CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: March 19, 2012 FILE REF: 3200

TO: Sheri Snowbank, NOR - Spooner

FROM: Dan Peerenboom, NOR - Rhinelander Dan Peerenboom 3/19/2012

SUBJECT: Effluent Limit Recommendations for Superior Sewage Disposal System

This memo is in response to your request for effluent limit recommendations prior to reissuing Wisconsin Pollution Discharge Elimination System (WPDES) Permit No. WI-0025593. The City of Superior is located in northwest Douglas County and operates the Superior Sewage Disposal System (SSDS).

This review included consideration of the current SSDS permit and evaluated the need for water quality based effluent limitations (WQBELs) using Chapters NR 102, 104, 105, 106, 207, and 217, Wisconsin Administrative Code. The limit recommendations are summarized in the tables below. More detailed descriptions of the limit calculations and recommendations are provided later within this memo.

The limit recommendations for Outfall 001 are for the regulation of effluent discharges to the Superior Bay portion of Lake Superior from the "Main Plant" wastewater treatment facility operated by the SSDS. Superior Bay has a cold water sport fish classification and Lake Superior is used for the City's public drinking water supply. The WQBEL review did not involve reconsideration of the existing limits for the "conventional pollutants" including; CBOD, TSS, pH and fecal coliform bacteria.

SSDS - Effluent Limit Recommendations for Outfall 001 (Main Plant)

Parameter	Daily Maximum	Weekly Average	Monthly Average
Ammonia, as NH3-N (limit varies w/eff. pH)	Variable Limit		
CBOD – Carbonaceous Bio. Oxygen Demand		40 mg/L	25 mg/L
Chlorine, Total Residual	38 ug/L		
Fecal Coliform Bacteria (geomean)			400 cts/100 mL (year round)
pH (std. units)	6.0 (minimum) 9.0 (maximum)		
Phosphorus, Total			1.0 mg/L
Suspended Solids, Total (TSS)		45 mg/L	30 mg/L
WET Testing	Annual WET Testing (Acute and Chronic)		

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Effluent limit recommendations for three combined sewer treatment plant (CSTP) outfalls are also noted below. The CSTPs treat intermittent discharges of combined sewer overflows (CSOs) and are located on different water bodies but each is in close proximity to Lake Superior. Similar to past WQBEL reviews the CSTPs are considered as discharges to water bodies that support cold water sport fish communities and are used to provide public water supply.

CSTP-2 (Outfall 002) is an aerated lagoon facility located adjacent to the main plant and has intermittent discharges to Superior Bay. CSTP-5 (Outfall 003) and CSTP-6 (Outfall 004) are physical/chemical treatment facilities that discharge to the Nemadji River (CSTP-5) and the St. Louis Bay portion of the St. Louis River (CSTP-6) and no changes to the current limits are recommended. During the six year period from July 2005 to June 2011 discharge events occurred 5 to 10 times annually at each outfall with CSTP discharges occurring on about 20 calendar dates each year.

SSDS - Effluent Limit Recommendations for Outfalls 002, 003 and 004 (CSTPs 2,5 & 6)			
Parameter	**Daily Maximum**	**Weekly Average**	**Monthly Average**
Ammonia, as NH3-N, at CSTP-2 only	Variable Limit		
Biochemical Oxygen Demand (BOD)		45 mg/L	30 mg/L
pH (std. units)	6.0 (minimum) 9.0 (maximum)		
Phosphorus, Total			1 mg/L
Suspended Solids, Total (TSS) at CSTP-2			60 mg/L
Suspended Solids, Total (TSS), CSTP-5 & CSTP-6		65 mg/L	
Chlorine, Total Residual, for CSTP-2 only	38 ug/L		
Fecal Coliform Bacteria (geomean), at CSTP-2 only			400 cts/100 mL (year round)
WET Testing	Three Acute WET Tests During Permit Term		

Water Quality Based Effluent Limit Recommendations & Discussion

Water Quality Based Effluent Limitations (WQBELs). The design flow for the SSDS facility is more than 1 MGD so comprehensive effluent monitoring for toxic substances is required and the reported data were considered in the WQBEL evaluation. The Water Quality Based Effluent Limits Calculations Summary – Outfall 001 notes 16 toxic substances were detected in discharges from the main plant.

The summary also lists the WQBELs for each substance based on the most stringent applicable water quality criteria (WQC) and includes a recommendation for whether or not limits are necessary.
The total residual chlorine limit may be dropped if chlorine use for disinfection is discontinued.

