EPA Contamination Monitoring results

Old City of Williston Landfill

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Monitoring Well 5 – Sta 16713+65, 125’ LT

Surface Water Sample – Sta 16712+10, 50’ LT

Legend

Groundwater Sample Locations

Property Boundary

0 140 280 560 Feet

N

Prepared for:
U.S. EPA Region 8

Contract No.:
EP-S8-13-01

TDD:
1412-01

TO:
0004

Prepared By:
Weston Solutions, Inc.
START IV

Suite 100
1435 Garrison Street
Lakewood, CO 80215

FIGURE 1
GROUNDWATER SAMPLING LOCATION MAP
OLD WILLISTON LANDFILL
WILLISTON, ND

Date: 1/22/2016

MW-05
Groundwater Results
VOCs

Table 1

Analyte	CAS.NO	Units	Sample ID Date Type	WL-MW-05 5/12/2015 Field Sample	WL-MW-05 10/6/2015 Field Sample	WL-MW-05 10/6/2015 Field Duplicate
VOCs						
1,1,1-Trichloroethane	71-55-6	ug/L	--	0.50 U	0.5 U	5.0 R
1,1,2,2-Tetrachloroethane	79-34-5	ug/L	--	0.50 U	0.5 UJ	5.0 R
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/L	--	0.50 U	0.5 U	5.0 R
1,1,2-Trichloroethane	79-00-5	ug/L	--	**2.2**	0.5 U	5.0 R
1,1-Dichloroethane	75-34-3	ug/L	--	0.50 U	0.5 U	5.0 R
1,1-Dichloroethene	75-35-4	ug/L	--	0.50 U	0.5 U	5.0 R
1,2,3-Trichlorobenzene	87-61-6	ug/L	--	0.50 UJ	0.5 U	5.0 R
1,2,4-Trichlorobenzene	120-82-1	ug/L	--	0.50 U	0.5 U	5.0 R
1,2-Dibromo-3-chloropropane	96-12-8	ug/L	--	0.50 U	0.5 UJ	5.0 R
1,2-Dibromoethane	106-93-4	ug/L	--	0.50 U	0.5 U	5.0 R
1,2-Dichlorobenzene	95-50-1	ug/L	--	0.50 U	0.5 U	5.0 R
1,2-Dichloroethane	107-06-2	ug/L	--	0.50 U	0.5 U	5.0 R
1,2-Dichloropropane	78-87-5	ug/L	--	0.50 U	0.5 U	5.0 R
1,3-Dichlorobenzene	541-73-1	ug/L	--	0.50 U	0.5 U	5.0 R
1,4-Dichlorobenzene	106-46-7	ug/L	--	**6.9**	**8.6**	**15 J**
2-Butanone	78-93-3	ug/L	--	5.0 U	5 U	50 R
2-Hexanone	591-78-6	ug/L	--	5.0 U	5 U	50 R
4-Methyl-2-pentanone	108-10-1	ug/L	--	5.0 U	5 U	50 R
Acetone	67-64-1	ug/L	--	5.0 U	**11**	50 R
Benzene	71-43-2	ug/L	--	**0.66**	**0.34 J**	5.0 R
Bromochloromethane	74-97-5	ug/L	--	0.50 U	0.5 U	5.0 R
Bromodichloromethane	75-27-4	ug/L	--	0.50 U	0.5 U	5.0 R
Bromoform	75-25-2	ug/L	--	0.50 U	0.5 U	5.0 R
Bromomethane	74-83-9	ug/L	--	0.50 U	0.5 U	5.0 R
Carbon disulfide	75-15-0	ug/L	--	0.50 U	**0.57**	5.0 R
Carbon tetrachloride	56-23-5	ug/L	--	0.50 U	0.5 U	5.0 R
Chlorobenzene	108-90-7	ug/L	--	0.50 U	0.5 U	5.0 R
Chloroethane	75-00-3	ug/L	--	0.50 U	0.5 U	5.0 R
Chloroform	67-66-3	ug/L	--	0.50 U	0.5 U	5.0 R
Chloromethane	74-87-3	ug/L	--	0.50 U	0.5 U	5.0 R
cis-1,2-Dichloroethene	156-59-2	ug/L	--	**0.22 J**	**0.24 J**	**2.1 J**
cis-1,3-Dichloropropene	10061-01-5	ug/L	--	0.50 U	0.5 U	5.0 R
Cyclohexane	110-82-7	ug/L	--	**1.1**	**2.5**	5.0 R
Dibromochloromethane	124-48-1	ug/L	--	0.50 U	0.5 U	5.0 R
Dichlorodifluoromethane	75-71-8	ug/L	--	0.50 U	0.5 U	5.0 R
Ethylbenzene	100-41-4	ug/L	--	**0.22 J**	**0.54**	5.0 R
Isopropylbenzene	98-82-8	ug/L	--	**1.4**	**3.1**	5.0 R
m,p-Xylene	179601-23-1	ug/L	--	**0.32 J**	**0.47 J**	5.0 R
Methyl acetate	79-20-9	ug/L	--	0.50 U	0.5 U	5.0 R
Methyl tert-butyl ether	1634-04-4	ug/L	--	0.50 U	0.5 U	5.0 R
Methylcyclohexane	108-87-2	ug/L	--	**1.6**	**5.7**	**23 J**
Methylene chloride	75-09-2	ug/L	--	**0.27 J**	0.5 U	5.0 R
o-Xylene	95-47-6	ug/L	--	**0.39 J**	**0.49 J**	5.0 R
Styrene	100-42-5	ug/L	--	0.50 U	0.5 U	5.0 R
Tetrachloroethene	127-18-4	ug/L	--	0.50 U	0.5 U	5.0 R
Toluene	108-88-3	ug/L	--	0.50 U	**0.16 J**	5.0 R
trans-1,2-Dichloroethene	156-60-5	ug/L	--	0.50 U	0.5 U	5.0 R
trans-1,3-Dichloropropene	10061-02-6	ug/L	--	0.50 U	0.5 U	5.0 R
Trichloroethene	79-01-6	ug/L	--	0.50 U	0.5 U	5.0 R
Trichlorofluoromethane	75-69-4	ug/L	--	0.50 U	0.5 U	5.0 R
Vinyl chloride	75-01-4	ug/L	--	0.50 U	0.5 U	5.0 R

Notes:

Bold	The analyte was detected above the method detection limit
J	The associated value is an estimated quantity.
U	The material was analyzed for, but was not detected above the
ug/L	microgram(s) per liter
--	No data available or non-applicable

