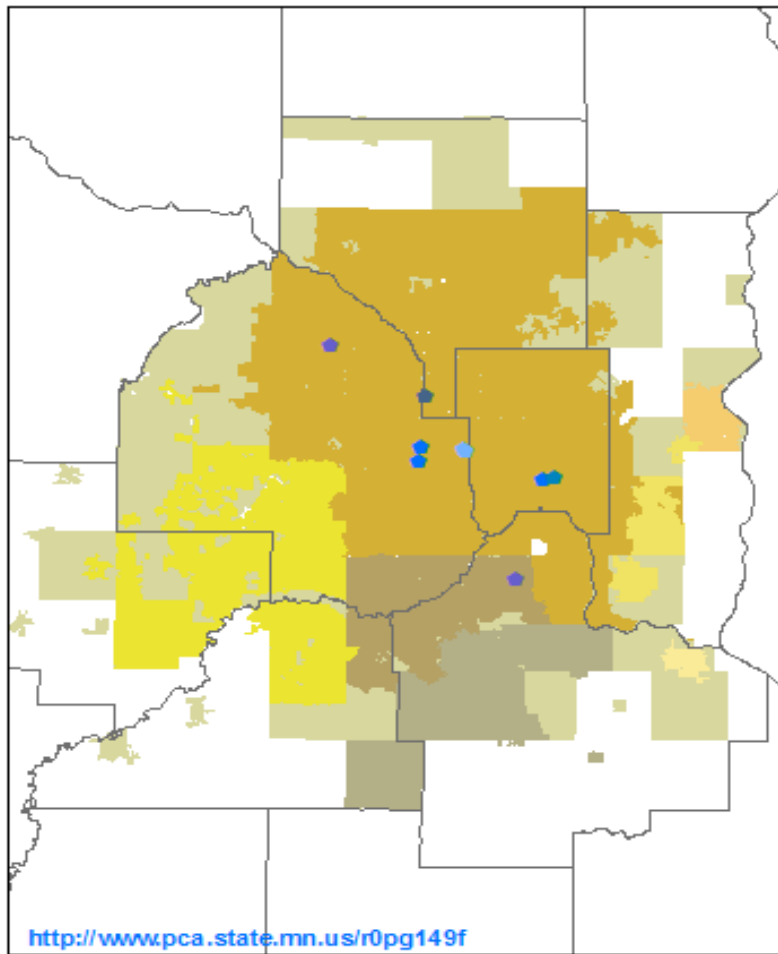




- Layers**
- ☒ 'Phase-out locations\$' Events
 - Company
 - Ameri Pride
 - Aramark
 - Cintas
 - GK Services
 - Health Systems Cooperative Laundries
 - ☒ counties_mndot
 -
 - ☒ sanitary_sewer_sheds_metc
 - WWTP
 - 0
 - Blue Lake
 - Eagles Pnt
 - Empire
 - Hastings
 - Metro
 - Seneca
 - St Croix

METRO PLANT Alkylphenol Sampling

Axys Fall 2016 - Primary Influent

Type: 24-hour composite/AXYS Method MLA-004 Rev 07 version 4

Date		MCES cleaning residue	Friday 10/21/16	Saturday 10/22/16	Sunday 10/23/16	Monday 10/24/16
CLIENT_ID		MCESCR1-102116	MCESMP2-102116	MCESMP2-102216	MCESMP2-102316	MCESMP2-102416
Axys ID		L26172-5	L26172-1	L26172-2	L26172-3	L26172-4
WORKGROUP		WG57121	WG57121	WG57121	WG57121	WG57121
Sample Size		0.977L	0.227L	0.256L	0.254L	0.234L
Influent flow (mgd)		NA	184.84	179.5	180.35	186.94
UNITS		ng/L	ng/L	ng/L	ng/L	ng/L
4-Nonylphenols	(CAS 84852-15-3)	B 7.09	11100	7970	5580	6460
4-Nonylphenol monoethoxylates	(CAS 104-35-8)	U 1.32	38700	19200	10700	17400
4-Nonylphenol diethoxylates	(CAS 20427-84-3)	U 1.36	8300	4770	3070	5980
4-n-Octylphenol	(CAS 1806-26-4)	U 0.211	95.1	94.3	78.2	68.1

