Small Utility Uses MDV to Help with Phosphorus Compliance

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WISCONSIN WASTEWATER OPERATORS' ASSOCIATION

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Welcome to the Milan Sanitary District

- Located west of Wausau, in the Town of Johnson
  - 47 residential households
  - 2 Churches, 1 Business, and 1 Clubhouse
  - 1 Large industry

- Annual budget:
  - $78,800 in 2015
- Operates a 3-cell lagoon wastewater treatment system
- Design flow 300,000 gpd

Interpreting the Permit Cover Letter

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Scott Walker, Governor
Cathy Stepp, Secretary
Dan Baumann, Regional Director

West Central Region Headquarters
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Eau Claire, WI 54702-4001
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Charles Luther
President
Milan S D, Athens, WI
5540 County Rd E
Athens, WI 54411

COPY

SUBJECT: WPDES Permit Reissuance N
Milan S D Wastewater Treatm
Johnson, Athens, WI

Dear Permittee:

Your Wisconsin Pollutant Discharge Elimination Syst
enclosed permit reissuance were determined using the
file, other information available to the Department, co
applicable Wisconsin Administrative Codes. All discl
thereto shall be in accordance with the terms and cond

This enclosed permit requires you to submit monitorin
forms, which must be submitted electronically, are available on the Department's web page. Go to the DNR Switchboard page at http://dnr.wi.gov/topic/switchboard/ to log in and access your monitoring forms.

The WPDES permit program has been approved by the Administrator of the U.S. Environmental Protection Agency pursuant to Section 402(b) of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. Section 1342 (b)). The terms and conditions of the enclosed permit are accordingly subject to enforcement under ss. 283.89 and 283.91, Stats., and Section 309 of the Federal Act (33 U.S.C. Section 1319).

The Department has the authority under chs. 160 and 283, Stats., to establish effluent limitations, monitoring requirements, and other permit conditions for discharges to groundwater and surface waters of the State. The Department also has the authority to issue, reissue, modify, suspend, or revoke WPDES permits under ch. 283, Stats.

The enclosed permit contains water quality-based effluent limitations that are necessary to ensure the water quality standards for a wetland drained by Randall Creek are met. You may apply for a variance from the water quality standard used to derive the limitations pursuant to s. 283.15, Stats., by submitting an application to the Director of the Bureau of Water Quality, P.O. Box 7921, Madison, Wisconsin 53707 within 60 days of the date the permit was issued (see "Date Permit Signed/Issued" after the signature on the front page of the enclosed permit). Subchapter III of ch. NR 200, Wis. Adm. Code, specifies the procedures that must be followed and the information that must be included when submitting an application for a variance.

To challenge the reasonableness or necessity for any term or condition of the enclosed permit, s. 283.63, Stats., and ch. NR 203, Wis. Adm. Code, require that you file a verified petition for review with the Secretary of the Department of Natural Resources within 60 days of the date the permit was issued (see "Date Permit Signed/Issued" after the signature on the front page of the enclosed permit). For permit-related decisions that are not reviewable pursuant to s. 283.63, Stats., it may be possible for permittees or other persons to obtain an

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1. Treatment Plant Improvements

- Tertiary Treatment
  - To achieve a limit of 0.075 mg/L requires TSS < 2.5 mg/L, assuming 3% TP in the TSS
  - We need to convert soluble phosphorus into not soluble
  - We need to remove almost all TSS.
- Three options considered
  - Sand filtration
  - Membrane
  - Algae

Table 3-1 : Planning Level Capital Cost Comparison Major Process Upgrades			
Equipment:	Option 1 Sand Filtration	Option 2 Membranes	Option 3 Algae Treatment
Filter/Membrane/Algae Equipment	$300,000	$670,000	$2,200,000
Chemical Storage	$20,000	$20,000	$0
Chemical mix tank & feed equipment	$30,000		$0
Effluent tank			$20,000
Misc equipment	$20,000	$30,000	$20,000
Building	$120,000	$120,000	$0
Equipment Sub-total 1	$490,000	$840,000	$2,240,000
Construction	$250,000	$350,000	$300,000
Electrical with New MCC, VFDS			
Field piping			
Civil/site work			
Mechanical			
Electrical & Controls/Programing			
Capital Cost Subtotal	**$740,000**	**$1,190,000**	**$2,540,000**
Contingency for Undesigned Details (25%)	$185,000	$297,500	$635,000
Design Engineering (8%)	$59,200	$95,200	$203,200
CRS & Expenses(5%)	$37,000	$60,000	$127,000
General Conditions/Profit(15%)	$111,000	$179,000	$381,000
TOTAL PROJECT COST	**$1,132,200**	**$1,821,700**	**$3,886,200**
TOTAL PROJECT TO MILAN SANITARY DISTRICT	**$226,440**	**$364,340**	**$777,240**