MW-05
Groundwater Results
SVOCs

Table 2

Analyte	CAS.NO	Units	Sample ID Date Type	WL-MW-05 5/12/2015 Field Sample	WL-MW-05 10/6/2015 Field Sample	WL-MW-05 10/6/2015 Field Duplicate
SVOCs						
1,1'-Biphenyl	92-52-4	ug/L	--	5.0 U	4.8 UJ	4.8 U
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/L	--	5.0 U	4.8 UJ	4.8 U
1,4-Dioxane	123-91-1	ug/L	--	--	1.9 UJ	1.9 U
2,2'-Oxybis(1-chloropropane)	108-60-1	ug/L	--	5.0 U	9.6 UJ	9.5 U
2,3,4,6-Tetrachlorophenol	58-90-2	ug/L	--	5.0 U	4.8 UJ	4.8 U
2,4,5-Trichlorophenol	95-95-4	ug/L	--	5.0 U	4.8 UJ	4.8 U
2,4,6-Trichlorophenol	88-06-2	ug/L	--	5.0 U	4.8 UJ	4.8 U
2,4-Dichlorophenol	120-83-2	ug/L	--	5.0 U	4.8 UJ	4.8 U
2,4-Dimethylphenol	105-67-9	ug/L	--	5.0 U	4.8 UJ	4.8 U
2,4-Dinitrophenol	51-28-5	ug/L	--	10 U	9.6 UJ	9.5 U
2,4-Dinitrotoluene	121-14-2	ug/L	--	5.0 U	4.8 UJ	4.8 U
2,6-Dinitrotoluene	606-20-2	ug/L	--	5.0 U	4.8 UJ	4.8 U
2-Chloronaphthalene	91-58-7	ug/L	--	5.0 U	4.8 UJ	4.8 U
2-Chlorophenol	95-57-8	ug/L	--	5.0 U	4.8 UJ	4.8 U
2-Methylnaphthalene	91-57-6	ug/L	--	5.0 U	4.8 UJ	4.8 U
2-Methylphenol	95-48-7	ug/L	--	5.0 U	9.6 UJ	9.5 U
2-Nitroaniline	88-74-4	ug/L	--	10 U	4.8 UJ	4.8 U
2-Nitrophenol	88-75-5	ug/L	--	5.0 U	4.8 UJ	4.8 U
3,3'-Dichlorobenzidine	91-94-1	ug/L	--	5.0 U	9.6 UJ	9.5 U
3-Nitroaniline	99-09-2	ug/L	--	10 U	9.6 UJ	9.5 U
4,6-Dinitro-2-methylphenol	534-52-1	ug/L	--	10 U	9.6 UJ	9.5 U
4-Bromophenyl-phenylether	101-55-3	ug/L	--	5.0 U	4.8 UJ	4.8 U
4-Chloro-3-methylphenol	59-50-7	ug/L	--	5.0 U	4.8 UJ	4.8 U
4-Chloroaniline	106-47-8	ug/L	--	5.0 U	9.6 UJ	9.5 U
4-Chlorophenyl-phenylether	7005-72-3	ug/L	--	5.0 U	4.8 UJ	4.8 U
4-Methylphenol	106-44-5	ug/L	--	5.0 U	9.6 UJ	9.5 U
4-Nitroaniline	100-01-6	ug/L	--	10 U	9.6 UJ	9.5 U
4-Nitrophenol	100-02-7	ug/L	--	10 U	9.6 UJ	9.5 U
Acenaphthene	83-32-9	ug/L	--	**4.7 J**	**4.1 J**	**4.6 J**
Acenaphthylene	208-96-8	ug/L	--	5.0 U	4.8 UJ	4.8 U
Acetophenone	98-86-2	ug/L	--	5.0 U	9.6 UJ	9.5 U
Anthracene	120-12-7	ug/L	--	5.0 U	**1.8 J**	**1.9 J**
Atrazine	1912-24-9	ug/L	--	5.0 U	9.6 UJ	9.5 U
Benzaldehyde	100-52-7	ug/L	--	5.0 U	9.6 UJ	9.5 U
Benzo(a)anthracene	56-55-3	ug/L	--	5.0 U	4.8 UJ	4.8 U
Benzo(a)pyrene	50-32-8	ug/L	--	5.0 U	4.8 UJ	4.8 U
Benzo(b)fluoranthene	205-99-2	ug/L	--	5.0 U	4.8 UJ	4.8 U
Benzo(g,h,i)perylene	191-24-2	ug/L	--	5.0 U	4.8 UJ	4.8 U
Benzo(k)fluoranthene	207-08-9	ug/L	--	5.0 U	4.8 UJ	4.8 U
Bis(2-chloroethoxy)methane	111-91-1	ug/L	--	5.0 U	4.8 UJ	4.8 U
Bis(2-chloroethyl)ether	111-44-4	ug/L	--	5.0 U	9.6 UJ	9.5 U
Bis(2-ethylhexyl)phthalate	117-81-7	ug/L	--	**3.0 J**	**1.3 J**	**1.5 J**
Butylbenzylphthalate	85-68-7	ug/L	--	5.0 U	4.8 UJ	4.8 U
Caprolactam	105-60-2	ug/L	--	5.0 U	9.6 UJ	9.5 U
Carbazole	86-74-8	ug/L	--	5.0 U	9.6 UJ	9.5 U
Chrysene	218-01-9	ug/L	--	5.0 U	**0.72 J**	4.8 U
Dibenzo(a,h)anthracene	53-70-3	ug/L	--	5.0 U	4.8 UJ	4.8 U
Dibenzofuran	132-64-9	ug/L	--	5.0 U	4.8 UJ	4.8 U
Diethylphthalate	84-66-2	ug/L	--	5.0 U	4.8 UJ	4.8 U
Dimethylphthalate	131-11-3	ug/L	--	5.0 U	4.8 UJ	4.8 U
Di-n-butylphthalate	84-74-2	ug/L	--	5.0 U	4.8 UJ	4.8 U
Di-n-octylphthalate	117-84-0	ug/L	--	5.0 U	9.6 UJ	9.5 U
Fluoranthene	206-44-0	ug/L	--	5.0 U	9.6 UJ	9.5 U
Fluorene	86-73-7	ug/L	--	**10**	**8.2 J**	**8.9**
Hexachlorobenzene	118-74-1	ug/L	--	5.0 U	4.8 UJ	4.8 U
Hexachlorobutadiene	87-68-3	ug/L	--	5.0 U	4.8 UJ	4.8 U
Hexachlorocyclopentadiene	77-47-4	ug/L	--	5.0 U	9.6 UJ	9.5 U
Hexachloroethane	67-72-1	ug/L	--	5.0 U	4.8 UJ	4.8 U
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	--	5.0 U	4.8 UJ	4.8 U
Isophorone	78-59-1	ug/L	--	5.0 U	4.8 UJ	4.8 U
Naphthalene	91-20-3	ug/L	--	5.0 U	4.8 UJ	4.8 U
Nitrobenzene	98-95-3	ug/L	--	5.0 U	4.8 UJ	4.8 U
N-Nitroso-di-n-propylamine	621-64-7	ug/L	--	5.0 U	4.8 UJ	4.8 U
N-Nitrosodiphenylamine	86-30-6	ug/L	--	5.0 U	4.8 UJ	4.8 U
Pentachlorophenol	87-86-5	ug/L	--	10 U	9.6 UJ	9.5 U
Phenanthrene	85-01-8	ug/L	--	**4.0 J**	**7.2 J**	**8.3**
Phenol	108-95-2	ug/L	--	5.0 U	9.6 UJ	9.5 U
Pyrene	129-00-0	ug/L	--	**2.8 J**	**2.2 J**	**2.5 J**

Notes:

Bold	The analyte was detected above the method detection limit
J	The associated value is an estimated quantity.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
UJ	The analyte was not deemed above the quantitation limit; however, this limit may not be precise
ug/L	microgram(s) per liter
--	No data available or non-applicable

MW-05
Groundwater Results
Pesticides and PCBs

Table 3

Analyte	CAS.NO	Units	Sample ID Date Type	WL-MW-05 5/12/2015 Field Sample	WL-MW-05 10/6/2015 Field Sample	WL-MW-05 10/6/2015 Field Duplicate
PCBs						
Aroclor-1016	12674-11-2	ug/L	--	1.0 U	1 UJ	0.96 U
Aroclor-1221	11104-28-2	ug/L	--	1.0 U	1 UJ	0.96 U
Aroclor-1232	11141-16-5	ug/L	--	1.0 U	1 UJ	0.96 U
Aroclor-1242	53469-21-9	ug/L	--	1.0 U	1 UJ	0.96 U
Aroclor-1248	12672-29-6	ug/L	--	1.0 U	1 UJ	0.96 U
Aroclor-1254	11097-69-1	ug/L	--	1.0 U	1 UJ	0.96 U
Aroclor-1260	11096-82-5	ug/L	--	1.0 U	1 UJ	0.96 U
Aroclor-1262	37324-23-5	ug/L	--	1.0 U	1 UJ	0.96 U
Aroclor-1268	11100-14-4	ug/L	--	1.0 U	1 UJ	0.96 U
Pesticides						
4,4'-DDD	72-54-8	ug/L	--	0.10 U	0.10 UJ	**0.0016 J**
4,4'-DDE	72-55-9	ug/L	--	0.10 U	0.10 UJ	0.096 UJ
4,4'-DDT	50-29-3	ug/L	--	0.10 U	0.10 UJ	0.096 UJ
Aldrin	309-00-2	ug/L	--	0.050 U	0.0018 UJ	**0.0039 J**
alpha-BHC	319-84-6	ug/L	--	0.050 U	**0.0018 J-**	**0.0015 J**
alpha-Chlordane	5103-71-9	ug/L	--	0.050 U	0.050 UJ	0.048 UJ
beta-BHC	319-85-7	ug/L	--	0.050 U	**0.0048 J-**	0.048 UJ
delta-BHC	319-86-8	ug/L	--	0.050 U	**0.0020 J-**	0.048 UJ
Dieldrin	60-57-1	ug/L	--	0.10 U	**0.0019 J-**	0.096 UJ
Endosulfan I	959-98-8	ug/L	--	0.050 U	0.050 UJ	0.048 UJ
Endosulfan II	33213-65-9	ug/L	--	0.10 U	**0.0043 J-**	0.096 UJ
Endosulfan sulfate	1031-07-8	ug/L	--	0.10 U	0.10 UJ	0.096 UJ
Endrin	72-20-8	ug/L	--	0.10 U	**0.0029 J-**	0.096 UJ
Endrin aldehyde	7421-93-4	ug/L	--	0.10 U	0.10 UJ	0.096 UJ
Endrin ketone	53494-70-5	ug/L	--	0.10 U	0.10 UJ	0.096 UJ
gamma-BHC (Lindane)	58-89-9	ug/L	--	0.050 U	0.050 UJ	0.048 UJ
gamma-Chlordane	5103-74-2	ug/L	--	0.050 U	**0.0070 J-**	**0.0034 J**
Heptachlor	76-44-8	ug/L	--	0.050 U	0.050 UJ	0.048 UJ
Heptachlor epoxide	1024-57-3	ug/L	--	0.050 U	**0.0050 J-**	0.048 UJ
Methoxychlor	72-43-5	ug/L	--	0.50 U	0.50 UJ	0.0025 U
Toxaphene	8001-35-2	ug/L	--	5.0 U	5.0 UJ	4.8 UJ

Notes:

J	The associated value is an estimated quantity.
J-	The associated value is an estimated quantity with a potential negative bias
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
UJ	The analyte was not deemed above the quantitation limit; however, this limit may not be precise
ug/L	microgram(s) per liter
--	No data available or non-applicable