Axys Fall 2014 - Primary Influent

Type: 24-hour composite/AXYS Method MLA-004 Rev 07 version 3

Date		Thursday 10/9/14	Friday 10/10/14	Saturday 10/11/14	Sunday 10/12/14	Monday 10/13/14
CLIENT_ID		MCESMP1-100914	MCESMP1-101014	MCESMP1-101114	MCESMP1-101214	MCESMP1-101314
Axys ID		L22266-1	L22266-2	L22266-3	L22266-4	L22266-5
WORKGROUP		WG49223	WG49223	WG49223	WG49223	WG49223
Sample Size		0.248L	0.266L	0.257L	0.267L	0.245L
Influent flow (mgd)		171.11	169.78	164.33	165.43	173.82
UNITS		ng/L	ng/L	ng/L	ng/L	ng/L
4-Nonylphenols		26000	31500	32500	29300	24300
4-Nonylphenol monoethoxylates		37900	30900	47600	27300	38000
4-Nonylphenol diethoxylates		11400	13400	15400	7650	3870
4-n-Octylphenol		U 42.3	U 50.9	R 51.8	U 48.5	R 74.4

U of M Novak 2006-2007

Type: 40-liter grab/U of M Method LC-MS

Date	Friday 7/28/06	Thursday 11/9/06	Wednesday 2/28/07	Friday 5/18/07	Friday 7/27/07
Primary Influent FLOW (L/day)	703,000,000	657,000,000	643,000,000	708,000,000	692,000,000
Primary Influent FLOW (mgd)	185.71	173.56	169.86	187.03	182.81
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L
Primary Influent (4-Nonylphenol)	31500	67700	17800	20100	16200

Type: 24-hour composite/AXYS Method MLA-004 Rev 07 version 3

CLIENT_ID	MCESBV1-032615	MCESBV2-032915	MCESMPL-040815	MCESSTP-040815	MCESEAG-040815	Lab Blank (101)	Spiked Matrix (102)	Spiked Matrix (Duplicate) (103)
Axys ID	L23018-1	L23018-2	L23018-3	L23018-4	L23018-5	WG50925-101	WG50925-102 (A)	WG50925-103 (DUP WG50925-102)
WORKGROUP	WG50925	WG50925	WG50925	WG50925	WG50925	WG50925	WG50925	WG50925
Sample Size	0.255L	0.255L	0.253L	0.253L	0.255L	0.250L		
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	% Recovery	% Recovery
4-Nonylphenols	1640	1550	268	1350	329	U 8.37	110	113
4-Nonylphenol monoethoxylates	10300	13900	U 118	U 277	U 145	U 31.2	111	103
4-Nonylphenol diethoxylates	U 257	841	U 118	U 207	U 164	U 32.6	117	122
4-n-Octylphenol	U 9.05	U 35.7	U 8.64	R 30.7	R 57.2	U 8.87	111	112
Location	Birchwood Village	Birchwood Village	Minneapolis Fremont & Minnehaha Pkwy	St. Paul Oxford & Lafond	Eagan Wilderness Run & Oak Chase			
	White Bear Lake area 45.05782, -92.98481 ~400 parcels	White Bear Lake area 45.05782, -92.98481 ~400 parcels	44.91051, -93.29593 ~262 parcels	44.96027, -93.14409 ~485 parcels	44.79738, -93.15435 ~163 parcels			
24-hour composites: dates taken	W 3/25-Th 3/26	Sa 3/28-Su 3/29	T 4/7-W 4/8	T 4/7-W 4/8	T 4/7-W 4/8			
Estimated volume for the period	43,000 gal Flow meter	49,000 gal Flow meter	17,000 gal	22,000 gal	60,000 gal			
			Line velocity/Manning equation					

Changes from MLA Rev 07 version 02 to MLA Rev 07 version 03

Page	Change Details
	Clarified names of the analytes by prefixing with "4-" as per the names in section A.
11	Section 3.1.1: Added water bath to the rotary evaporator.
15	Section 3.4: Updated acetic anhydride preparation and storage. Clarified shelf life for potassium carbonate solutions.
17	Section 4: Clarified clean blank matrices.
20	Section 5.1: Clarified that the refluxed extract is decanted into the collecting Erlenmeyer flask.
21	Section 5.2.1: Removed need to dilute surrogate standard with acetone prior to spiking, and added that vigorous swirling is acceptable for mixing at this stage.
22	Section 5.2.2: Increased hexane extraction steps to 15 minutes each. Allowed pH adjustment with conc. hydrochloric acid as well as 25% solution.
24	Section 5.4: Clarified the non-aqueous acetylation procedure.
25	Section 6.2: Added note that recovery standard must be spiked after recolumning on basic silica.
33	Appendix A: Added optional procedure for determination of 4- nonylphenol only in aqueous samples using only non-aqueous derivatization.

