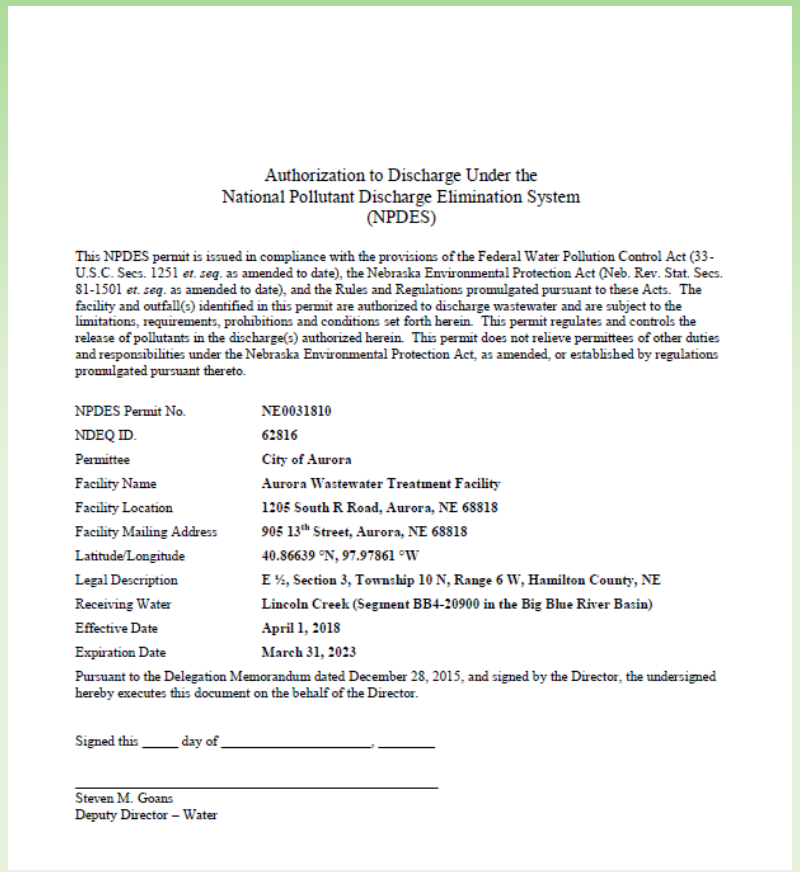
NDEQ National Pollutant Discharge Elimination System (NPDES) Water Quality-Based Limits

Patrick Ducey - NPDES Permit Writer

Nebraska Surface Water Monitoring Council

April 26, 2018

NPDES and NPP Permits



Authorization to Discharge Under the
National Pollutant Discharge Elimination System
(NPDES)

This NPDES permit is issued in compliance with the provisions of the Federal Water Pollution Control Act (33-U.S.C. Secs. 1251 *et. seq.* as amended to date), the Nebraska Environmental Protection Act (Neb. Rev. Stat. Secs. 81-1501 *et. seq.* as amended to date), and the Rules and Regulations promulgated pursuant to these Acts. The facility and outfall(s) identified in this permit are authorized to discharge wastewater and are subject to the limitations, requirements, prohibitions and conditions set forth herein. This permit regulates and controls the release of pollutants in the discharge(s) authorized herein. This permit does not relieve permittees of other duties and responsibilities under the Nebraska Environmental Protection Act, as amended, or established by regulations promulgated pursuant thereto.

NPDES Permit No.	**NE0031810**
NDEQ ID.	**62816**
Permittee	**City of Aurora**
Facility Name	**Aurora Wastewater Treatment Facility**
Facility Location	**1205 South R Road, Aurora, NE 68818**
Facility Mailing Address	**905 13th Street, Aurora, NE 68818**
Latitude/Longitude	**40.86639 °N, 97.97861 °W**
Legal Description	**E ½, Section 3, Township 10 N, Range 6 W, Hamilton County, NE**
Receiving Water	**Lincoln Creek (Segment BB4-20900 in the Big Blue River Basin)**
Effective Date	**April 1, 2018**
Expiration Date	**March 31, 2023**

Pursuant to the Delegation Memorandum dated December 28, 2015, and signed by the Director, the undersigned hereby executes this document on the behalf of the Director.

Signed this ____ day of _____, _____

_____
Steven M. Goans
Deputy Director – Water

Making what is illegal, legal

NDEQ Wastewater Permitting

- Federal Water Pollution Control Act (FWPCA), Clean Water Act (1977)
- National Pollutant Discharge Elimination System (NPDES) – 1972 Amendment to FWPCA
- Nebraska Pretreatment Program (NPP) – one of four states with a program
- Concentrated Animal Feeding Operations (CAFOs) – not covered in this presentation

NPDES Point Sources and Non-Point Sources of Pollution

- Point source – publicly owned treatment works (POTWs), PWTPs, industrial discharges (process and non-process wastewater), MS4s, CSOs, construction stormwater, industrial stormwater, fish hatcheries
- Non-point sources – Agricultural wastewater, silvicultural discharges

Permit Limits

- Effluent limitation guidelines (ELGs) or technology-based effluent limitations (TBELs)
- Water quality-based effluent limitations (WQBELs)
- NPDES permits authorize discharges to waters of the state

Technology-Based Effluent Limits

- Limits based on level of treatment technology
- Used for: - POTWs (BOD, TSS)
  - ELGs for industrial process wastewater
  - NPP permitted facilities and limits
- BPT, BCT, BAT, new source, existing source
- Best professional judgment process (BPJ) for non-promulgated limits