MW-05
Groundwater Results
Metals

Table 4

Analyte	CAS.NO	Units	Sample ID Date Type	WL-MW-05 5/12/2015 Field Sample	WL-MW-05 10/6/2015 Field Sample	WL-MW-05 10/6/2015 Field Duplicate
Total Metals						
Aluminum	7429-90-5	ug/L	--	**22200**	**26800**	**18500**
Antimony	7440-36-0	ug/L	--	0.11 U	2 UJ	2.0 UJ
Arsenic	7440-38-2	ug/L	--	**27.5**	**24.8**	**14.6**
Barium	7440-39-3	ug/L	--	**833 J**	**875**	**669**
Beryllium	7440-41-7	ug/L	--	**3.2**	**3.5**	**2.1**
Cadmium	7440-43-9	ug/L	--	**1.6**	**1.4**	1.0 U
Calcium	7440-70-2	ug/L	--	**305000**	**239000**	**168000**
Chromium	7440-47-3	ug/L	--	**244**	**78.9**	**63.9**
Cobalt	7440-48-4	ug/L	--	**22.1**	**30.4**	**18.1**
Copper	7440-50-8	ug/L	--	**9.0**	**74.5**	**44.8**
Iron	7439-89-6	ug/L	--	**103000**	**83000**	**49000**
Lead	7439-92-1	ug/L	--	**51.8**	**58.8**	**33.8**
Magnesium	7439-95-4	ug/L	--	**206000**	**169000**	**147000**
Manganese	7439-96-5	ug/L	--	**3650**	**3390**	**2240**
Mercury	7439-97-6	ug/L	--	--	**0.52**	**0.22**
Nickel	7440-02-0	ug/L	--	**101**	**90.3**	**57.0**
Potassium	7440-09-7	ug/L	--	**19300 J**	**15900**	**13600**
Selenium	7782-49-2	ug/L	--	**5.2 J+**	5 U	10.0 U
Silver	7440-22-4	ug/L	--	1.0 U	1 U	1.0 U
Sodium	7440-23-5	ug/L	--	**313000**	**321000**	**258000**
Thallium	7440-28-0	ug/L	--	0.42 U	1 U	1.0 U
Vanadium	7440-62-2	ug/L	--	**92.9**	**103**	**70.8**
Zinc	7440-66-6	ug/L	--	**320 J**	**230**	**151**
Dissolved Metals						
Aluminum	7429-90-5	ug/L	--	**14.3 J**	**6.1 J**	**6.1 J**
Antimony	7440-36-0	ug/L	--	2.0 U	2 UJ	2.0 UJ
Arsenic	7440-38-2	ug/L	--	**6.1**	**1.8**	**1.8**
Barium	7440-39-3	ug/L	--	**446**	**433**	**451**
Beryllium	7440-41-7	ug/L	--	1.0 U	1 U	1.0 U
Cadmium	7440-43-9	ug/L	--	1.0 U	1 U	1.0 U
Calcium	7440-70-2	ug/L	--	**111000**	**109000**	**119000**
Chromium	7440-47-3	ug/L	--	**2.8**	**2.2**	**2.0**
Cobalt	7440-48-4	ug/L	--	**0.68 J**	**0.74 J**	**1.3**
Copper	7440-50-8	ug/L	--	**2.0 J**	**1.2 J**	**1.8 J**
Iron	7439-89-6	ug/L	--	**601**	**303 J**	**323 J**
Lead	7439-92-1	ug/L	--	**0.12 J**	1 UJ	1.0 UJ
Magnesium	7439-95-4	ug/L	--	**131000**	**131000**	**137000**
Manganese	7439-96-5	ug/L	--	**764**	**829**	**918**
Mercury	7439-97-6	ug/L	--	--	0.2 U	0.20 U
Nickel	7440-02-0	ug/L	--	**9.5**	**5.6**	**9.1**
Potassium	7440-09-7	ug/L	--	**9850**	**10200**	**10600**
Selenium	7782-49-2	ug/L	--	5.0 U	5 U	**2.0 J**
Silver	7440-22-4	ug/L	--	1.0 U	1 UJ	1.0 UJ
Sodium	7440-23-5	ug/L	--	**308000**	**269000**	**293000**
Thallium	7440-28-0	ug/L	--	1.0 U	1 U	1.0 U
Vanadium	7440-62-2	ug/L	--	**1.3 J**	**1.9 J**	**2.4 J**
Zinc	7440-66-6	ug/L	--	**7.2**	**9.2**	**10.6**

Notes:

Bold	The analyte was detected above the method detection limit
J	The associated value is an estimated quantity.
J+	The associated value is an estimated quantity with a potential positive bias
U	The material was analyzed for, but was n
UJ	The analyte was not deemed above the quantitation limit; however, this limit may not be precise
ug/L	microgram(s) per liter
--	No data available or non-applicable

Legend

Surface Water Sample Location

Property Boundary

0 180 360 720 Feet

N

Prepared for:
U.S. EPA Region 8

Contract No.:
EP-S8-13-01

TDD:
1412-01

TO:
0004

Prepared By:
Weston Solutions, Inc.
START IV

Suite 100
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Lakewood, CO 80215

FIGURE 2
SURFACE WATER SAMPLE LOCATION MAP
OLD WILLISTON LANDFILL
WILLISTON, ND

Date: 1/22/2016

May 2015
Surface Water
VOCs

Table 7.1

Analyte	CAS.NO	Units	SCDM Environmental Benchmarks		North Dakota Water Quality Standards			Location	Background			Opportunity
					Aquatic Life Standards		Human Health Standards					
			Acute Freshwater CMC	Chronic Freshwater CCC	Acute	Chronic	Class II Creek	Sample ID Date Type	WL-LMR-SW05 5/13/2015 Field Sample	WL-LMR-SW06 5/13/2015 Field Sample	3x Background	WL-OPP-SW01 5/13/2015 Field Sample
VOCs												
1,1,1-Trichloroethane	71-55-6	ug/L	--	--	--	--	200	--	0.50 U	0.50 U	--	0.50 U
1,1,2,2-Tetrachloroethane	79-34-5	ug/L	--	--	--	--	0.17	--	0.50 U	0.50 U	--	0.50 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	0.50 U
1,1,2-Trichloroethane	79-00-5	ug/L	--	--	--	--	0.59	--	0.50 U	0.50 U	--	0.50 U
1,1-Dichloroethane	75-34-3	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	0.50 U
1,1-Dichloroethene	75-35-4	ug/L	--	--	--	--	7	--	0.50 U	0.50 U	--	0.50 U
1,2,3-Trichlorobenzene	87-61-6	ug/L	--	--	--	--	--	--	0.50 UJ	0.50 UJ	--	**0.26 J**
1,2,4-Trichlorobenzene	120-82-1	ug/L	--	--	--	--	35	--	0.50 U	0.50 U	--	0.50 U
1,2-Dibromo-3-chloropropane	96-12-8	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	0.50 U
1,2-Dibromoethane	106-93-4	ug/L	--	--	--	--	0.05	--	0.50 U	0.50 U	--	0.50 U
1,2-Dichlorobenzene	95-50-1	ug/L	--	--	--	--	420	--	0.50 U	0.50 U	--	0.50 U
1,2-Dichloroethane	107-06-2	ug/L	--	--	--	--	0.38	--	0.50 U	0.50 U	--	0.50 U
1,2-Dichloropropane	78-87-5	ug/L	--	--	--	--	0.5	--	0.50 U	0.50 U	--	0.50 U
1,3-Dichlorobenzene	541-73-1	ug/L	--	--	--	--	320	--	0.50 U	0.50 U	--	0.50 U
1,4-Dichlorobenzene	106-46-7	ug/L	--	--	--	--	63	--	0.50 U	0.50 U	--	0.50 U
2-Butanone	78-93-3	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
2-Hexanone	591-78-6	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
4-Methyl-2-pentanone	108-10-1	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Acetone	67-64-1	ug/L	--	--	28,000[2]	1,500[2]	--	--	5.0 U	5.0 U	--	5.0 U
Benzene	71-43-2	ug/L	--	--	--	--	2.2	--	0.50 U	0.50 U	--	**1.5**
Bromochloromethane	74-97-5	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	0.50 U
Bromodichloromethane	75-27-4	ug/L	--	--	--	--	0.55	--	0.50 U	0.50 U	--	0.50 U
Bromoform	75-25-2	ug/L	--	--	--	--	4.3	--	0.50 U	0.50 U	--	0.50 U
Bromomethane	74-83-9	ug/L	--	--	--	16	47	--	0.50 U	0.50 U	--	0.50 U
Carbon disulfide	75-15-0	ug/L	--	--	17[2]	0.92[2]	--	--	0.50 U	0.50 U	--	0.50 U
Carbon tetrachloride	56-23-5	ug/L	--	--	--	--	0.23	--	0.50 U	0.50 U	--	0.50 U
Chlorobenzene	108-90-7	ug/L	--	--	--	--	100	--	0.50 U	0.50 U	--	0.50 U
Chloroethane	75-00-3	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	0.50 U
Chloroform	67-66-3	ug/L	--	--	--	--	5.7	--	0.50 U	0.50 U	--	0.50 U
Chloromethane	74-87-3	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	0.50 U
cis-1,2-Dichloroethene	156-59-2	ug/L	--	--	--	--	70	--	0.50 U	0.50 U	--	0.50 U
cis-1,3-Dichloropropene	10061-01-5	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	0.50 U
Cyclohexane	110-82-7	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	**4.1**
Dibromochloromethane	124-48-1	ug/L	--	--	--	--	0.4	--	0.50 U	0.50 U	--	0.50 U
Dichlorodifluoromethane	75-71-8	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	0.50 U
Ethylbenzene	100-41-4	ug/L	--	--	--	--	530	--	0.50 U	0.50 U	--	**1.5**
Isopropylbenzene	98-82-8	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	0.50 U
m,p-Xylene	179601-23-1	ug/L	--	--	--	--	10000	--	0.50 U	0.50 U	--	**2.8**
Methyl acetate	79-20-9	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	0.50 U
Methyl tert-butyl ether	1634-04-4	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	**0.26 J**
Methylcyclohexane	108-87-2	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	**0.79**
Methylene chloride	75-09-2	ug/L	--	--	--	--	4.6	--	0.50 U	0.50 U	--	0.50 U
o-Xylene	95-47-6	ug/L	--	--	--	--	10000	--	0.50 U	0.50 U	--	0.50 U
Styrene	100-42-5	ug/L	--	--	--	--	100	--	0.50 U	0.50 U	--	0.50 U
Tetrachloroethene	127-18-4	ug/L	--	--	--	--	0.69	--	0.50 U	0.50 U	--	0.50 U
Toluene	108-88-3	ug/L	--	--	--	--	1000	--	0.50 U	0.50 U	--	0.50 U
trans-1,2-Dichloroethene	156-60-5	ug/L	--	--	--	--	100	--	0.50 U	0.50 U	--	0.50 U
trans-1,3-Dichloropropene	10061-02-6	ug/L	--	--	--	--	--	--	0.50 U	0.50 U	--	0.50 U
Trichloroethene	79-01-6	ug/L	--	--	--	--	2.5	--	0.50 U	0.50 U	--	0.50 U
Trichlorofluoromethane	75-69-4	ug/L	--	--	11,000[3]	--	--	--	0.50 U	0.50 U	--	0.50 U
Vinyl chloride	75-01-4	ug/L	--	--	--	--	0.025	--	0.50 U	0.50 U	--	0.50 U

Notes:

[2] - 4 Tier II Secondary Acute Value: http://www.esd.ornl.gov/programs/ecorisk/tools.html

[3] - National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables for Organics in Water and Soil- Lowest Observed Effect Level (LOEL)