Water Quality Based Effluent Limits Calculations Summary for SSDS Outfall 001				
Substance Detected	Criteria	Most Stringent Limit	Effluent Concentration	Limit Recommendation
Arsenic	HCC	2.2 ug/L (Monthly Ave.)	0.61 ug/L 30-d p99 = 0.72 ug/L	No Limit
Antimony	HTC	62 ug/L (Monthly Ave.)	0.5 ug/L	No Limit
Cadmium	ATC	17 ug/L (Daily Max.)	0.09 ug/L	No Limit
Chloride	ATC	1,500 ug/L (Daily Max.)	165 mg/L	No Limit
Chlorine (limit is also required at CSTP-2)	ATC	38 ug/L (Daily Max.)	Not detect in >99% of 4,515 samples	Retain Current Limit
Chloroform	HCC	580 ug/L (Monthly Ave.)	1.5 ug/L	No Limit
Chromium	CTC	790 ug/L (Weekly Ave.)	1.5 ug/L	No Limit
Copper	ATC	53 ug/L (Daily Max.)	5.6 ug/L	No Limit
Cyanide	ATC	45 ug/L (Daily Max.)	4.4 ug/L	No Limit
Dichlorobenzene	HCC	132 ug/L (Monthly Ave.)	0.4 ug/L	No Limit
Lead	HTC	110 ug/L (Monthly Ave.)	0.6 ug/L	No Limit
Mercury	WC	9.3 ng/L (Monthly Ave.)	3.4 ng/L 30d-p99 = 4.7 ng/L	No Limit
Nickel	CTC	475 ug/L (Weekly Ave.)	3.3 ug/L	No Limit
Selenium	CTC	55 ug/L (Weekly Ave.)	1.3 ug/L	No Limit
Zinc	ATC	400 ug/L (Daily Max.)	21 ug/L	No Limit
ATC = acute toxicity criteria, CTC = chronic toxicity criteria, WC = wildlife criteria, HTC = human threshold criteria, HCC = human cancer criteria.				

Effluent monitoring for toxic substances for the CSTP outfalls has been less extensive and a partial summary of prior limit reviews has been included with this memo (see Attachment 1). The only recommended WQBELs are for ammonia and total residual chlorine at CSTP-2 (Outfall 002).

Ammonia. Daily maximum effluent ammonia limits are recommended for Outfalls 001 and 002 with limits based on effluent pH at the time of discharge as noted in the table below.

The 2006 WQBEL review for the SSDS concluded effluent ammonia limits were necessary for Outfalls 001 and 002. During the current permit term the limit recommendations were amended several times due to the availability of additional monitoring data, refinements to the criteria used for limit calculations and consideration of upgrades being made to the treatment works. Facility upgrades include the installation of equipment for effluent pH adjustment to assure compliance with daily maximum effluent ammonia limits.

Variable (Daily Maximum) Effluent Ammonia Limits for SSDS at Outfalls 001 & 002

Effluent pH	Daily Limit	Effluent pH	Daily Limit	Effluent pH	Daily Limit
$7.2 < pH \leq 7.3$	39 mg/L	$7.8 < pH \leq 7.9$	16 mg/L	$8.4 < pH \leq 8.5$	5.2 mg/L
$7.3 < pH \leq 7.4$	35 mg/L	$7.9 < pH \leq 8.0$	14 mg/L	$8.5 < pH \leq 8.6$	4.3 mg/L
$7.4 < pH \leq 7.5$	31 mg/L	$8.0 < pH \leq 8.1$	11 mg/L	$8.6 < pH \leq 8.7$	3.5 mg/L
$7.5 < pH \leq 7.6$	27 mg/L	$8.1 < pH \leq 8.2$	9.3 mg/L	$8.7 < pH \leq 8.8$	2.9 mg/L
$7.6 < pH \leq 7.7$	23 mg/L	$8.2 < pH \leq 8.3$	7.6 mg/L	$8.8 < pH \leq 8.9$	2.5 mg/L
$7.7 < pH \leq 7.8$	19 mg/L	$8.3 < pH \leq 8.4$	6.3 mg/L	$8.9 < pH \leq 9.0$	2.1 mg/L

Daily maximum ammonia limits are not required when calculated limit values exceed 20 mg/L in summer (May - Oct., w/pH < 7.7) or 40 mg/L during winter (Nov. – April, w/pH < 7.2).

As part of the WQBEL review past effluent monitoring results for ammonia and pH reported from 1999 through 2011 were matched by date and compared with the limits noted in the variable limits table. For the Main Plant (Outfall 001) 150 pairs of data were available for review and based on the effluent pH at the time of discharge only one of the effluent ammonia concentrations reported for the same date would have exceeded a daily maximum limit. For CSTP-2 (Outfall 002) 78 pairs of data were reviewed and based on the effluent pH at the time of discharge none of the effluent ammonia concentrations reported for that date would have exceeded a daily maximum limit.