Table 3-2: Annual Cost Summary Operation & Maintenance				
	Major Process Upgrades			Multi-Discharger Variance
	Option 1 Sand Filtration	Option 2 Membranes	Option 3 Algae Treatment	
O&M and chemicals	$65,000	$80,000	$20,000	
Annual MDV fee				$28,200
TOTAL Annual Operating Cost	**$65,000**	**$80,000**	**$20,000**	**$28,200**
TOTAL Annual Operating Cost TO MSD	**$13,000**	**$16,000**	**$4,000**	**$5,640**

Treatment Plant Improvements

- Equipment intensive = High capital
- O&M intensive = High operating cost
- Additional sludge generation = Disposal challenges
- Requires constant attention to maintain compliance

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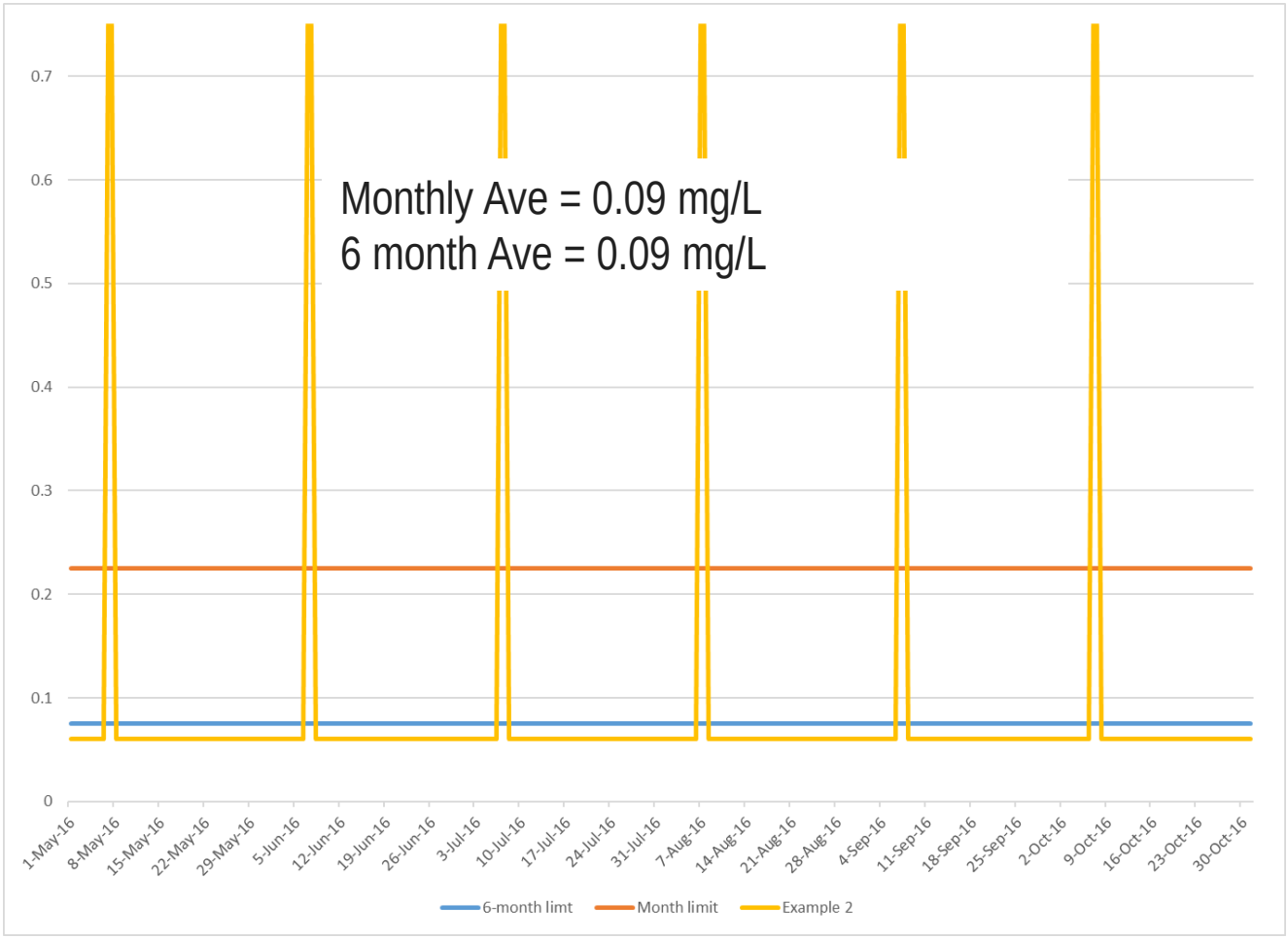
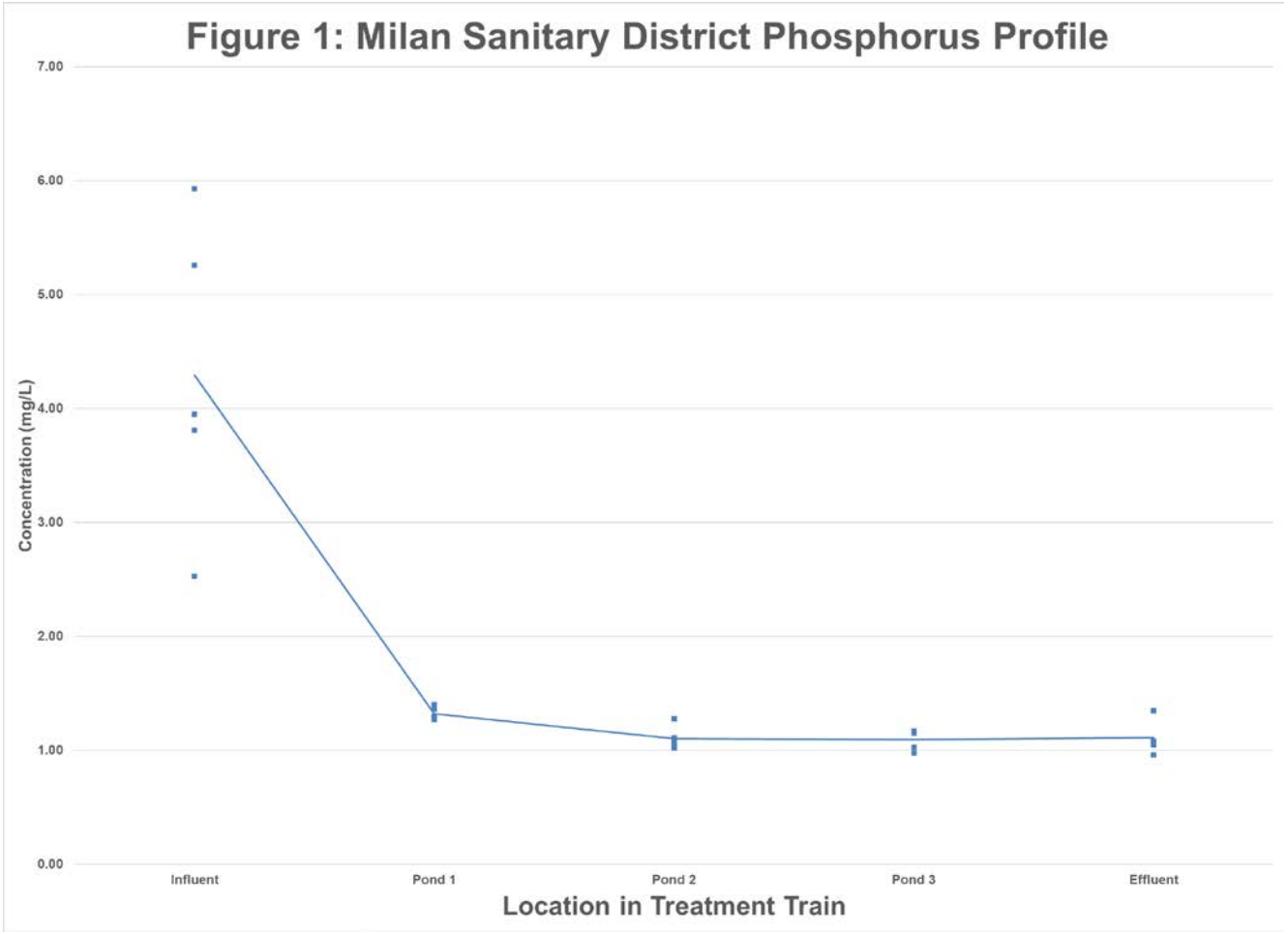
Example – A Monthly Excursion