Water Quality-Based Effluent Limits

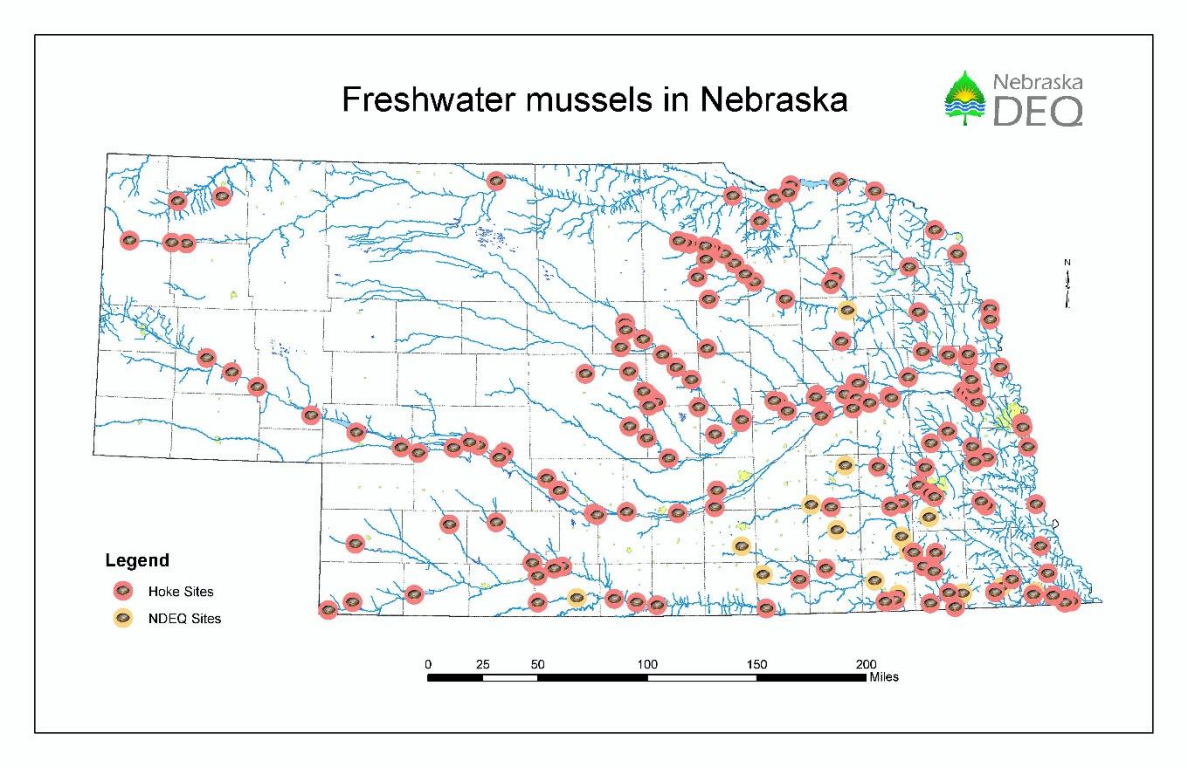
Water Quality-Based Effluent Limits

- Site-specific, pollutant specific
- Limits are developed using effluent parameters, receiving stream parameters, and water quality criteria
- NPDES criteria set forth in NDEQ Title 117, Chapter 4
- Common permit parameters with WQBELS: ammonia, total residual chlorine (TRC), chloride, conductivity, dissolved metals, whole effluent toxicity (WET)
- Limits are developed in wasteload allocations (WLAs)

Example WLA - Ammonia

- Ammonia is a non-conventional pollutant limited in all POTW NPDES permits and some industrial permits
- Ammonia is toxic to freshwater mussels
- NDEQ uses two methodologies to develop limits: steady-state and CORMIX
- First example will be steady-state
- Calculations are derived for Nebraska from the methods set forth in the *Technical Support Document For Water Quality-based Toxics Control* (EPA 505/2-90-001, March 1991)

New Ammonia Criteria is Protective of Mussels



Criteria is based on pH and temperature

WQBEL Modeling Data Required for Calculating Steady-State Limits for Ammonia

- Effluent Parameters
  - Median Flow
  - Critical temperature
  - Critical pH
  - Coefficient of variation
- Receiving Stream
  - Flow (1Q10, 30Q5)
  - Median temperature
  - Median pH
  - Median and critical background ammonia
  - Stream characteristics

Critical: 90th percentile of data

Effluent Data – EPA ICIS System

Obtained from Facility Discharge Monitoring Reports (DMRs)