Bold	The analyte was detected above the method detection limit
Bold	The analyte concentration exceeds 3X background and is significant to the Site
J	The associated value is an estimated quantity.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
UJ	The analyte was not deemed above the quantitation limit; however, this limit may not be precise
ug/L	microgram(s) per liter
CCC	Criterion Continuous Concentration (chronic exposure)
CMC	Criterion Maximum Concentration (acute exposure)
SCDM	Superfund Chemical Data Matrix
--	No data available or non-applicable

May 2015
Surface Water Results
SVOCs

Table 7.2

Analyte	CAS.NO	Units	SCDM Environmental Benchmarks		North Dakota Water Quality Standards			Location	Background			Opportunity
					Aquatic Life Standards		Human Health Standards					
			Acute Freshwater CMC	Chronic Freshwater CCC	Acute	Chronic	Class II Creek	Sample ID Date Type	WL-LMR-SW05 5/13/2015 Field Sample	WL-LMR-SW06 5/13/2015 Field Sample	3x Background	WL-OPP-SW01 5/13/2015 Field Sample
SVOCs												
1,1'-Biphenyl	92-52-4	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
2,2'-Oxybis(1-chloropropane)	108-60-1	ug/L	--	--	--	--	1400	--	5.0 U	5.0 U	--	5.0 U
2,3,4,6-Tetrachlorophenol	58-90-2	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
2,4,5-Trichlorophenol	95-95-4	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
2,4,6-Trichlorophenol	88-06-2	ug/L	--	--	--	--	1.4	--	5.0 U	5.0 U	--	5.0 U
2,4-Dichlorophenol	120-83-2	ug/L	--	--	--	--	77	--	5.0 U	5.0 U	--	5.0 U
2,4-Dimethylphenol	105-67-9	ug/L	--	--	--	--	380	--	5.0 U	5.0 U	--	5.0 U
2,4-Dinitrophenol	51-28-5	ug/L	--	--	--	--	69	--	10 U	10 U	--	10 U
2,4-Dinitrotoluene	121-14-2	ug/L	--	--	--	--	0.11	--	5.0 U	5.0 U	--	5.0 U
2,6-Dinitrotoluene	606-20-2	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
2-Chloronaphthalene	91-58-7	ug/L	--	--	--	--	1000	--	5.0 U	5.0 U	--	5.0 U
2-Chlorophenol	95-57-8	ug/L	--	--	--	--	81	--	5.0 U	5.0 U	--	5.0 U
2-Methylnaphthalene	91-57-6	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
2-Methylphenol	95-48-7	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
2-Nitroaniline	88-74-4	ug/L	--	--	--	--	--	--	10 U	10 U	--	10 U
2-Nitrophenol	88-75-5	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
3,3'-Dichlorobenzidine	91-94-1	ug/L	--	--	--	--	0.021	--	5.0 U	5.0 U	--	5.0 U
3-Nitroaniline	99-09-2	ug/L	--	--	--	--	--	--	10 U	10 U	--	10 U
4,6-Dinitro-2-methylphenol	534-52-1	ug/L	--	--	--	--	13	--	10 U	10 U	--	10 U
4-Bromophenyl-phenylether	101-55-3	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
4-Chloro-3-methylphenol	59-50-7	ug/L	--	--	--	--	3000	--	5.0 U	5.0 U	--	5.0 U
4-Chloroaniline	106-47-8	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
4-Chlorophenyl-phenylether	7005-72-3	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
4-Methylphenol	106-44-5	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
4-Nitroaniline	100-01-6	ug/L	--	--	--	--	--	--	10 U	10 U	--	10 U
4-Nitrophenol	100-02-7	ug/L	--	--	--	--	--	--	10 U	10 U	--	10 U
Acenaphthene	83-32-9	ug/L	--	--	--	--	670	--	5.0 U	5.0 U	--	5.0 U
Acenaphthylene	208-96-8	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Acetophenone	98-86-2	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Anthracene	120-12-7	ug/L	--	--	--	--	8300	--	5.0 U	5.0 U	--	5.0 U
Atrazine	1912-24-9	ug/L	--	--	--	--	3	--	5.0 U	5.0 U	--	5.0 U
Benzaldehyde	100-52-7	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Benzo(a)anthracene	56-55-3	ug/L	--	--	--	--	0.0038	--	5.0 U	5.0 U	--	5.0 U
Benzo(a)pyrene	50-32-8	ug/L	--	--	--	--	0.0038	--	5.0 U	5.0 U	--	5.0 U
Benzo(b)fluoranthene	205-99-2	ug/L	--	--	--	--	0.0038	--	5.0 U	5.0 U	--	5.0 U
Benzo(g,h,i)perylene	191-24-2	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Benzo(k)fluoranthene	207-08-9	ug/L	--	--	--	--	0.0038	--	5.0 U	5.0 U	--	5.0 U
Bis(2-chloroethoxy)methane	111-91-1	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Bis(2-chloroethyl)ether	111-44-4	ug/L	--	--	--	--	0.03	--	5.0 U	5.0 U	--	5.0 U
Bis(2-ethylhexyl)phthalate	117-81-7	ug/L	--	--	--	--	1.2	--	5.0 U	5.0 U	--	5.0 U
Butylbenzylphthalate	85-68-7	ug/L	--	--	--	--	1500	--	5.0 U	5.0 U	--	5.0 U
Caprolactam	105-60-2	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Carbazole	86-74-8	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Chrysene	218-01-9	ug/L	--	--	--	--	0.0038	--	5.0 U	5.0 U	--	5.0 U
Dibenzo(a,h)anthracene	53-70-3	ug/L	--	--	--	--	0.0038	--	5.0 U	5.0 U	--	5.0 U
Dibenzofuran	132-64-9	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Diethylphthalate	84-66-2	ug/L	--	--	--	--	17000	--	5.0 U	5.0 U	--	5.0 U
Dimethylphthalate	131-11-3	ug/L	--	--	--	--	270000	--	5.0 U	5.0 U	--	5.0 U
Di-n-butylphthalate	84-74-2	ug/L	--	--	--	--	2000	--	5.0 U	5.0 U	--	5.0 U
Di-n-octylphthalate	117-84-0	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Fluoranthene	206-44-0	ug/L	--	--	--	--	130	--	5.0 U	5.0 U	--	5.0 U
Fluorene	86-73-7	ug/L	--	--	--	--	1100	--	5.0 U	5.0 U	--	5.0 U
Hexachlorobenzene	118-74-1	ug/L	--	--	--	--	0.00028	--	5.0 U	5.0 U	--	5.0 U
Hexachlorobutadiene	87-68-3	ug/L	--	--	--	--	0.44	--	5.0 U	5.0 U	--	5.0 U
Hexachlorocyclopentadiene	77-47-4	ug/L	--	--	--	--	40	--	5.0 U	5.0 U	--	5.0 U
Hexachloroethane	67-72-1	ug/L	--	--	--	--	1.4	--	5.0 U	5.0 U	--	5.0 U
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	--	--	--	--	0.0038	--	5.0 U	5.0 U	--	5.0 U
Isophorone	78-59-1	ug/L	--	--	--	--	35	--	5.0 U	5.0 U	--	5.0 U
Naphthalene	91-20-3	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Nitrobenzene	98-95-3	ug/L	--	--	--	--	17	--	5.0 U	5.0 U	--	5.0 U
N-Nitroso-di-n-propylamine	621-64-7	ug/L	--	--	--	--	0.005	--	5.0 U	5.0 U	--	5.0 U
N-Nitrosodiphenylamine	86-30-6	ug/L	--	--	--	--	3.3	--	5.0 U	5.0 U	--	5.0 U
Pentachlorophenol	87-86-5	ug/L	19	15	19	15	0.27	--	10 U	10 U	--	10 U
Phenanthrene	85-01-8	ug/L	--	--	--	--	--	--	5.0 U	5.0 U	--	5.0 U
Phenol	108-95-2	ug/L	--	--	--	--	10000	--	5.0 U	5.0 U	--	5.0 U
Pyrene	129-00-0	ug/L	--	--	--	--	830	--	5.0 U	5.0 U	--	5.0 U

Notes:

Bold	The analyte concentration exceeds one or more benchmarks
J	The associated value is an estimated quantity.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
ug/L	microgram(s) per liter
CCC	Criterion Continuous Concentration (chronic exposure)
CMC	Criterion Maximum Concentration (acute exposure)
SCDM	Superfund Chemical Data Matrix
--	No data available or non-applicable