Weekly and monthly (chronic) average effluent ammonia limits are not recommended for the Main Plant (Outfall 001). Chronic limits calculated for this outfall exceed the 20 mg/L (summer) and 40 mg/L (winter) threshold for limits except for a monthly average limit (35 mg/L) during winter. However the 30-day p99 value (20.6 mg/L) is lower than the calculated monthly average limit during winter.

Weekly and monthly (chronic) average effluent ammonia limits are not recommended for CSTP-2. Discharges from CSTP-2 are infrequent, short in duration and occur during wet weather. Chronic limits calculated for this outfall exceed the 20 mg/L (summer) and 40 mg/L (winter) threshold for limits except for a monthly average limit (35 mg/L) during winter. However the maximum reported monitoring result of 25.6 mg/L (81 samples) and the 30-day p99 value (10.1 mg/L) are lower than the calculated limit.

Daily maximum (acute) effluent ammonia limits are not recommended for CSTP-5 or CSTP-6. Both the 1-day p99 value and the maximum effluent ammonia concentration reported are lower than the calculated limits for either outfall. An evaluation of monitoring results, 71 data pairs for effluent ammonia and effluent pH, collected on the same dates also indicated that if limits had been in effect no daily limits would have been exceeded with only a single result greater than 1/5 of the corresponding limit value.

Weekly and monthly (chronic) average effluent ammonia limits are not recommended for CSTP-5 or CSTP-6. Discharges from these outfalls are infrequent, short in duration and occur during wet weather when stream flows are well above low flow conditions. Chronic limits calculated for either outfall based on the minimum observed stream flows during CSO discharges greatly exceed the 20 mg/L (summer) and 40 mg/L (winter) limit thresholds. In addition, the maximum reported monitoring results (78 samples) and both the 4-day and 30-day p99 values for both locations are lower than chronic limits calculated assuming low flow stream conditions.

Mercury. The mercury WQBEL review evaluated 58 representative effluent sample results and an effluent limitation for mercury is not recommended. The limit calculation assumes the SSDS request for a mixing zone phase-out exception will be granted and the SSDS to will be required to continue with their Mercury Pollution Minimization Program efforts. A summary of the SSDS mercury monitoring results, a description of the pollution minimization program (PMP) reporting requirements and a draft mixing zone phase-out exemption recommendation are provided in Attachment 3.

Phosphorus. The current SSDS permit contains a 1.0 mg/ L monthly average effluent phosphorus limit for Outfalls 001, 002, 003 and 004 that should be continued when the permit is reissued. NR 217.04 (1)(a)1 requires a 1.0 mg/L limit for municipal wastewater treatment facilities discharging more than 150 pounds of phosphorus per month and applies to the SSDS. The 1.0 mg/L limit is considered a technology based limit (TBL) with compliance required at all major (> 1 MGD) municipal wastewater treatment facilities.

In addition to the TBL recent revisions to the administrative rules regulating phosphorus require that WQBELs for phosphorus also be considered. The December 1, 2010 rule revisions set phosphorus water quality criteria (WQC) for various types of water bodies in NR 102.06 and NR 217 Subchapter III defines the methods for calculating phosphorus WQBELs. Although NR 102.06 (5)(b) sets a WQC of 5 ug/L for Lake Superior no phosphorus WQBEL, or interim limits, are recommended because near shore and/or whole lake modeling for setting waste load allocations are not yet complete.

During the current permit term effluent phosphorus concentrations at Outfall 001 averaged 0.44 mg/L and the 30-day p99 value for 1,790 daily samples is 0.58 mg/L. Effluent phosphorus concentrations from the CSTPs averaged 0.40 mg/L with a flow proportioned (weighted) average of 0.30 mg/L. The SSDS may be able to improve phosphorus removal at the main plant by increasing chemical feed rates.

If future modeling results in phosphorus loading allocations that are lower than current discharges the SSDS may need to consider additional control methods that could include; treatment optimization, pollutant trading with other dischargers (point or nonpoint sources), requesting alternate phosphorus limits (APL) or the development of an adaptive management strategy that combines a broad range of control methods.

Thermal Limits. Administrative rule changes to Chapters NR 102 and NR 106 took effect in October 2010 and established thermal WQC for discharges to all surface waters. Thermal limits for SSDS outfalls are not recommended because all calculated limit values are much higher than the observed or expected effluent temperatures.

Although Superior Bay is considered part of Lake Superior it is possible the St Louis River affects thermal conditions near Outfalls 001 and 002 so the limits evaluation considered the requirements for both stream and lake discharges. The table below summarizes the results of the limit calculations and the conditions for a stream discharge are more stringent for Outfall 001 but the conditions for a lake discharge are more stringent for Outfall 002.