OMAHA MISSOURI RIVER WWTF

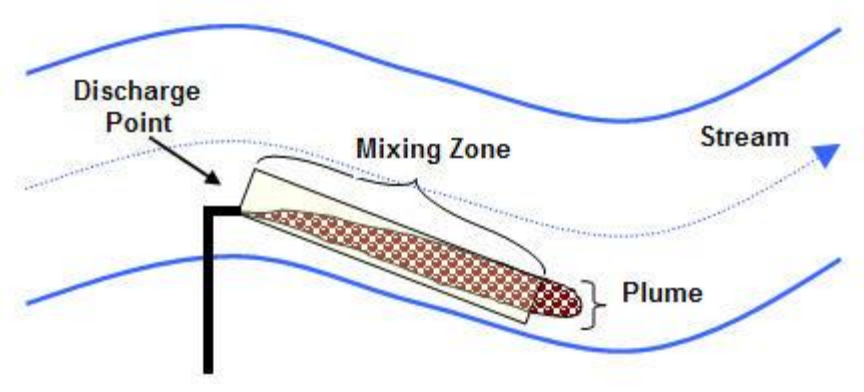
NPDES ID	n Featu	t De	ameter C	Parameter Desc	Limit Freque	ue Ty	DMR Value	Limit Unit	Statistical B	Limit V	NOI	NODI Desc	Monitoring P
NE0036358	001	A	00310	BOD, 5-day, 20 de	Daily	C1	49.	mg/L	MO AVG				02/28/2013
NE0036358	001	A	00310	BOD, 5-day, 20 de	Daily	C1	49.	mg/L	MO AVG				03/31/2013
NE0036358	001	A	00310	BOD, 5-day, 20 de	Daily	C1	50.	mg/L	MO AVG				01/31/2013
NE0036358	001	A	00310	BOD, 5-day, 20 de	Daily	C2	54.	mg/L	7 DA AVG				03/31/2013
NE0036358	001	A	00310	BOD, 5-day, 20 de	Daily	C2	56.	mg/L	7 DA AVG				01/31/2013
NE0036358	001	A	00310	BOD, 5-day, 20 de	Daily	C2	59.	mg/L	7 DA AVG				02/28/2013
NE0036358	001	A	00400	pH	Daily	C1	7.3	SU	DAILY MN	6.5			02/28/2013
NE0036358	001	A	00400	pH	Daily	C1	7.3	SU	DAILY MN	6.5			03/31/2013
NE0036358	001		00400	pH	Daily	C1	7.4	SU	DAILY MN	6.5			01/31/2013
NE0036358	001	A	00400	pH	Daily	C3	7.6	SU	DAILY MX	9.			02/28/2013
NE0036358	001	A	00400	pH	Daily	C3	7.7	SU	DAILY MX	9.			03/31/2013
NE0036358	001	A	00400	pH	Daily	C3	7.8	SU	DAILY MX	9.			01/31/2013
NE0036358	001	A	00530	Solids, total suspe	Daily	C2	28.	mg/L	MO AVG	45.			02/28/2013
NE0036358	001	A	00530	Solids, total suspe	Daily	C2	28.	mg/L	MO AVG	45.			03/31/2013
NE0036358	001	A	00530	Solids, total suspe	Daily	C2	30.	mg/L	MO AVG	45.			01/31/2013
NE0036358	001	A	00530	Solids, total suspe	Daily	C3	31.	mg/L	7 DA AVG	65.			02/28/2013
NE0036358	001	A	00530	Solids, total suspe	Daily	C3	32.	mg/L	7 DA AVG	65.			01/31/2013
NE0036358	001	A	00530	Solids, total suspe	Daily	C3	37.	mg/L	7 DA AVG	65.			03/31/2013

Receiving Stream Data – NDEQ Ambient Monitoring Stations, USGS, DNR

Segment	STATION #	DATE	Month	Temp	pH	Ammonia	NO3-NO2	Chloride				
MT1-10000	SMT1MISSR110	8/13/2009	8	26.93	8.35	0.03	0.70	17.00				
MT1-10000	SMT1MISSR110	8/3/2010	8	26.74	7.74	0.05	1.75	13.00				
MT1-10000	SMT1MISSR110	8/9/2010	8	28.12	8.03	0.05	1.48	14.90				
MT1-10000	SMT1MISSR110	8/16/2010	8	27.43	7.99	0.0566	1.48	14.50				
MT1-10000	SMT1MISSR110	8/23/2010	8	27.63	8.22	0.05	1.19	17.70				
MT1-10000	SMT1MISSR110	8/30/2010	8	24.35	8.15	0.05	0.90	15.90				
MT1-10000	SMT1MISSR110	9/4/07	9	24.26	8.11	0.02	1.01	16.00				
MT1-10000	SMT1MISSR110	9/18/07	9	19.51	8.37	0.02	0.73	16.00				
MT1-10000	SMT1MISSR110	9/3/08	9	21.40		0.02	0.50	15.00				
MT1-10000	SMT1MISSR110	9/10/2009	9	22.52	8.19	0.03	0.30	16.00				
MT1-10000	SMT1MISSR110	9/7/2010	9	21.46	8.23	0.05	0.67	14.20				
MT1-10000	SMT1MISSR110	9/13/2010	9	20.28	8.52	0.05	0.73	14.10				
MT1-10000	SMT1MISSR110	9/20/2010	9	19.07	8.24	0.0515	0.85	14.50				
MT1-10000	SMT1MISSR110	9/27/2010	9	18.06	7.93	0.0515	1.30	13.00				
MT1-10000	SMT1MISSR110	10/23/07	10			0.05	5.10	21.00				
MT1-10000	SMT1MISSR110	10/15/2008	10	15.48	8.22	0.1	0.50	17.00				
		Summer		24.35	8.15	0.05	1.32	16.00	AcTemp	27.622	AcAm	0.07405
MT1-10000	SMT1MISSR110	1/9/07	1	2.51	7.40	0.02	2.60	18.00				
MT1-10000	SMT1MISSR110	1/3/08	1	0.12	7.81	0.06	1.80	19.00				
MT1-10000	SMT1MISSR110	2/5/07	2	0.01	8.15	0.38	1.20	19.00				
MT1-10000	SMT1MISSR110	2/7/08	2	1.71	8.04	0.14	1.30	21.00				
MT1-10000	SMT1MISSR110	2/3/2009	2	0.98	7.95							
MT1-10000	SMT1MISSR110	11/14/07	11	8.53	8.30	0.02	3.20	21.00				
MT1-10000	SMT1MISSR110	11/12/2008	11	6.42	7.94	0.13	1.96	22.00				
MT1-10000	SMT1MISSR110	12/10/07	12	0.24		0.18	2.00	20.00				
MT1-10000	SMT1MISSR110	12/9/2008	12	1.76	8.19							
		Winter		1.71	8.00	0.13	1.96	20.00	AcTemp	6.842	AcAm	0.26