METRO PLANT Alkylphenol Sampling

Primary Influent

Method: AXYS Method MLA-004 Rev 07 (versions 2, 3, and 4)

Date	CASRN	Type	ng/L Wednesday	ng/L Thursday	ng/L Friday	ng/L Saturday	ng/L Sunday	ng/L Monday	(PPT) MEAN	2-yr change	10-yr change
2016 4-Nonylphenols (normalized for lower flow in baseline year 2014/higher flow in 2016)					12,085	8,706	6,083	6,948	8,455	-70.56%	-76.53%
10-2016	4-Nonylphenols	84852-15-3	24-hr composite		11,100	7,970	5,580	6,460	7,778	-72.92%	-78.42%
10-2014	4-Nonylphenols		24-hr composite	26,000	31,500	32,500	29,300	24,300	28,720	-20.30%	
2006-07	4-Nonylphenols (U of M method)		40-L grab	17,800 (single)	67,700 (single)	22,600 (avg of 3)			36,033		
10-2016	4-Nonylphenol monoethoxylates	104-35-8	24-hr composite		38,700	19,200	10,700	17,400	21,500	-40.84%	
10-2014	4-Nonylphenol monoethoxylates		24-hr composite	37,900	30,900	47,600	27,300	38,000	36,340		
10-2016	4-Nonylphenol diethoxylates	20427-84-3	24-hr composite		8,300	4,770	3,070	5,980	5,530	-46.54%	
10-2014	4-Nonylphenol diethoxylates		24-hr composite	11,400	13,400	15,400	7,650	3,870	10,344		
10-2016	Total NPE				47,000	23,970	13,770	23,380	27,030	-42.10%	
10-2014	Total NPE			49,300	44,300	63,000	34,950	41,870	46,684		
10-2016	4-n-Octylphenol	1806-26-4	24-hr composite		95	94	78	68			
10-2014	4-n-Octylphenol		24-hr composite	U 42.3	U 50.9	R 51.8	U 48.5	R 74.4			
2006-07	4-n-Octylphenol (U of M method)		40-L grab	U 44	U 44	U 44					
10-2016	Influent flow (mgd)				8.87%	9.23%	9.02%	7.55%	8.30%		
10-2014	Influent flow (mgd)				184.84	179.5	180.35	186.94	183	8.30%	
2006-07	Influent flow (mgd)			171.11	169.78	164.33	165.43	173.82	169		
				169.86	173.56	185.18			176		
					(avg of 3)						

Final Effluent

Method: AXYS

4-2012	4-Nonylphenols	24-hr composite						258	
4-2012	4-Nonylphenol monoethoxylates	24-hr composite						461	
4-2012	4-Nonylphenol diethoxylates	24-hr composite						226	
4-2012	Octylphenol	24-hr composite						< 9.34	

Preliminarily:

4-nonylphenols in 2016 were lower to a statistically significant degree than in 2014 and 2006-07

Individual NPEs and total NPEs are lower in 2016, on average, although the 2016 high result is above the 2014 mean

The weekend drop for nonylphenols and nonylphenol ethoxylates is much clearer this year than it was in 2014

Documented NPE reductions (annual)	Statewide	Metro Main Plant	Metro share
Industrial laundries (2013)	323 tons	179 tons	55%
Hotels, health care, long-term care (2016)	135 tons	75 tons	projected, based on the 55% share calculated for industrial laundries

METRO PLANT Alkylphenol Sampling

Primary Influent

Date	Analyte	CASRN	Type
2006-07	4-Nonylphenols (UM)	84852-15-3	40-L grab
10-2014	4-Nonylphenols (AXYS)		24-hr
10-2016	4-Nonylphenols (AXYS)		24-hr
2016	<i>4-NPs (normalized for flow)</i>		
10-2014	4-NP monoethoxylates (AXYS)	104-35-8	24-hr
10-2016	4-NP monoethoxylates (AXYS)		24-hr
10-2014	4-NP diethoxylates (AXYS)	20427-84-3	24-hr
10-2016	4-NP diethoxylates (AXYS)		24-hr