Daily maximum effluent temperature limits are not recommended because the calculated limit values are much higher than effluent temperatures are likely to approach. The calculated daily limit for Outfall 001 is 120 degrees F year-round and at Outfall 002 the only limit below 100 degrees F is 93 degrees F in October. To date the maximum effluent temperature reported at either outfall is 76 degrees F.

Weekly average effluent temperature limits are not recommended. Weekly limits would only apply at Outfall 001 from April to August and during October at Outfall 002. Limit values range from 87 to 116 degrees F and its unlikely effluent temperatures will approach these limits. To date effluent temperatures reported during all months are lower than the corresponding limit values by at least 24 degrees.

Effluent Temperature Limit Calculations Summary for SSDS (Outfalls 001 & 002)

Main Plant – Outfall 001			CSTP-2 – Outfall 002		
Month	Calculated Weekly Limit	Calculated Daily Limit	Month	Calculated Weekly Limit	Calculated Daily Limit
January	NA	120 deg F	January	NA	120 deg F
February	NA	120 deg F	February	NA	120 deg F
March	NA	120 deg F	March	NA	110 deg F
April	101 deg F	120 deg F	April	NA	110 deg F
May	94 deg F	120 deg F	May	NA	120 deg F
June	98 deg F	120 deg F	June	NA	113 deg F
July	116 deg F	120 deg F	July	NA	100 deg F
August	114 deg F	120 deg F	August	NA	109 deg F
September	NA	120 deg F	September	NA	103 deg F
October	NA	120 deg F	October	87	93 deg F
November	NA	120 deg F	November	NA	120 deg F
December	NA	120 deg F	December	NA	120 deg F

The applicable thermal water quality criteria are described in Table 2 (stream discharge) and Table 5 (lake discharge) in NR 102.25 (2). The limit calculation methodology used to derive the limits in this table are described in NR 106.55 (6) & (7) and are based on the limit calculation formulas noted below:

For stream discharge $WQBEL = [((WQC - Ta)(Qs + (1 - f)Qe))/Qe] + Ta$

For lake discharge $WQBEL = [((WQC - Ta)/e^{-a}] + Ta$

Because these outfalls are in close proximity the thermal limit calculations for Outfall 002 were flow weighted to include additional volume equal to the simultaneous discharges from Outfall 001.

Effluent temperature limits are not recommended for CSTP-5 or CSTP-6. In addition to the discharges being infrequent and of relatively short duration they occur during wet weather conditions when stream flow volumes increase. The 2006 WQBEL review included a detailed evaluation to correlate CSTP discharges with stream flows in the period from 1997 to 2006. During CSTP discharges the minimum observed stream flows provided dilution ratios of more than 50:1. For flow ratios exceeding 30:1 the only limit to consider is a daily maximum effluent temperature limit of 120 degrees F. Discharge temperatures approaching 120 degrees F are not expected and to date the maximum reported CSTP temperature is 76 degrees F. Therefore no thermal limits are recommended for CSTP-5 or CSTP-6.

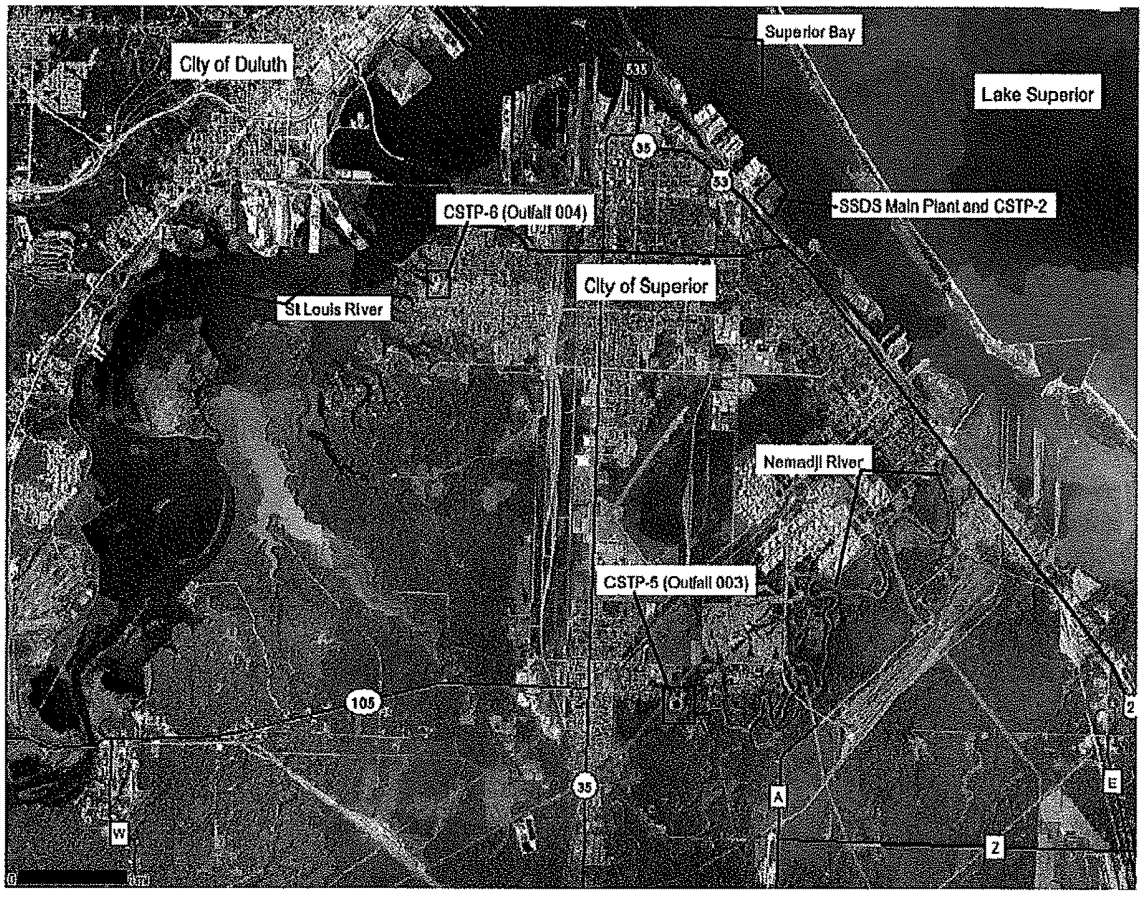
Disinfection. Effluent disinfection is required year-round for discharges from Outfalls 001and 002 (CSTP-2) and the current limits for fecal coliform bacteria and total residual chlorine should remain in effect. However, the total residual chlorine limit at Outfall 001 may be dropped if the existing chlorine gas system is replaced with the proposed ultraviolet (UV) light system for effluent disinfection.