Criteria and Mixing Zones

- Ammonia and other wasteload allocations are derived using Acute and Chronic criteria
- Effluent must meet criteria at the end of a mixing zone
- Coldwater and Warmwater ammonia criteria and mixing zones



Calculation of Limits

Input parameters: effluent flow, criteria, receiving stream characteristics, CV

"MATH"

Wasteload Allocation Limits

"MATH" to Produce Limits

Mixing Zones and Wasteload Calculations

Target Velocity – V_t

$$V_t = \frac{V_k}{\left(Flow_k / Flow_t\right)^{0.5}}$$

Target Depth – D_t

$$D_t = \frac{D_k}{\left(Flow_k / Flow_t\right)^{0.4}}$$

Target Cross-Sectional Area - CSA_t

$$CSA_t = \frac{CSA_k}{\left(Flow_k / Flow_t\right)^{0.5}}$$

Stream width at design flow - W_t

$$W_t = \frac{CSA_t}{D_t}$$

V_k – Known velocity
$Flow_k$ – Known flow
D_k – Known depth
CSA_k – Known cross-sectional area

Shear velocity – v*

$$v^* = \sqrt{g \cdot D_t \cdot s}$$

g – Gravity, 32.2 ft/s/s
s – Channel slope, ft/mile

Lateral dispersion – d_y

$$d_y = \left(1.5 \cdot c \cdot D_t \cdot v^*\right)$$

c – Channel sinuosity

Distance to complete lateral mixing - X_m

$$X_m = \frac{m \cdot W_t^2 \cdot V_t}{d_y}$$

m – 0.2, coefficient of uniformity

Maximum allowable effluent concentration - C_e

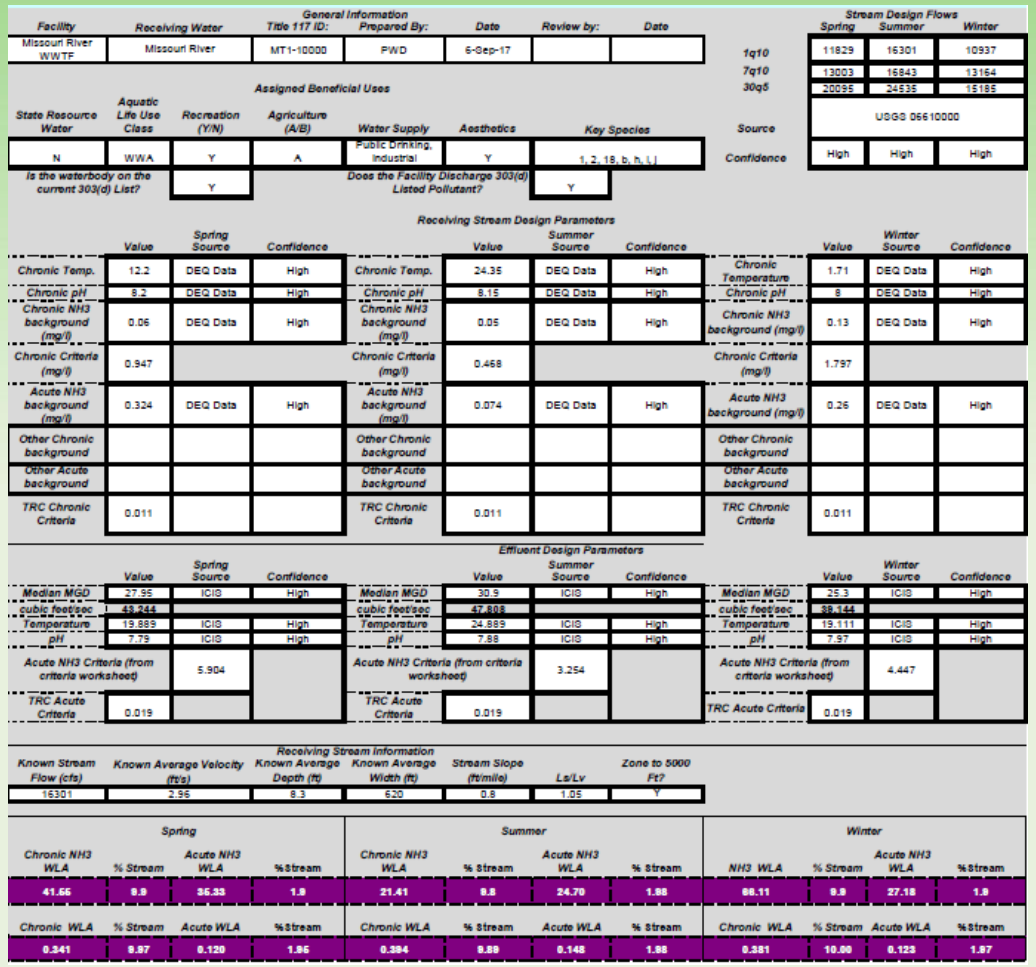
$$C_e = \frac{C_x(Q_e + Q_s) - C_s(Q_s)}{Q_e}$$

C_x – Water quality criteria
C_s – Background pollutant concentration
Q_s – Seasonal design flow of receiving stream
X – Maximum mixing zone (Title 117)
Q_e – Median seasonal effluent flow

Volume of stream utilized at mixing zone boundary - Q_{zb}

$$Q_{zb} = \frac{C_e(Q_e) - C_s(Q_s)}{C_x - C_s}$$

NDEQ Steady State Wasteload Allocation



General Information

Facility	Receiving Water	Title 117 ID:	Prepared By:	Date	Review by:	Date
Missouri River WWTF	Missouri River	MT1-10000	PWD	6-Sep-17		