Influent has Little Impact on Effluent



2. Adaptive Management

- Innovative
- Lead watershed improvements in return for some relief on your TP effluent limits
- Improvements judged on the instream TP concentration
  - Must achieve criteria
- You are given time (up to 3 permit terms)

Milan not eligible, not enough non-point source

3. Nutrient Trading

- Similar to Adaptive Management
- Invest in watershed improvements that reduce TP mass into the receiving water
- Allowed to apply some of the reductions toward complying with your limit
- Trades must be identified and in place before your permit

Evaluated but did not believe a trade would be approved because of "hotspot" issue

Trading Analysis

Table 2-1. Final P Limit Phosphorus Trading Worksheet (12/31/2016)		
Parameter	**Units**	**Current**
Effluent Flow	MGD	0.1210
Effluent TP concentration	mg/L	1.4
	Lbs/day	1.41
WQBEL from WPDES permit	mg/L	0.075
	Lbs/day	0.076
TP Trade required	Lbs/day	1.334
	Lbs/year	487
Trade ratio		3.0
Amount of TP credit needed	Lbs/year	1,461
TP reduction from BMP's	Lbs/ac-yr	1
Amount of land to acquire	Acres	1,461

490 acres

Table 2-2: Preliminary Capital Cost Nutrient Trading	
	Alternative 2
Land acquisition (1,461 acres)	$2,660,600
BMP construction	$1,826,250
Legal fees	$50,000
Sub-total 1	$4,536,850
Capital Cost Subtotal	**$4,536,850**
Contingency for Undesigned Details (5%)	$91,313
Design Engineering	$30,000
CRS & Expenses	$30,000
General Conditions/Profit(1%)	$45,000
TOTAL PROJECT COST	**$4,733,163**

$1.58 M

What About a Variance?

Site Specific	Multi-Discharger Variance
Requires approval from USEPA	Pre-approved based on eligibility

Both involve showing economic consequences

5. What is the MDV?

- MDV stands for Multi-Discharger Variance
- Provides temporary relief from restrictive limits
  - In exchange, interim conditions must be met
- Available to all existing point sources throughout the State
- To be eligible you must:
  - Be faced with a water quality based phosphorus limit
  - Require a major facility upgrade to achieve compliance
  - Be located within a economically challenged county

For Municipalities – Economic Analysis

- The cost of compliance must cause your annual wastewater bill to exceed at least 1% of your median household income (MHI)
- If below 1%, variance is not approved
- If above 1%, need a secondary indicator score (SIS) of ≥ 3
- If above 2%, SIS ≥ 2
- Marathon County SIS = 5

MDV Checklist Worksheet
For
Estimating Eligibility

Client: Milan Sanitary District
Facility: Municipal WWTP
Industry Category: N.A.

Check General MDV Eligibility Questions

1. Is the facility an existing discharge? – YES

2. Does the facility need a "major facility upgrade" to meet final limits? – YES, the final limit of 0.075 mg/L will require significant process improvements.

3. Is the facility located in a potentially eligible county? – Yes, Appendix H says Marathon County is eligible in the version of the draft guidance document submitted to USEPA for approval.

Check the Primary Indicators

4. Do the compliance costs cause the average sanitary district users annual sewer charge to exceed 1% of the median household income (MHI) of the sanitary district? Yes, the cost increase to install equipment to achieve compliance with WQBEL would result in a sewer charge greater than 1% of MHI.

   2% of MHI? No, the cost increase would result in a sewer charge that is less than 2% of MHI. Note, The district does not have economic data for its users. It is anticipated that the MHI of the district users is significantly lower than the MHI of the surrounding communities. It is therefore likely that the sewer charge could exceed 2% of the MHI of the district's residential users.