The need for effluent disinfection for Outfall 003 (CSTP-5) and Outfall 004 (CSTP-6) was considered in a prior (2006) WQBEL review and was not recommended because the discharges are infrequent, they occur during high stream flow conditions and fecal coliform bacteria counts were relatively low. Nemadji River flows at the Outfall 003 location averaged 1,923 cfs during CSO events (7Q10 = 32 cfs) with a minimum 4-day flow of 252 cfs. St. Louis River flows at the Outfall 004 location averaged 7,987 cfs during CSO events (7Q10 = 225 cfs) with a minimum 4-day flow of 1,337 cfs. A correlation between effluent volume, bacteria counts and stream flow indicated bacteria concentrations were below the disinfection requirement threshold during all CSO events.

WET Testing. The SSDS has done extensive whole effluent toxicity (WET) testing and WET limits are not required. Annual WET testing (acute and chronic) is recommended for Outfall 001. WET testing is also recommended (acute only) for each CSTP outfall with a frequency of three times during the permit term. WET testing for chronic toxicity is not recommended for the CSTP outfalls because the discharges are infrequent, short in duration, and occur when receiving water flows are above normal. A more detailed discussion of WET test methods, a summary of testing results, review comments and recommendations for monitoring is provided in Attachment 2.

cc Eric de Veneica, NOR – Ashland Service Center

Aerial View - City of Superior with Locations of SSDS Wastewater Treatment Facilities



Attachment 1

Water Quality Based Effluent Limits Calculations Summary for CSTP Outfalls

Substance	Daily Limits - based on acute toxicity criteria	Effluent Concentration	Limit Recommendation
Arsenic	680 ug/L	Not Detected	No Limit
Cadmium	8 ug/L	Not Detected	No Limit
Chloride	1,500 mg/L	120 mg/L	No Limit
Chlorine, retain limit at CSTP-2 (Outfall 002)	38 ug/L	Not Detected	No Limits at Outfalls 003 & 004
Chromium	3,600 ug/L	4 ug/L	No Limit
Copper	59 ug/L	10 ug/L	No Limit
Cyanide	45 ug/L	5 ug/L	No Limit
Dieldrin	0.5 ug/L	Not Detected	No Limit
Endrin	0.2 ug/L	Not Detected	No Limit
Lead	210 ug/L	2.2 ug/L	No Limit
Mercury	1.7 ug/L	Not Detected	No Limit
Nickel	2,700 ug/L	Not Detected	No Limit
Pentachlorophenol	6.4 ug/L	Not Detected	No Limit
Toxaphene	1.5 ug/L	Not Detected	No Limit
Zinc	240 ug/L	36 ug/L	No Limit

Past monitoring at CSTP-2 reported "not-detected" for most sample results for chlorine, cyanide and lead but, when present, concentrations of these substances were below levels for concern. Chlorides were detected but were present below levels for concern.