Assigned Beneficial Uses

State Resource Water	Aquatic Life Use Class	Recreation (Y/N)	Agriculture (A/B)	Water Supply	Aesthetics	Key Species
N	WWA	Y	A	Public Drinking, Industrial	Y	1, 2, 18, b, h, Li

Is the waterbody on the current 303(d) List? Y

Does the Facility Discharge 303(d) Listed Pollutant? Y

Stream Design Flows

	Spring	Summer	Winter
1q10	11829	16301	10937
7q10	13003	16843	13164
30q5	20095	24535	15185
Source	USGS 06610000		
Confidence	High	High	High

Receiving Stream Design Parameters

	Value	Spring Source	Confidence	Value	Summer Source	Confidence	Value	Winter Source	Confidence
Chronic Temp.	12.2	DEQ Data	High	24.35	DEQ Data	High	1.71	DEQ Data	High
Chronic pH	8.2	DEQ Data	High	8.15	DEQ Data	High	8	DEQ Data	High
Chronic NH3 background (mg/l)	0.06	DEQ Data	High	0.05	DEQ Data	High	0.13	DEQ Data	High
Chronic Criteria (mg/l)	0.947			0.468			1.797		
Acute NH3 background (mg/l)	0.324	DEQ Data	High	0.074	DEQ Data	High	0.26	DEQ Data	High
Other Chronic background									
Other Acute background									
TRC Chronic Criteria	0.011			0.011			0.011		

Effluent Design Parameters

	Value	Spring Source	Confidence	Value	Summer Source	Confidence	Value	Winter Source	Confidence
Median MGD	27.95	ICIS	High	30.9	ICIS	High	25.3	ICIS	High
cubic feet/sec	43.244			47.808			39.144		
Temperature	19.889	ICIS	High	24.889	ICIS	High	19.111	ICIS	High
pH	7.79	ICIS	High	7.88	ICIS	High	7.97	ICIS	High
Acute NH3 Criteria (from criteria worksheet)		5.904			3.254			4.447	
TRC Acute Criteria	0.019			0.019			0.019		

Receiving Stream Information

Known Stream Flow (cfs)	Known Average Velocity (ft/s)	Known Average Depth (ft)	Known Average Width (ft)	Stream Slope (ft/mile)	Ls/Lv	Zone to 5000 Ft?
16301	2.96	8.3	620	0.8	1.05	Y

Spring				Summer				Winter			
Chronic NH3 WLA	% Stream	Acute NH3 WLA	% Stream	Chronic NH3 WLA	% Stream	Acute NH3 WLA	% Stream	NH3 WLA	% Stream	Acute NH3 WLA	% Stream
41.66	8.9	36.33	1.9	21.41	8.8	24.70	1.88	88.11	8.9	27.18	1.9
Chronic WLA	% Stream	Acute WLA	% Stream	Chronic WLA	% Stream	Acute WLA	% Stream	Chronic WLA	% Stream	Acute WLA	% Stream
0.341	8.97	0.120	1.95	0.384	8.89	0.148	1.88	0.381	10.00	0.123	1.97

Wasteload Allocation Results and Proposed Limits

ENTER DATA INTO BLUE SHADED AREAS ONLY

General Data	
Facility Name:	Missouri River WWTF
Permit Number:	NE0036358
Date:	6-Sep-17
Permit Writer:	PWD
Receiving Stream:	Missouri River
Title 117 ID:	MT1-10000
Aquatic Use:	WWA
Pollutant of Concern:	NH3
Coefficient of Variation (CV):	
Spring	0.443
Summer	0.178
Winter	0.593
Samples/Month (N):	4
Chronic (N) day average:	4