May 2015
Surface Water Results

Table 7.3

Analyte	CAS.NO	Units	SCDM Environmental Benchmarks		North Dakota Water Quality Standards			Location	Background			Opportunity
					Aquatic Life Standards		Human Health Standards					
			Acute Freshwater CMC	Chronic Freshwater CCC	Acute	Chronic	Class II Creek	Sample ID Date Type	WL-LMR-SW05 5/13/2015 Field Sample	WL-LMR-SW06 5/13/2015 Field Sample	3x Background	WL-OPP-SW01 5/13/2015 Field Sample
PCBs												
Aroclor-1016	12674-11-2	ug/L	--	0.014	--	0.014	0.000064	--	1.0 U	1.0 U	--	1.0 U
Aroclor-1221	11104-28-2	ug/L	--	0.014	--	0.014	0.000064	--	1.0 U	1.0 U	--	1.0 U
Aroclor-1232	11141-16-5	ug/L	--	0.014	--	0.014	0.000064	--	1.0 U	1.0 U	--	1.0 U
Aroclor-1242	53469-21-9	ug/L	--	0.014	--	0.014	0.000064	--	1.0 U	1.0 U	--	1.0 U
Aroclor-1248	12672-29-6	ug/L	--	0.014	--	0.014	0.000064	--	1.0 U	1.0 U	--	1.0 U
Aroclor-1254	11097-69-1	ug/L	--	0.014	--	0.014	0.000064	--	1.0 U	1.0 U	--	1.0 U
Aroclor-1260	11096-82-5	ug/L	--	0.014	--	0.014	0.000064	--	1.0 U	1.0 U	--	1.0 U
Aroclor-1262	37324-23-5	ug/L	--	0.014	--	0.014	0.000064	--	1.0 U	1.0 U	--	1.0 U
Aroclor-1268	11100-14-4	ug/L	--	0.014	--	0.014	0.000064	--	1.0 U	1.0 U	--	1.0 U
Pesticides												
4,4'-DDD	72-54-8	ug/L	--	--	--	--	0.00031	--	0.10 U	0.10 U	--	0.10 U
4,4'-DDE	72-55-9	ug/L	--	--	--	--	0.00022	--	0.10 U	0.10 U	--	0.10 U
4,4'-DDT	50-29-3	ug/L	1.1	0.001	0.55	0.001	0.00022	--	0.10 U	0.10 U	--	0.10 U
Aldrin	309-00-2	ug/L	3	--	1.5	--	0.000049	--	0.050 U	0.050 U	--	0.050 U
alpha-BHC	319-84-6	ug/L	--	--	--	--	0.0026	--	0.050 U	0.050 U	--	0.050 U
alpha-Chlordane	5103-71-9	ug/L	2.4	0.0043	--	--	--	--	0.050 U	0.050 U	--	0.050 U
beta-BHC	319-85-7	ug/L	--	--	--	--	0.0091	--	0.050 U	0.050 U	--	0.050 U
delta-BHC	319-86-8	ug/L	--	--	--	--	--	--	0.050 U	0.050 U	--	0.050 U
Dieldrin	60-57-1	ug/L	0.24	0.056	0.24	0.056	0.000052	--	0.10 U	0.10 U	--	0.10 U
Endosulfan I	959-98-8	ug/L	0.22	0.056	0.11	0.056	62	--	0.050 U	0.050 U	--	0.050 U
Endosulfan II	33213-65-9	ug/L	0.22	0.056	0.11	0.056	62	--	0.10 U	0.10 U	--	0.10 U
Endosulfan sulfate	1031-07-8	ug/L	--	--	--	--	62	--	0.10 U	0.10 U	--	0.10 U
Endrin	72-20-8	ug/L	0.086	0.036	0.09	0.036	0.059	--	0.10 U	0.10 U	--	0.10 U
Endrin aldehyde	7421-93-4	ug/L	--	--	--	--	0.29	--	0.10 U	0.10 U	--	0.10 U
Endrin ketone	53494-70-5	ug/L	--	--	--	--	--	--	0.10 U	0.10 U	--	0.10 U
gamma-BHC (Lindane)	58-89-9	ug/L	0.95	0.16	0.95	--	0.2	--	0.050 U	0.050 U	--	0.050 U
gamma-Chlordane	5103-74-2	ug/L	2.4	0.0043	--	--	--	--	0.050 U	0.050 U	--	0.050 U
Heptachlor	76-44-8	ug/L	0.52	0.0038	0.26	0.0038	0.000079	--	0.050 U	0.050 U	--	0.050 U
Heptachlor epoxide	1024-57-3	ug/L	0.52	0.0038	0.26	0.0038	0.000039	--	0.050 U	0.050 U	--	0.050 U
Methoxychlor	72-43-5	ug/L	--	0.03	--	--	40	--	0.50 U	0.50 U	--	0.50 U
Toxaphene	8001-35-2	ug/L	0.73	0.0002	0.73	0.0002	0.00028	--	5.0 U	5.0 U	--	5.0 U

Notes:

U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
ug/L	microgram(s) per liter
CCC	Criterion Continuous Concentration (chronic exposure)
CMC	Criterion Maximum Concentration (acute exposure)
EPA	United States Environmental Protection Agency
MCL	Maximum Contaminant Level
SCDM	Superfund Chemical Data Matrix
--	No data available or non-applicable

May 2015
Surface Water Results
Metals

Table 7.4

Analyte	CAS.NO	Units	SCDM Environmental Benchmarks		North Dakota Water Quality Standards			Location	Background			Opportunity
					Aquatic Life Standards		Human Health Standards					
			Acute Freshwater CMC	Chronic Freshwater CCC	Acute	Chronic	Class II Creek	Sample ID Date Type	WL-LMR-SW05 5/13/2015 Field Sample	WL-LMR-SW06 5/13/2015 Field Sample	3x Background	WL-OPP-SW01 5/13/2015 Field Sample
Total Metals												
Aluminum	7429-90-5	ug/L	--	--	--	--	--	--	**541**	**523**	**1623**	**22.3**
Antimony	7440-36-0	ug/L	--	--	--	--	5.6	--	0.27 U	0.27 U	--	0.25 U
Arsenic	7440-38-2	ug/L	--	--	340	150	10	--	**6.4**	**6.8**	**20.4**	**31.8**
Barium	7440-39-3	ug/L	--	--	--	--	--	--	**50.5 J**	**52.5 J**	**197**	**776 J**
Beryllium	7440-41-7	ug/L	--	--	--	--	4	--	1.0 U	1.0 U	--	1.0 U
Cadmium	7440-43-9	ug/L	--	--	9.04*	0.78*	5	--	1.0U	1.0 U	--	1.0 U
Calcium	7440-70-2	ug/L	--	--	--	--	--	--	**63800**	**66700**	**200100**	**121000**
Chromium	7440-47-3	ug/L	--	--	5770*	276*	100	--	**1.6 J**	**1.8 J**	--	**0.58 J**
Cobalt	7440-48-4	ug/L	--	--	--	--	--	--	**0.67 J**	**0.69 J**	--	**0.79 J**
Copper	7440-50-8	ug/L	--	--	53.4*	31.4*	1000	--	**6.8**	**3.1**	**20.4**	**2.0 J**
Iron	7439-89-6	ug/L	--	--	--	--	--	--	**1210**	**1210**	**3630**	**1800**
Lead	7439-92-1	ug/L	--	--	498*	19.4*	15	--	**6.0**	**1.6**	**18**	0.19 U
Magnesium	7439-95-4	ug/L	--	--	--	--	--	--	**61700**	**61600**	**185100**	**143000**
Manganese	7439-96-5	ug/L	--	--	--	--	--	--	**227**	**230**	**690**	**503**
Nickel	7440-02-0	ug/L	--	--	1560*	174*	100	--	**11.3**	**4.0**	**33.9**	**7.3**
Potassium	7440-09-7	ug/L	--	--	--	--	--	--	**10900 J**	**11000 J**	**40920**	**5830 J**
Selenium	7782-49-2	ug/L	--	--	20	5	50	--	2.1 U	2.2 U	--	3.9 U
Silver	7440-22-4	ug/L	--	--	43.6*	--	--	--	1.0 U	1.0 U	--	1.0 U
Sodium	7440-23-5	ug/L	--	--	--	--	--	--	**251000**	**265000**	**795000**	**289000**
Thallium	7440-28-0	ug/L	--	--	--	--	0.24	--	1.0 U	1.0 U	--	1.0 U
Vanadium	7440-62-2	ug/L	--	--	--	--	--	--	**4.6 J**	**4.7 J**	--	**0.70 J**
Zinc	7440-66-6	ug/L	--	--	399*	399*	7400	--	**247 J**	**9.9 J**	**956**	**5.6 J**
Dissolved Metals												
Aluminum	7429-90-5	ug/L	750	87	--	--	--	--	**5.8 J**	**3.5 J**	--	**25.2**
Antimony	7440-36-0	ug/L	--	--	--	--	5.6	--	2.0 U	2.0 U	--	2.0 U
Arsenic	7440-38-2	ug/L	340	150	340	150	10	--	**7.1**	**7.7**	**23.1**	**29.6**
Barium	7440-39-3	ug/L	--	--	--	--	--	--	**48.9**	**46.4**	**146.7**	**775**
Beryllium	7440-41-7	ug/L	--	--	--	--	4	--	1.0 U	1.0 U	--	1.0 U
Cadmium	7440-43-9	ug/L	2	0.25	10.3*	0.85*	5	--	1.0 U	1.0 U	--	1.0 U
Calcium	7440-70-2	ug/L	--	--	--	--	--	--	**78300**	**74600**	**234900**	**127000**
Chromium	7440-47-3	ug/L	--	--	6415*	306*	100	--	**7.9**	**1.6 J**	**23.7**	**2.9**
Cobalt	7440-48-4	ug/L	--	--	--	--	--	--	**0.46 J**	**0.40 J**	--	**0.96 J**
Copper	7440-50-8	ug/L	2.3	1.4	60.3*	35.1*	1000	--	**2.3 J**	**2.4 J**	**9**	**2.1 J**
Iron	7439-89-6	ug/L	--	1000	--	--	--	--	**248**	**221**	**744**	**419**
Lead	7439-92-1	ug/L	65	2.5	587*	22.9*	15	--	**0.065 J**	**0.16 J**	--	**0.049 J**
Magnesium	7439-95-4	ug/L	--	--	--	--	--	--	**69900**	**66600**	**209700**	**161000**
Manganese	7439-96-5	ug/L	--	--	--	--	--	--	**10.4**	**7.1**	**31.2**	**570**
Nickel	7440-02-0	ug/L	470	52	1740*	194*	100	--	**4.3**	**3.8**	**12.9**	**10.3**
Potassium	7440-09-7	ug/L	--	--	--	--	--	--	**12900**	**12300**	**38700**	**6890**
Selenium	7782-49-2	ug/L	290	5	20	5	50	--	5.0 U	5.0 U	--	**5.2**
Silver	7440-22-4	ug/L	3.2	--	54.4*	--	--	--	1.0 U	1.0 U	--	1.0 U
Sodium	7440-23-5	ug/L	--	--	--	--	--	--	**304000**	**284000**	**912000**	**333000**
Thallium	7440-28-0	ug/L	--	--	--	--	0.24	--	1.0 U	1.0 U	--	1.0 U
Vanadium	7440-62-2	ug/L	--	--	--	--	--	--	**4.0 J**	**3.5 J**	--	**0.41 J**
Zinc	7440-66-6	ug/L	120	120	445*	445*	7400	--	**2.9**	**4.6**	**13.8**	**10.6**

Notes:

*	These benchmarks were calculated using a mean background hardness of 414 ppm for total metals and 471 ppm for dissolved metals
Bold	The analyte was detected above the method detection limit
Bold	The analyte concentration exceeds 3X background and is significant to the Site
Bold	The analyte concentration exceeds one or more benchmarks
Bold	The analyte concentration exceeds 3x background and one or more benchmarks
J	The associated value is an estimated quantity.
J-	The associated value is an estimated quantity with a potential negative bias
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
UJ	The analyte was not deemed above the quantitation limit; however, this limit may not be precise
ug/L	microgram(s) per liter
CCC	Criterion Continuous Concentration (chronic exposure)
CMC	Criterion Maximum Concentration (acute exposure)
SCDM	Superfund Chemical Data Matrix
--	No data available or non-applicable

October 2015
Surface Water Results
VOCs

Table 10.1

Analyte	CAS.NO	Units	SCDM Environmental Benchmarks		North Dakota Water Quality Standards			Location	Background				Opportunity
					Aquatic Life Standards		Human Health Standards						
			Acute Freshwater CMC	Chronic Freshwater CCC	Acute	Chronic	Class II Creek	Sample ID Date Type	WL-LMR-SW05 10/7/2015 Field Sample	WL-LMR-SW06 10/8/2015 Field Sample	WL-LMR-SW06 10/8/2015 Field Duplicate	3x Background	WL-OPP-SW01 10/7/2015 Field Sample
VOCs													
1,1,1-Trichloroethane	71-55-6	ug/L	--	--	--	--	200	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,1,2,2-Tetrachloroethane	79-34-5	ug/L	--	--	--	--	0.17	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,1,2-Trichloroethane	79-00-5	ug/L	--	--	--	--	0.59	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,1-Dichloroethane	75-34-3	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,1-Dichloroethene	75-35-4	ug/L	--	--	--	--	7	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,2,3-Trichlorobenzene	87-61-6	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,2,4-Trichlorobenzene	120-82-1	ug/L	--	--	--	--	35	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,2-Dibromo-3-chloropropane	96-12-8	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,2-Dibromoethane	106-93-4	ug/L	--	--	--	--	0.05	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,2-Dichlorobenzene	95-50-1	ug/L	--	--	--	--	420	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,2-Dichloroethane	107-06-2	ug/L	--	--	--	--	0.38	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,2-Dichloropropane	78-87-5	ug/L	--	--	--	--	0.5	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,3-Dichlorobenzene	541-73-1	ug/L	--	--	--	--	320	--	0.5 U	0.5 U	0.50 U	--	0.5 U
1,4-Dichlorobenzene	106-46-7	ug/L	--	--	--	--	63	--	0.5 U	0.5 U	0.50 U	--	0.5 U
2-Butanone	78-93-3	ug/L	--	--	--	--	--	--	5 U	5 U	5.0 U	--	5 U
2-Hexanone	591-78-6	ug/L	--	--	--	--	--	--	5 U	5 U	5.0 U	--	5 U
4-Methyl-2-pentanone	108-10-1	ug/L	--	--	--	--	--	--	5 U	5 U	5.0 U	--	5 U
Acetone	67-64-1	ug/L	--	--	28,000[2]	1,500[2]	--	--	**6.9**	**6.2**	**7.7**	**20.7**	**8.5**
Benzene	71-43-2	ug/L	--	--	--	--	2.2	--	0.5 U	0.5 U	0.50 U	--	**0.19 J**
Bromochloromethane	74-97-5	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Bromodichloromethane	75-27-4	ug/L	--	--	--	--	0.55	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Bromoform	75-25-2	ug/L	--	--	--	--	4.3	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Bromomethane	74-83-9	ug/L	--	--	--	16	47	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Carbon disulfide	75-15-0	ug/L	--	--	17[2]	0.92[2]	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Carbon tetrachloride	56-23-5	ug/L	--	--	--	--	0.23	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Chlorobenzene	108-90-7	ug/L	--	--	--	--	100	--	0.5 UJ	0.5 U	0.50 U	--	0.5 U
Chloroethane	75-00-3	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Chloroform	67-66-3	ug/L	--	--	--	--	5.7	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Chloromethane	74-87-3	ug/L	--	--	--	--	--	--	0.5 U	**0.24 J**	**0.26 J**	--	0.5 U
cis-1,2-Dichloroethene	156-59-2	ug/L	--	--	--	--	70	--	0.5 U	0.5 U	0.50 U	--	0.5 U
cis-1,3-Dichloropropene	10061-01-5	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Cyclohexane	110-82-7	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	**4.1**
Dibromochloromethane	124-48-1	ug/L	--	--	--	--	0.4	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Dichlorodifluoromethane	75-71-8	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Ethylbenzene	100-41-4	ug/L	--	--	--	--	530	--	0.5 U	0.5 U	0.50 U	--	**0.48 J**
Isopropylbenzene	98-82-8	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
m, p-Xylene	179601-23-1	ug/L	--	--	--	--	10000	--	0.5 U	**0.12 J**	**0.14 J**	--	**1.7**
Methyl acetate	79-20-9	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Methyl tert-butyl ether	1634-04-4	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	**0.35 J**
Methylcyclohexane	108-87-2	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	**1**
Methylene chloride	75-09-2	ug/L	--	--	--	--	4.6	--	0.5 U	0.5 U	0.50 U	--	0.5 U
o-Xylene	95-47-6	ug/L	--	--	--	--	10000	--	0.5 U	0.5 U	0.50 U	--	**0.22 J**
Styrene	100-42-5	ug/L	--	--	--	--	100	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Tetrachloroethene	127-18-4	ug/L	--	--	--	--	0.69	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Toluene	108-88-3	ug/L	--	--	--	--	1000	--	0.5 U	0.5 U	**0.13 J**	--	0.5 U
trans-1,2-Dichloroethene	156-60-5	ug/L	--	--	--	--	100	--	0.5 U	0.5 U	0.50 U	--	0.5 U
trans-1,3-Dichloropropene	10061-02-6	ug/L	--	--	--	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Trichloroethene	79-01-6	ug/L	--	--	--	--	2.5	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Trichlorofluoromethane	75-69-4	ug/L	--	--	11,000[3]	--	--	--	0.5 U	0.5 U	0.50 U	--	0.5 U
Vinyl chloride	75-01-4	ug/L	--	--	--	--	0.025	--	0.5 U	0.5 U	0.50 U	--	0.5 U

Notes:

[2] - 4 Tier II Secondary Acute Value: http://www.esd.ornl.gov/programs/ecorisk/tools.html

[3] - National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables for Organics in Water and Soil- Lowest Observed Effect Level (LOEL)

Bold	The analyte was detected above the method detection limit
J	The associated value is an estimated quantity.
J-	The associated value is an estimated quantity with a potential negative bias
J+	The associated value is an estimated quantity with a potential positive bias
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
UJ	The analyte was not deemed above the quantitation limit; however, this limit may not be precise
R	Rejected data
Dry	Site was dry at time of sampling
ug/L	microgram(s) per liter
CCC	Criterion Continuous Concentration (chronic exposure)
CMC	Criterion Maximum Concentration (acute exposure)
SCDM	Superfund Chemical Data Matrix
--	No data available or non-applicable