Attachment 2

Whole Effluent Toxicity (WET) Evaluation & Monitoring Recommendations

WET testing is used to measure, predict, and control the discharge of toxic substances that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time. Acute tests predict the concentration that causes lethality of aquatic organisms during a 48-96 hour exposure. Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure.

WET Test Results for Outfall 001 (SSDS - Main Plant)

	Acute Results LC_{50} (%)				Chronic Results IC_{25} (%)		
Test Date	*C. dubia*	Fathead	Pass/Fail	RPF data?	*C. dubia*	Fathead	Pass/Fail
03/03/98	>100	>100	P	Yes	>100	>100	P
04/28/98	>100	>100	P	Yes	>100	>100	P
08/31/98	>100	>100	P	Yes	>100	>100	P
10/30/98	>100	>100	P	Yes	>100	>100	P
10/03/01	-	-	-	-	>100	>100	P
12/31/01	>100	>100	P	Yes	>100	>100	P
09/09/02	>100	>100	P	Yes	>100	29.8	P
05/12/03	>100	>100	P	Yes	-	-	-
01/19/04	>100	>100	P	Yes	>80	>80	P
03/01/05	>100	87.1	*Fail	Yes	-	-	-
04/18/05	>100	>100	P	Yes	-	-	-
08/15/06	>100	>100	P	Yes	>100	>100	P
09/10/07	>100	>100	P	Yes	70.6	45.2	P
04/25/08	>100	>100	P	Yes	-	-	-
08/04/08	>100	>100	P	Yes	>100	42.5	P
08/03/09	>100	>100	P	Yes	43.4	>100	P
09/20/10	>100	>100	P	Yes	>100	>100	P
09/12/11	>100	>100	P	Yes	>100	>100	P

WET data prior to 1998 may not be representative and has not been included for RPF calculations.
*Fail – effluent ammonia levels on 03/01/05 (two samples 26.6 and 34.4 mg/L) may have caused acute test failure (fathead minnow toxicity) - an acute limit (daily max.) for ammonia is recommended.

Acute WET: In order to assure that discharges by the SSDS are not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC_{50} greater than 100% effluent.

Chronic WET: In order to assure that the discharges by the SSDS are not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} greater than the instream waste concentration (IWC). The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 9% shown in the WET Checklist summary for Outfall 001 was calculated based on a 10:1 dilution ratio.

Dilution Series: According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Wis. Adm. Code), the default acute dilution series is: 6.25, 12.5, 25, 50, 100%, and the default chronic dilution series is 100, 75, 50, 25, 12.5%. The permittee or Department staff may choose other dilution series, but alternate dilution series must be specified in the WPDES permit. For guidance on selecting an alternate dilution series, see Chapter 2.11 of the WET Guidance Document.

Receiving water: According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Wis. Adm. Code) receiving water must be used as the dilution water and primary control in WET tests, unless other dilution water is approved by the Department prior to use. The dilution water used in WET tests shall be grab samples collected from the receiving water location, upstream/out of the influence of the mixing zone and any other known discharge. The receiving water location must be specified in the WPDES permit.

WET Checklist: Department staff uses the WET Checklist when deciding whether WET limits and monitoring are needed. As toxicity potential increases, more points accumulate and more monitoring is needed to insure that toxicity is not occurring. The completed WET Checklists and monitoring recommendations are summarized in the tables below. (For more information see Chapter 1.3 of the WET Guidance Document, at: http://www.dnr.state.wi.us/org/water/wm/ww/biomon/biomon.htm).

WET Monitoring and Limit Recommendations: Based on historical WET data and RPF calculations as required in s. NR 106.08, Wis. Adm. Code. Based on the point totals generated on the WET Checklists, the information given above, and Chapter 1.3 of the WET Guidance Document WET limits are not recommended. Annual WET testing for acute and chronic toxicity is recommended for Outfall 001 and three acute WET tests are recommended for each of the CSTP discharges during the next permit term. WET tests for Outfall 001 should be conducted during the months from June through October to reduce the potential for effluent ammonia to interfere the test results.