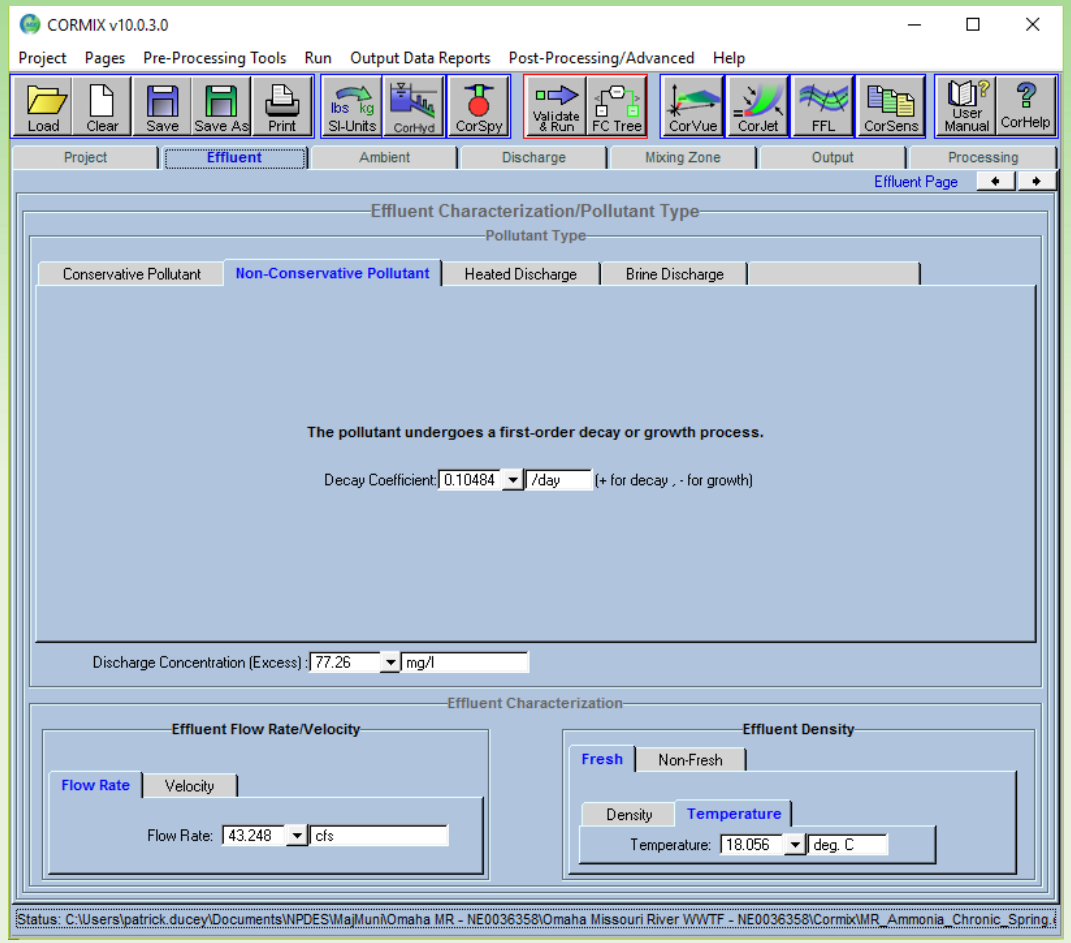
Data from WLA Worksheet	Spring	Summer	Winter
Effluent Flow in cfs:	43.24424	47.8085	39.1442
1q10 Stream Flow in cfs:	11829	16301	10937
7q10 Stream Flow in cfs:	13003	16843	13164
30q5 Stream Flow in cfs:	20095	24535	15185
% 1q10 used for mixing:	1.927731	1.98	1.9435
% 7q10 used for mixing:	9.850511	9.76198	9.94458
% 30q5 used for mixing:	9.850511	9.76198	9.94458
Acute WLA:	35.33	24.70	27.18
Chronic WLA:	41.55	21.41	66.11

Calculated WLA Multipliers	Spring	Summer	Winter
acute WLA multiplier:	0.409	0.674	0.324
chronic WLA multiplier:	0.616	0.817	0.531
MDL LTA multiplier:	2.45	1.48	3.08
AML LTA multiplier:	1.40	1.15	1.55

Water Quality Based Permit Limit Calculations for: NH3	Spring	Summer	Winter
Acute WLA	35.33	24.70	27.18
Chronic WLA	41.55	21.41	66.11
Acute LTA	14.43	16.63	8.81
Chronic LTA	25.58	17.48	35.10
Concentration Based Permit Limits:			
Maximum Daily (mg/L)	*35.33*	*24.70*	*27.18*
Average Monthly (mg/L)	*20.20*	*19.18*	*13.62*
Mass Based Permit Limits:			
Maximum Daily (kg/day)	*3737.38*	*2888.44*	*2603.09*
Average Monthly (kg/day	*2137.05*	*2242.70*	*1304.63*

Whole Effluent Toxicity Limits **Based on CV of 0.6	Spring	Summer	Winter
Acute WLA	1.88	2.32	1.93
Chronic WLA	30.62	35.39	34.44
Acute LTA	0.60	0.75	0.62
Chronic LTA	16.15	18.67	18.17
Acute Toxicity (TUa)	1.88	2.32	1.93
Chronic Toxicity (TUc)	50.30	58.14	56.58
Permit Limits:			
Acute Toxicity (TUa)	*1.88*	*2.32*	*1.93*