October 2015
Surface Water Results
SVOCs

Table 10.2

Analyte	CAS.NO	Units	SCDM Environmental Benchmarks		North Dakota Water Quality Standards			Location	Background				Opportunity
					Aquatic Life Standards		Human Health Standards						
			Acute Freshwater CMC	Chronic Freshwater CCC	Acute	Chronic	Class II Creek	Sample ID Date Type	WL-LMR-SW05 10/7/2015 Field Sample	WL-LMR-SW06 10/8/2015 Field Sample	WL-LMR-SW06 10/8/2015 Field Duplicate	3x Background	WL-OPP-SW01 10/7/2015 Field Sample
SVOCs													
1,1'-Biphenyl	92-52-4	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
1,4-Dioxane	123-91-1	ug/L	--	--	--	--	--	--	2.0 U	1.9 U	1.9 U		2.0 U
2,2'-Oxybis(1-chloropropane)	108-60-1	ug/L	--	--	--	--	1400	--	10 U	9.5 U	9.5 U	--	10 U
2,3,4,6-Tetrachlorophenol	58-90-2	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
2,4,5-Trichlorophenol	95-95-4	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
2,4,6-Trichlorophenol	88-06-2	ug/L	--	--	--	--	1.4	--	5 U	4.8 U	4.8 U	--	5 U
2,4-Dichlorophenol	120-83-2	ug/L	--	--	--	--	77	--	5 U	4.8 U	4.8 U	--	5 U
2,4-Dimethylphenol	105-67-9	ug/L	--	--	--	--	380	--	5 U	4.8 U	4.8 U	--	5 U
2,4-Dinitrophenol	51-28-5	ug/L	--	--	--	--	69	--	10 U	9.5 U	9.5 U	--	10 U
2,4-Dinitrotoluene	121-14-2	ug/L	--	--	--	--	0.11	--	5 U	4.8 U	4.8 U	--	5 U
2,6-Dinitrotoluene	606-20-2	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
2-Chloronaphthalene	91-58-7	ug/L	--	--	--	--	1000	--	5 U	4.8 U	4.8 U	--	5 U
2-Chlorophenol	95-57-8	ug/L	--	--	--	--	81	--	5 U	4.8 U	4.8 U	--	5 U
2-Methylnaphthalene	91-57-6	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
2-Methylphenol	95-48-7	ug/L	--	--	--	--	--	--	10 U	9.5 U	9.5 U	--	10 U
2-Nitroaniline	88-74-4	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
2-Nitrophenol	88-75-5	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
3,3'-Dichlorobenzidine	91-94-1	ug/L	--	--	--	--	0.021	--	10 U	9.5 U	9.5 U	--	10 U
3-Nitroaniline	99-09-2	ug/L	--	--	--	--	--	--	10 U	9.5 U	9.5 U	--	10 U
4,6-Dinitro-2-methylphenol	534-52-1	ug/L	--	--	--	--	13	--	10 U	9.5 U	9.5 U	--	10 U
4-Bromophenyl-phenylether	101-55-3	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
4-Chloro-3-methylphenol	59-50-7	ug/L	--	--	--	--	3000	--	5 U	4.8 U	4.8 U	--	5 U
4-Chloroaniline	106-47-8	ug/L	--	--	--	--	--	--	10 U	9.5 U	9.5 U	--	10 U
4-Chlorophenyl-phenyl ether	7005-72-3	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
4-Methylphenol	106-44-5	ug/L	--	--	--	--	--	--	10 U	9.5 U	9.5 U	--	10 U
4-Nitroaniline	100-01-6	ug/L	--	--	--	--	--	--	10 U	9.5 U	9.5 U	--	10 U
4-Nitrophenol	100-02-7	ug/L	--	--	--	--	--	--	10 U	9.5 U	9.5 U	--	10 U
Acenaphthene	83-32-9	ug/L	--	--	--	--	670	--	5 U	4.8 U	4.8 U	--	5 U
Acenaphthylene	208-96-8	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
Acetophenone	98-86-2	ug/L	--	--	--	--	--	--	10 U	9.5 U	9.5 U	--	10 U
Anthracene	120-12-7	ug/L	--	--	--	--	8300	--	5 U	4.8 U	4.8 U	--	5 U
Atrazine	1912-24-9	ug/L	--	--	--	--	3	--	10 U	9.5 U	9.5 U	--	10 U
Benzaldehyde	100-52-7	ug/L	--	--	--	--	--	--	10 U	9.5 U	9.5 U	--	10 U
Benzo(a)anthracene	56-55-3	ug/L	--	--	--	--	0.0038	--	5 U	4.8 U	4.8 U	--	5 U
Benzo(a)pyrene	50-32-8	ug/L	--	--	--	--	0.0038	--	5 U	4.8 U	4.8 U	--	5 U
Benzo(b)fluoranthene	205-99-2	ug/L	--	--	--	--	0.0038	--	5 U	4.8 U	4.8 U	--	5 U
Benzo(g,h,i)perylene	191-24-2	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
Benzo(k)fluoranthene	207-08-9	ug/L	--	--	--	--	0.0038	--	5 U	4.8 U	4.8 U	--	5 U
Bis(2-chloroethoxy)methane	111-91-1	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
Bis(2-Chloroethyl) ether	111-44-4	ug/L	--	--	--	--	0.03	--	10 U	9.5 U	9.5 U	--	10 U
Bis(2-ethylhexyl)phthalate	117-81-7	ug/L	--	--	--	--	1.2	--	5 U	4.8 U	4.8 U	--	5 U
Butylbenzylphthalate	85-68-7	ug/L	--	--	--	--	1500	--	5 U	4.8 U	4.8 U	--	5 U
Caprolactam	105-60-2	ug/L	--	--	--	--	--	--	10 U	9.5 U	9.5 U	--	10 U
Carbazole	86-74-8	ug/L	--	--	--	--	--	--	10 U	9.5 U	9.5 U	--	10 U
Chrysene	218-01-9	ug/L	--	--	--	--	0.0038	--	5 U	4.8 U	4.8 U	--	5 U
Dibenzo(a,h)anthracene	53-70-3	ug/L	--	--	--	--	0.0038	--	5 U	4.8 U	4.8 U	--	5 U
Dibenzofuran	132-64-9	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
Diethylphthalate	84-66-2	ug/L	--	--	--	--	17000	--	5 U	4.8 U	4.8 U	--	5 U
Dimethyl phthalate	131-11-3	ug/L	--	--	--	--	270000	--	5 U	4.8 U	4.8 U	--	5 U
Di-n-butylphthalate	84-74-2	ug/L	--	--	--	--	2000	--	5 U	4.8 U	4.8 U	--	5 U
Di-n-octylphthalate	117-84-0	ug/L	--	--	--	--	--	--	10 UJ	9.5 UJ	9.5 UJ	--	10 U
Fluoranthene	206-44-0	ug/L	--	--	--	--	130	--	10 U	9.5 U	9.5 U	--	10 U
Fluorene	86-73-7	ug/L	--	--	--	--	1100	--	5 U	4.8 U	4.8 U	--	5 U
Hexachlorobenzene	118-74-1	ug/L	--	--	--	--	0.00028	--	5 U	4.8 U	4.8 U	--	5 U
Hexachlorobutadiene	87-68-3	ug/L	--	--	--	--	0.44	--	5 U	4.8 U	4.8 U	--	5 U
Hexachlorocyclo-pentadiene	77-47-4	ug/L	--	--	--	--	40	--	10 U	9.5 U	9.5 U	--	10 U
Hexachloroethane	67-72-1	ug/L	--	--	--	--	1.4	--	5 U	4.8 U	4.8 U	--	5 U
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	--	--	--	--	0.0038	--	5 U	4.8 U	4.8 U	--	5 U
Isophorone	78-59-1	ug/L	--	--	--	--	35	--	5 U	4.8 U	4.8 U	--	5 U
Naphthalene	91-20-3	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
Nitrobenzene	98-95-3	ug/L	--	--	--	--	17	--	5 U	4.8 U	4.8 U	--	5 U
N-Nitroso-di-n propylamine	621-64-7	ug/L	--	--	--	--	0.005	--	5 U	4.8 U	4.8 U	--	5 U
N-Nitrosodiphenylamine	86-30-6	ug/L	--	--	--	--	3.3	--	5 U	4.8 U	4.8 U	--	5 U
Pentachlorophenol	87-86-5	ug/L	19	15	19	15	0.27	--	10 U	9.5 U	9.5 U	--	10 U
Phenanthrene	85-01-8	ug/L	--	--	--	--	--	--	5 U	4.8 U	4.8 U	--	5 U
Phenol	108-95-2	ug/L	--	--	--	--	10000	--	10 U	9.5 U	9.5 U	--	10 U
Pyrene	129-00-0	ug/L	--	--	--	--	830	--	5 U	4.8 U	4.8 U	--	5 U

Notes:

U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
UJ	The analyte was not deemed above the quantitation limit; however, this limit may not be precise
Dry	Site was dry at time of sampling
ug/L	microgram(s) per liter
CCC	Criterion Continuous Concentration (chronic exposure)
CMC	Criterion Maximum Concentration (acute exposure)
SCDM	Superfund Chemical Data Matrix
--	No data available or non-applicable

October 2015
Surface Water Results
Pesticides and PCBs

Table 10.3

Analyte	CAS.NO	Units	SCDM Environmental Benchmarks		North Dakota Water Quality Standards			Location	Background				Opportunity
					Aquatic Life Standards		Human Health Standards						
			Acute Freshwater CMC	Chronic Freshwater CCC	Acute	Chronic	Class II Creek	Sample ID Date Type	WL-LMR-SW05 10/7/2015 Field Sample	WL-LMR-SW06 10/8/2015 Field Sample	WL-LMR-SW06 10/8/2015 Field Duplicate	3x Background	WL-OPP-SW01 10/7/2015 Field Sample
PCBs													
Aroclor-1016	12674-11-2	ug/L	--	0.014	--	0.014	0.000064	--	0.96 U	0.99 U	1.0 U	--	1 U
Aroclor-1221	11104-28-2	ug/L	--	0.014	--	0.014	0.000064	--	0.96 U	0.99 U	1.0 U	--	1 U
Aroclor-1232	11141-16-5	ug/L	--	0.014	--	0.014	0.000064	--	0.96 U	0.99 U	1.0 U	--	1 U
Aroclor-1242	53469-21-9	ug/L	--	0.014	--	0.014	0.000064	--	0.96 U	0.99 U	1.0 U	--	1 U
Aroclor-1248	12672-29-6	ug/L	--	0.014	--	0.014	0.000064	--	0.96 U	0.99 U	1.0 U	--	1 U
Aroclor-1254	11097-69-1	ug/L	--	0.014	--	0.014	0.000064	--	0.96 U	0.99 U	1.0 U	--	1 U
Aroclor-1260	11096-82-5	ug/L	--	0.014	--	0.014	0.000064	--	0.96 U	0.99 U	1.0 U	--	1 U
Aroclor-1262	37324-23-5	ug/L	--	0.014	--	0.014	0.000064	--	0.96 U	0.99 U	1.0 U	--	1 U
Aroclor-1268	11100-14-4	ug/L	--	0.014	--	0.014	0.000064	--	0.96 U	0.99 U	1.0 U	--	1 U
Pesticides													
4,4'-DDD	72-54-8	ug/L	--	--	--	--	0.00031	--	0.097 U	0.099 U	0.10 U	--	0.10 U
4,4'-DDE	72-55-9	ug/L	--	--	--	--	0.00022	--	0.097 U	0.099 U	0.10 U	--	0.10 U
4,4'-DDT	50-29-3	ug/L	1.1	0.001	0.55	0.001	0.00022	--	0.097 U	0.099 U	0.10 U	--	0.10 U
Aldrin	309-00-2	ug/L	3	--	1.5	--	0.000049	--	0.049 U	0.050 U	0.050 U	--	0.050 U
alpha-BHC	319-84-6	ug/L	--	--	--	--	0.0026	--	0.049 U	0.050 U	0.050 U		0.050 U
beta-BHC	319-85-7	ug/L	--	--	--	--	0.0091	--	0.049 U	0.050 U	0.050 U	--	0.050 U
cis-Chlordane	5103-71-9	ug/L	2.4	0.0043	--	--	--	--	0.049 U	0.050 U	**0.0028 J**	--	0.050 U
delta-BHC	319-86-8	ug/L	--	--	--	--	--	--	0.049 U	0.050 U	0.050 U		0.050 U
Dieldrin	60-57-1	ug/L	0.24	0.056	0.24	0.056	0.000052	--	0.097 U	0.099 U	0.10 U	--	0.10 U
Endosulfan I	959-98-8	ug/L	0.22	0.056	0.11	0.056	62	--	0.049 U	0.050 U	0.050 U	--	0.050 U
Endosulfan II	33213-65-9	ug/L	0.22	0.056	0.11	0.056	62	--	0.097 U	0.099 U	0.10 U	--	0.10 U
Endosulfan sulfate	1031-07-8	ug/L	--	--	--	--	62	--	0.097 U	0.099 U	0.10 U	--	**0.0018 J**
Endrin	72-20-8	ug/L	0.086	0.036	0.09	0.036	0.059	--	0.097 U	0.099 U	0.10 U	--	0.10 U
Endrin aldehyde	7421-93-4	ug/L	--	--	--	--	0.29	--	0.097 U	0.099 U	0.10 U	--	0.10 U
Endrin ketone	53494-70-5	ug/L	--	--	--	--	--	--	0.097 U	0.099 U	0.10 U	--	0.10 U
gamma-BHC (Lindane)	58-89-9	ug/L	0.95	0.16	0.95	--	0.2	--	0.049 U	0.050 U	0.050 U	--	0.050 U
Heptachlor	76-44-8	ug/L	0.52	0.0038	0.26	0.0038	0.000079	--	0.049 U	0.050 U	0.050 U	--	0.050 U
Heptachlor epoxide	1024-57-3	ug/L	0.52	0.0038	0.26	0.0038	0.000039	--	0.049 U	**0.0020 J**	0.050 U		0.050 U
Methoxychlor	72-43-5	ug/L	--	0.03	--	--	40	--	0.49 U	0.50 U	5.0 U	--	5.0 U
Toxaphene	8001-35-2	ug/L	0.73	0.0002	0.73	0.0002	0.00028	--	4.9 U	5.0 U	0.050 U	--	0.050 U
trans-Chlordane	5103-74-2	ug/L	2.4	0.0043	--	--	--	--	0.049 U	0.050 U	0.050 U	--	0.050 U