Whole Effluent Toxicity (WET) Checklist Summary – SSDS Outfall 001		
Factors Considered for Toxicity Potential	**A C U T E (points)**	**C H R O N I C (points)**
1. IWC	1A. Not Applicable (0)	1B. IWC = 9% (0)
2. HISTORICAL DATA	2A. 17 tests used, RPF = 0 (0)	2B. 10 tests used, RPF = 0.1 (0)
3. EFFLUENT VARIABILITY	3A. Little variability, no upsets or violations & consistent operations (0)	3B. Same as Acute (0)
4. STREAM CLASSIFICATION	4A. Lake Superior (CW/PWS) (15)	4B. Same as Acute (15)
5. CHEMICAL SPECIFIC DATA	5A. Limits for ammonia & chlorine, 15 other substances detected (9)	5B. No chronic limits for 17 detected substances (3)
6. ADDITIVES	6A. One biocide (chlorine) and three WQ conditioners are used. (6)	6B. Additives are used more often than once every fourth day. (6)
7. DISCHARGE CATEGORY	7A. No primary industries (0)	7B. Same as Acute (0)
8. WASTEWATER TREATMENT	8A. Secondary Treatment (0)	8B. Same as Acute (0)
9. DOWNSTREAM IMPACTS	9A. None from discharge. (0)	9B. Same as Acute (0)
TOTAL POINTS	30 Points	24 Points
Recommended Testing	**Annual Testing Recommended**	**Annual Testing Recommended**

Acute WET Test Results for SSDS Outfalls 002, 003 and 004 (CSTPs 2, 5 & 6)							
Test Date	*C. dubia*	Fathead	Pass/Fail	RPF?			
Outfall 002 (CSTP-2) eight acute tests – all passed							
05/09/02	>100	>100	P	Yes	-	-	-
04/29/03	>100	>100	P	Yes	-	-	-
03/31/04	>100	>100	P	Yes	-	-	-
03/27/05	>100	>100	P	Yes	-	-	-
03/30/06	>100	>100	P	Yes	-	-	-
04/08/08	>100	>100	P	Yes	-	-	-
03/18/09	>100	>100	P	Yes	-	-	-
08/03/10	>100	>100	P	Yes	-	-	-
Outfall 003 (CSTP-5) nine acute tests – all passed							
04/11/02	>100	>100	P	Yes	-	-	-
07/11/03	>100	>100	P	Yes	-	-	-
03/29/04	>100	>100	P	Yes	-	-	-
03/31/05	>100	>100	P	Yes	-	-	-
04/03/06	>100	>100	P	Yes	-	-	-
09/20/07	>100	>100	P	Yes	-	-	-
04/08/08	>100	>100	P	Yes	-	-	-
03/19/09	>100	>100	P	Yes	-	-	-
03/13/10	>100	>100	P	Yes	-	-	-
Outfall 004 (CSTP-6) seven acute tests – all passed							
04/12/02	>100	>100	P	Yes	-	-	-
07/11/03	>100	>100	P	Yes	-	-	-
03/29/04	>100	>100	P	Yes	-	-	-
06/15/05	>100	>100	P	Yes	-	-	-
04/03/06	>100	>100	P	Yes	-	-	-
03/19/09	>100	>100	P	Yes	-	-	-
03/15/10	>100	>100	P	Yes	-	-	-

WET Checklist Summary for SSDS Outfalls 002, 003, and 004 and Acute WET Test Recommendations (CSTP Outfalls #'s 2, 5 and 6)	
1. IWC	Not Applicable (0)
2. Historical Data	24 Acute WET tests at the three CSTPs – all have passed (0)
3. Effluent Variability	Varies at all CSTPs (5)
4. Stream Class	Each CSTP is a direct or indirect tributary to Lake Superior (15)
5. Chemical Data	CSTP-2 ammonia & chlorine limits (9), no limits at CSTP-5 or CSTP-6 (1)
6. Additives	CSTP-2 has disinfection (4) and no additive use a CSTPs 5 & 6 (0)
7. Discharge Category	Each outfall has an intermittent CSTP discharge (0)
8. Treatment Level	Treatment – primary at CSTP-5 (8) & CSTP-6 (8), secondary at CSTP-2 (0)
9. Downstream Impacts	No impact (0)
Total Points	CSTP-2 has 33 points, CSTP-5 has 28 points and CSTP-6 has 29 points
Recommended Testing	**Three Acute Tests during permit term**

Attachment 3

Effluent Mercury Monitoring Results and Limit Recommendation for SSDS

Sample Date	Effluent Hg (ng/L)	Sample Date	Effluent Hg (ng/L)	Sample Date	Effluent Hg (ng/L)
11/13/2003	1.9	07/28/2005	8.4	11/28/2007	1.7
12/12/2003	4.4	08/10/2005	2.5	01/25/2008	2.4
01/15/2004	4.1	09/20/2005	3.8	05/28/2008	2.9
02/13/2004	2.5	10/11/2005	7.6	07/23/2008	1.1
03/16/2004	1.4	11/08/2005	1.3	10/28/2008	1.5
04/20/2004	4.6	12/20/2005	1.9	01/09/2009	13.7
05/21/2004	4.5	01/05/2006	1.7	02/04/2009	2.1
06/24/2004	3.8	02/14/2006	2.2	04/22/2009	1.9
07/14/2004	2.5	03/09/2006	2.4	08/11/2009	1.6
08/19/2004	2	04/18/2006	1.1	10/21/2009	2.2
09/20/2004	3.4	05/03/2006	6.2	01/20/2010	1.1
10/13/2004	2.9	06/07/2006	1.6	04/13/2010	4
11/16/2004	2.8	07/13/2006	2.5	07/28/2010	13.2
12/17/2004	3.4	08/02/2006	4.1	11/09/2010	1.24
01/12/2005	1.7	09/19/2006	3.7	02/16/2011	2.17
02/16/2005	9.9	10/11/2006	3.5	06/08/2011	5.83
03/10/2005	3.5	11/16/2006	2.5	08/23/2011	2.1
04/05/2005	3	12/14/2006	1.7	10/19/2011	6.07
05/17/2005	2.7	04/19/2007	3.3	-	-
06/23/2005	2.8	09/06/2007	1.5	-	-
Average = 3.4 ng/L			**30-day p99 = 4.7 ng/L**		