CORMIX Method



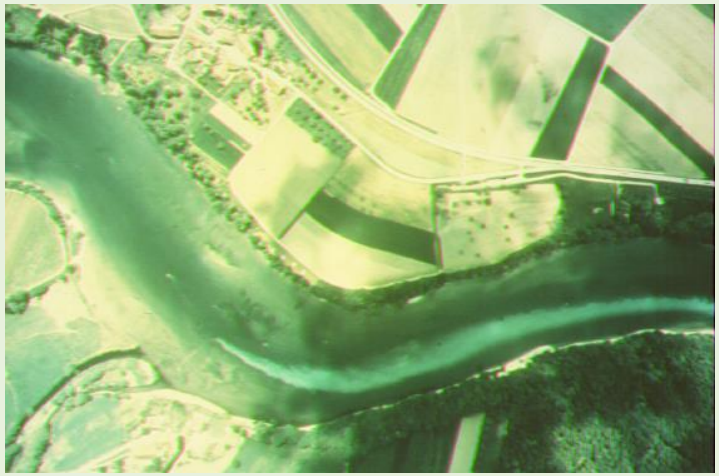
Data Needed

		Missouri River WRRF - Ammonia					
		Spring		Summer		Winter	
		Chronic	Acute	Chronic	Acute	Chronic	Acute
K_d	d^{-1}	0.10484	0.14983	0.18317	0.21288	0.06475	0.08197
C_e	mg/l	77.26	59.53	31.15	44	107.97	42.81
Q_e	MGD	27.95	27.95	30.9	30.9	25.3	25.3
Q_e	cfs	43.248	43.248	47.813	47.813	39.148	39.148
T_e	°C	18.056	19.889	23.889	24.889	15.833	19.111
D_s	ft	11.2015	8.15354	12.5403	9.96881	8.97119	7.17877
Vel_s	ft/s	3.01	2.51	3.25	2.8	2.98	2.76
W_s	ft	596	578	602	584	568	552
Q_s	cfs	20095	11829	24535	16301	15185	10937
n		0.03	0.03	0.03	0.03	0.03	0.03
T_s	°C	12.2	19.976	24.35	27.622	1.71	6.842
u	mph	12.1	12.1	9.55	9.55	10.58	10.58
θ	deg	0	0	0	0	0	0
σ	deg	90	90	90	90	90	90
w_e	ft	4.65	4.65	4.889	4.889	4.424	4.424
d_e	ft	2.325	2.325	2.445	2.445	2.212	2.212
C_s	mg/l	0.06	0.324	0.05	0.074	0.13	0.26
C_{std}	mg/l	0.947	5.904	0.468	3.254	1.797	4.447
C_{std}'	mg/l	0.887	5.58	0.418	3.18	1.667	4.187
L_s	ft	5000	250	5000	250	5000	250
L_{ROI} PCTF	ft	79500	79500	79500	79500	79500	79500
$_{CROI}$ PCTF	mg/l	0.287	0.404	0.101	0.225	0.509	0.292
$Width_{mix}$	ft	104.07	21.69	86.68	22.83	94.32	35.33
Mix	%	0.17461	0.03753	0.14399	0.03909	0.16606	0.064
Cormix #		3	3	3	3	3	3
Steps		100	100	100	100	100	100

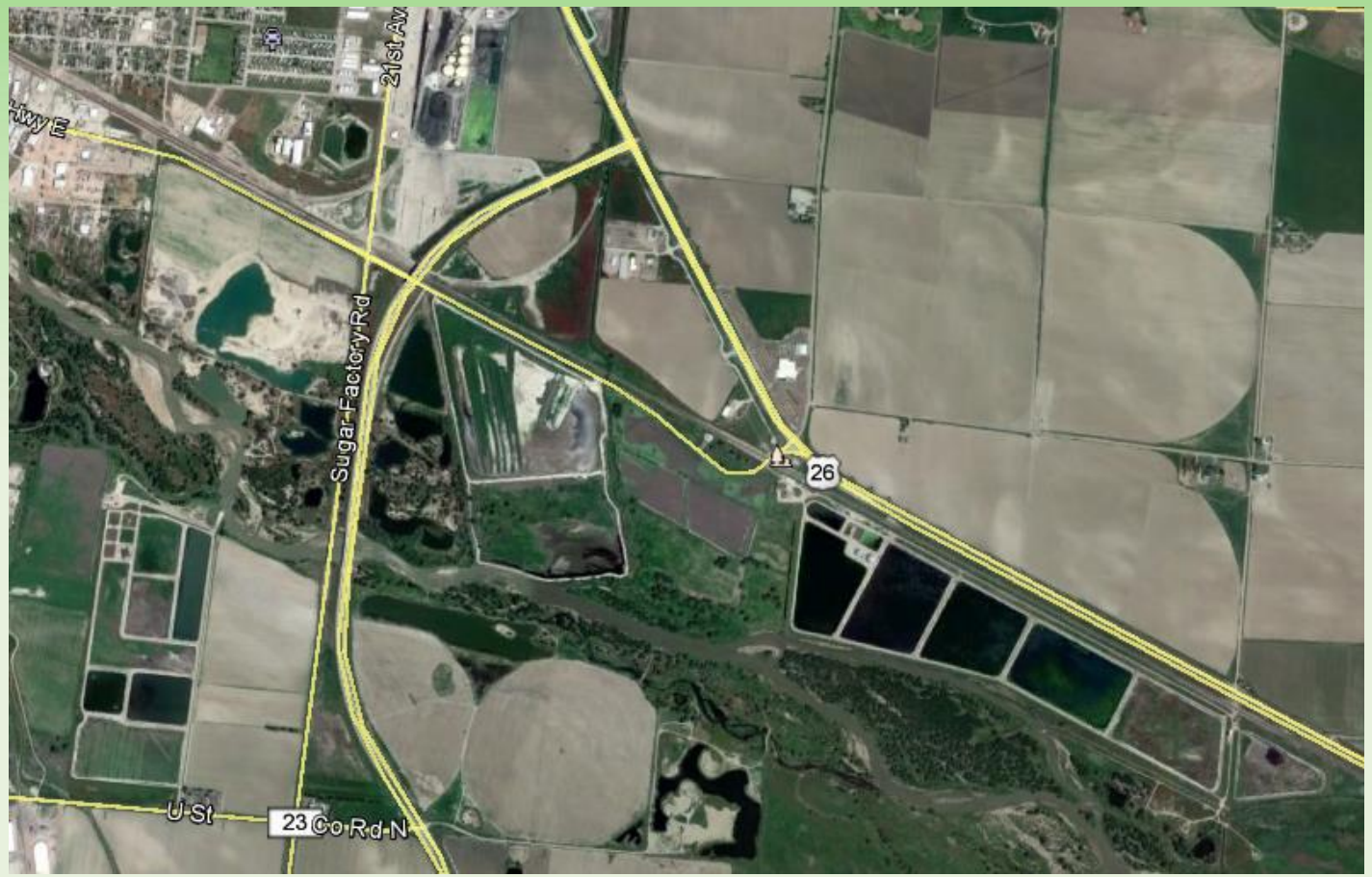
		Missouri River WRRF - TRC					
		Spring		Summer		Winter	
		Chronic	Acute	Chronic	Acute	Chronic	Acute
K_d	d^{-1}	20	20	20	20	20	20
C_e	mg/l	0.83	0.37	0.901	0.387	1.232	0.365
Q_e	MGD	27.95	27.95	30.9	30.9	25.3	25.3
Q_e	cfs	43.248	43.248	47.813	47.813	39.148	39.148
T_e	°C	18.056	19.889	23.889	24.889	15.833	19.111
D_s	ft	7.81242	8.15354	10.5341	9.96881	8.27841	7.17877
Vel_s	ft/s	2.92	2.51	2.71	2.8	2.78	2.76
W_s	ft	570	578	590	584	572	552
Q_s	cfs	13003	11829	16843	16301	13164	10937
n		0.03	0.03	0.03	0.03	0.03	0.03
T_s	°C	12.2	19.976	24.35	27.622	1.71	6.842
u	mph	12.1	12.1	9.55	9.55	10.58	10.58
θ	deg	0	0	0	0	0	0
σ	deg	90	90	90	90	90	90
w_e	ft	4.65	4.65	4.889	4.889	4.424	4.424
d_e	ft	2.325	2.325	2.445	2.445	2.212	2.212
C_s	mg/l	0	0	0	0	0	0
C_{std}	mg/l	0.011	0.019	0.011	0.019	0.011	0.019
C_{std}'	mg/l	0.011	0.019	0.011	0.019	0.011	0.019
L_s	ft	5000	250	5000	250	5000	250
L_{ROI} PCTF	ft	79500	79500	79500	79500	79500	79500
$_{CROI}$ PCTF	mg/l	1E-06	1E-06	5E-06	3E-06	0.00001	3E-06
$Width_{mix}$	ft	95.28	39.57	88.55	33.3	124.38	49.11
Mix	%	0.16716	0.06846	0.15008	0.05702	0.21745	0.08897
Cormix #		3	3	3	3	3	3
Steps		100	100	100	100	100	100