Notes:

Bold	The analyte was detected above the method detection limit
J	The associated value is an estimated quantity.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
Dry	Site was dry at time of sampling
ug/L	microgram(s) per liter
CCC	Criterion Continuous Concentration (chronic exposure)
CMC	Criterion Maximum Concentration (acute exposure)
SCDM	Superfund Chemical Data Matrix
--	No data available or non-applicable

October 2015
Surface Water Results
Metals

Table 10.4

Analyte	CAS.NO	Units	SCDM Environmental Benchmarks		North Dakota Water Quality Standards			Location	Background				Opportunity
					Aquatic Life Standards		Human Health Standards						
			Acute Freshwater CMC	Chronic Freshwater CCC	Acute	Chronic	Class II Creek	Sample ID Date Type	WL-LMR-SW05 10/7/2015 Field Sample	WL-LMR-SW06 10/8/2015 Field Sample	WL-LMR-SW06 10/8/2015 Field Duplicate	3x Background	WL-OPP-SW01 10/7/2015 Field Sample
Total Metals													
Aluminum	7429-90-5	ug/L	--	--	--	--	--	--	**1470**	**1310 J**	**673**	**4410**	**4270**
Antimony	7440-36-0	ug/L	--	--	--	--	5.6	--	2 U	2 U	2.0 U	--	2 U
Arsenic	7440-38-2	ug/L	--	--	340	150	10	--	**10.3**	**10.5**	**10.1**	**31.5**	**166**
Barium	7440-39-3	ug/L	--	--	--	--	--	--	**80.2**	**78**	**72.0**	**240.6**	**1770**
Beryllium	7440-41-7	ug/L	--	--	--	--	4	--	1 U	1 U	1.0 U	--	1 U
Cadmium	7440-43-9	ug/L	--	--	10*	0.834*	5	--	**0.05 J**	**0.04 J**	**0.050 J**	--	**0.27 J**
Calcium	7440-70-2	ug/L	--	--	--	--	--	--	**53300**	**53000**	**54000**	**159900**	**164000**
Chromium	7440-47-3	ug/L	--	--	6258*	299*	100	--	**5**	**3.2**	**2.5**	**15**	**10.9**
Cobalt	7440-48-4	ug/L	--	--	--	--	--	--	**1.3**	**1.2**	**1.1**	**3.9**	**4.4**
Copper	7440-50-8	ug/L	--	--	58.6*	34.2*	1000	--	**4.2**	**3.8**	**3.5**	**12.6**	**15.2**
Iron	7439-89-6	ug/L	--	--	--	--	--	--	**2130**	**1960**	**1140**	**6390**	**21800**
Lead	7439-92-1	ug/L	--	--	565*	22*	15	--	**2.7**	**2.3**	**2.6**	**8.1**	**9.1**
Magnesium	7439-95-4	ug/L	--	--	--	--	--	--	**79500**	**78600**	**79200**	**238500**	**200000**
Manganese	7439-96-5	ug/L	--	--	--	--	--		**244**	**244**	**246**	**732**	**1360**
Mercury	7439-97-6	ug/L	--	--	1.7	0.012	0.05	--	0.2 U	0.2 U	0.20 U	--	0.2 U
Nickel	7440-02-0	ug/L	--	--	1696*	188.6*	100	--	**6.6**	**5.9**	**5.2**	**19.8**	**19.3**
Potassium	7440-09-7	ug/L	--	--	--	--	--	--	**11000**	**10600**	**10800**	**33000**	**9100**
Selenium	7782-49-2	ug/L	--	--	20	5	50	--	5 U	**1.9 J**	5.0 U	--	**1.9 J**
Silver	7440-22-4	ug/L	--	--	51.6*	--	--	--	1 U	1 U	1.0 U	--	1 U
Sodium	7440-23-5	ug/L	--	--	--	--	--	--	**398000**	**407000**	**413000**	**1221000**	**406000**
Thallium	7440-28-0	ug/L	--	--	--	--	0.24	--	1 U	1 U	**0.080 J**	--	**0.12 J**
Vanadium	7440-62-2	ug/L	--	--	--	--	--	--	**9.2**	**9**	**7.1**	**27.6**	**17.4**
Zinc	7440-66-6	ug/L	--	--	434*	434*	7400	--	**19.5**	**20.7 J**	**16.3**	**80.1**	**84.3**
Dissolved Metals													
Aluminum	7429-90-5	ug/L	750	87	--	--	--	--	**21.5**	**14.1 J**	**8.2 J**	**64.5**	20 U
Antimony	7440-36-0	ug/L	--	--	--	--	5.6	--	2 U	2 U	2.0 U	--	2 UJ
Arsenic	7440-38-2	ug/L	340	150	340	150	10	--	**8.3**	**8.2**	**9.0**	**24.9**	**34.3**
Barium	7440-39-3	ug/L	--	--	--	--	--	--	**51.3**	**55.1**	**55.8**	**165.3**	**958**
Beryllium	7440-41-7	ug/L	--	--	--	--	4	--	1 U	1 U	1.0 U	--	1 U
Cadmium	7440-43-9	ug/L	2	0.25	9.35*	0.795*	5	--	1 U	1 U	1.0 U	--	1 U
Calcium	7440-70-2	ug/L	--	--	--	--	--	--	**48000**	**50300**	**50600**	**150900**	**130000**
Chromium	7440-47-3	ug/L	--	--	5931*	283.5*	100	--	**7.7**	**1.4 J**	**1.2 J**	**23.1**	**1.9 J**
Cobalt	7440-48-4	ug/L	--	--	--	--	--	--	**0.51 J**	**0.73 J**	**0.50 J**	--	**1.3**
Copper	7440-50-8	ug/L	2.3	1.4	55.1*	32.3*	1000	--	**1.6 J**	**1.2 J**	**1.1 J**	--	**1.6 J**
Iron	7439-89-6	ug/L	--	1000	--	--	--	--	**60.6 J**	**34.6 J**	**27.6 J**	--	**55.9 J**
Lead	7439-92-1	ug/L	65	2.5	519.7*	20.3*	15	--	1 U	1 U	1.0 U	--	1 UJ
Magnesium	7439-95-4	ug/L	--	--	--	--	--	--	**72300**	**76700**	**80300**	**230100**	**186000**
Manganese	7439-96-5	ug/L	--	--	--	--	--		**11**	**20.9**	**18.3**	**62.7**	**454**
Mercury	7439-97-6	ug/L	1.4	0.77	1.7	0.012	0.05	--	0.2 U	0.2 U	0.20 U	--	0.2 U
Nickel	7440-02-0	ug/L	470	52	1605*	178.5*	100	--	**7.8**	**4.4**	**4.6**	**23.4**	**8.5**
Potassium	7440-09-7	ug/L	--	--	--	--	--	--	**9830**	**10200**	**10700**	**30600**	**7950**
Selenium	7782-49-2	ug/L	290	5	20	5	50	--	5 U	5 U	5.0 U	--	**1.7 J**
Silver	7440-22-4	ug/L	3.2	--	46.1*	--	--	--	1 U	1 U	1.0 U	--	1 UJ
Sodium	7440-23-5	ug/L	--	--	--	--	--	--	**379000**	**380000**	**404000**	**1140000**	**368000**
Thallium	7440-28-0	ug/L	--	--	--	--	0.24	--	1 U	1 U	1.0 U	--	1 U
Vanadium	7440-62-2	ug/L	--	--	--	--	--	--	**4.4 J**	**4.3 J**	5.0 U	--	**1.4 J**
Zinc	7440-66-6	ug/L	120	120	410.7*	410.7*	7400	--	**7.5**	**9.8**	**9.0**	**29.4**	**9.9**

Notes:

*	These benchmarks were calculated using a mean background hardness of 457 ppm for total metals and 428 ppm for dissolved metals
Bold	The analyte was detected above the method detection limit
Bold	The analyte concentration exceeds 3X background and is significant to the Site
Bold	The analyte concentration exceeds one or more benchmarks
Bold	The analyte concentration exceeds 3x background and one or more benchmarks
J	The associated value is an estimated quantity.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
UJ	The analyte was not deemed above the quantitation limit; however, this limit may not be precise
Dry	Site was dry at time of sampling
ug/L	microgram(s) per liter
CCC	Criterion Continuous Concentration (chronic exposure)
CMC	Criterion Maximum Concentration (acute exposure)
SCDM	Superfund Chemical Data Matrix
--	No data available or non-applicable