Calculated Monthly Average Effluent Limitation = 9.3 ng/L

Effluent Limit Recommendation: No Limit Required

Field blanks: Sample results of "not detected" were reported for 31 of 57 field blank, 22 results were between the LOD (0.1 ng/L) and LOQ (0.3 ng/L), and two results of 0.4 ng/L and two results of 0.5 ng/L were reported.

DRAFT - Mixing Zone Phase-Out Exception for Mercury - SSDS

The Superior Sewage Disposal System (SSDS) has requested an exception to the proposed mixing zone phase out when calculating effluent limitations for mercury beyond November 15, 2010 under the exception for technical and economic considerations to the mixing zone phase-out for bioaccumulating chemicals of concern (BCC's) at 40 CFR, Part 132, Appendix F, Procedure 3 C. 6. In consideration of requirements contained at the above reference, the Wisconsin Department of Natural Resources (WDNR) determines that:

- The SSDS is in compliance with and shall continue to comply with all applicable requirements of Clean Water Act sections 118, 301, 302, 303, 304, 306, 307, 401, and 402, including existing categorical effluent limits and water quality based effluent limits (WQBELs).

- The SSDS will accept a permit compliance schedule requiring they continue implementation of a Mercury Pollution Minimization Plan (PMP) meeting the requirements of s. 106.145(7). WDNR believes the finding at s. 106.145(1)(a) sufficiently demonstrates that controls beyond a PMP would result in unreasonable economic effects because controls to remove mercury using wastewater treatment technology are not feasible or cost-effective.

- The SSDS wastewater treatment facility discharge to Superior Bay is considered a direct discharge to Lake Superior. Under s. NR 106.06(4)(b)2 WQBELs are calculated using a mixing or dilution calculation of one part effluent to ten parts receiving water. The WQBEL for mercury using this procedure is 9.3 ng/L.

- The size of the mixing zone is defined by a 10:1 dilution ratio. There are no regulatory requirements nor does data and information exist to allow WDNR to make a scientifically and valid determination of an alternative size of the mixing zone that could be attained with current available and economically feasible technology.

- By definition, the water quality criteria are met at the edge of the mixing zone.

- There is currently no applicable TMDL for mercury in Lake Superior and available data indicate the concentration of mercury in Lake Superior meets all applicable water quality criteria.

- With a mixing zone exemption a WQBEL for mercury is not required. The requirements for authorizing the exception and the circumstances under which it is being granted are essentially the same as those for granting a variance to water quality standards. WDNR has analyzed the potential impacts to endangered and threatened species as part of its variance process. The analysis concluded that approval of mercury variances, with more stringent permit requirements for PMPs, is unlikely to adversely affect bald eagles or other listed species that occur within the State of Wisconsin.

Therefore, WDNR grants a mixing zone phase out exemption for effluent discharges from the wastewater treatment facility operated by the SSDS due to technical and economic considerations.

The granting of this exception to the SSDS shall apply only to the 5-year permit term of the proposed WPDES permit. The SSDS will need to make a similar request and DNR will need to make a similar determination for a further continuation of a mixing zone, if those actions become appropriate for the next permit term.

Permit Language. Standard language for mercury sample collection procedures is available and should be included when the permit is reissued. The permit compliance schedule should require annual status reports on the Mercury Pollution Minimization Program efforts including descriptions of any unique features or special points of emphasis in the plan. Planned actions and due dates should be identified in the PMP plan and the permit compliance schedule.

Mercury Pollutant Minimization Program

The permittee shall begin or continue to implement a pollutant minimization program that meets the requirements of s. NR 106.145(7), Wis. Adm. Code.

Required Action	Date Due
Submit Annual Status Reports: The permittee shall submit to the Department an annual status report on the progress of the PMP as required by s. NR 106.145(7), Wis. Adm. Code. Submittal of the annual status reports is required by the March 31 of each year.	