CORMIX

- Useful for discharges into larger streams and rivers
- Most accurate results as more model parameters are used in the calculation (pipe diameter, different season characteristics, water density, decay coefficient)
- Can be used to find background pollutant levels
- Can model diffusers and different pipe orientations



CORMIX Use Example



Model Proposed Results in the Permit

- Steady-state or CORMIX WLA results

Geneva WWTF – Projected Ammonia Limitations Derived from WLAs		
Parameter	Monthly Average	Maximum
Spring Ammonia	2.96 mg/L	5.93 mg/L
(March 1 – May 31)	1.90 kg/day	3.82 kg/day
Summer Ammonia	1.48 mg/L	2.96 mg/L
(June 1 – October 31)	0.94 kg/day	1.88 kg/day
Winter Ammonia	3.23 mg/L	6.47 mg/L
(Nov. 1 – February 28 [29])	2.11 kg/day	4.24 kg/day

- Existing limits

Spring Ammonia	6.21 mg/L	10.76 mg/L	Monthly
Summer Ammonia	3.55 mg/L	6.15 mg/L	Monthly
Winter Ammonia	2.98 mg/L	5.17 mg/L	Monthly

- Use most stringent seasonal limits, compare to existing

Final Permit Limits

Table 2: Seasonal Discharge Limits and Monitoring Requirements

Parameters	Storet #	Units	Discharge Limits		Monitoring Frequency	Sample Type
			Monthly Average	Daily Maximum		
Spring Ammonia (March 1 – May 31)	00610	mg/L	34.04	59.53	Three Times Per Week	24-Hour Composite
		kg/day	3603[a]	6300[a]		
Summer Ammonia (June 1 – Oct. 31)	00610	mg/L	29.32	37.76	Three Times Per Week	24-Hour Composite
		kg/day	3430[a]	4417[a]		
Winter Ammonia (Nov. 1 – Feb. 28 [29])	00610	mg/L	21.46	42.81	Three Times Per Week	24-Hour Composite
		kg/day	2055[a]	4100[a]		
Spring TRC (March 1 – May 31)	50060	mg/L	0.101	0.27	Three Times Per Week[b]	Grab[c]
		kg/day	11.00[a]	28.80[a]		
Summer TRC (June 1 – Oct. 31)	50060	mg/L	0.13	0.33	Three Times Per Week[b]	Grab[c]
		kg/day	14.12[a]	36.97[a]		
Winter TRC (Nov. 1 – Feb. 28 [29])	50060	mg/L	0.10	0.27	Three Times Per Week[b]	Grab[c]
		kg/day	10.19[a]	26.67[a]		
Spring Acute Toxicity (March 1 – May 31) – *Ceriodaphnia sp*	61425	TUa	Report	3.38	Once Per Season	24-Hour Composite
Spring Acute Toxicity (March 1 – May 31) – *Pimephales promelas*	61427	TUa	Report	3.38	Once Per Season	24-Hour Composite
Summer Acute Toxicity (June 1 – Oct. 31) – *Ceriodaphnia sp*	61425	TUa	Report	4.30	Once Per Season	24-Hour Composite
Summer Acute Toxicity (June 1 – Oct. 31) – *Pimephales promelas*	61427	TUa	Report	4.30	Once Per Season	24-Hour Composite
Winter Acute Toxicity (Nov. 1 – Feb 28[29]) – *Ceriodaphnia sp*	61425	TUa	Report	4.26	Once Per Season	24-Hour Composite
Winter Acute Toxicity (Nov. 1 – Feb 28[29]) – *Pimephales promelas*	61427	TUa	Report	4.26	Once Per Season	24-Hour Composite

Other Pollutant Parameters and Models

- Dissolved metals – hardness-based criteria
- TRC – no background chlorine
- Conductivity – only agricultural season
- Dissolved oxygen – for BOD and CBOD, using Streeter-Phelps, assumes instant and complete mixing
- Reasonable potential calculation – does the pollutant have the RP to violate water quality standards

Antidegradation

- All permit limits and requirements written and enforced to maintain water quality and to be protective of the fishable/swimmable goals of the CWA

Questions?

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