5. Is the point source located in a county that is within the top 75% of counties incurring costs? – N.A.

Check the Secondary Score

The facility needs to have a secondary score ≥ 3 if the annual sewer charge exceeds 1% of the MHI.
The facility needs to have a secondary score ≥ 2 if the annual sewer charge exceeds 2% of the MHI.

6. Does the facility's county meet the necessary secondary score? – According to Appendix A Marathon County has a secondary score of 5.

End Result

This facility meets the criteria to be potentially eligible for the MDV.

How to Calculate Impact of Compliance?

1. **Determine the cost** of treatment plant improvements
2. **Convert this cost** into an annual charge
3. **Divide** the annual charge by the number of dischargers within your sewerage district
   - This becomes the annual charge to each household
4. **Add** the existing annual charge per house, and compare to the median household income

Calculations for Milan

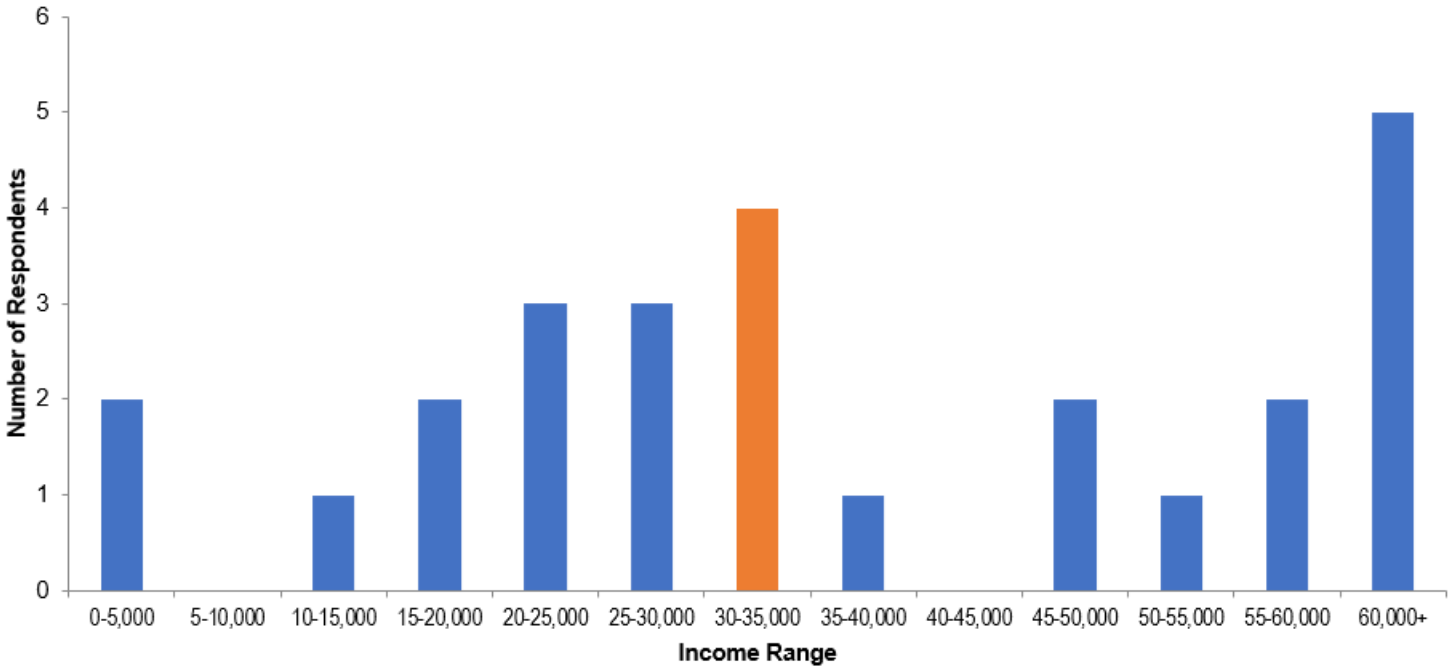
- Capital cost = $1,132,200
  - A 20-year capital loan for $1,132,200 at 2% interest rate would have an annual payment of $69,242
- Annual maintenance cost is estimated at $65,000
- Total annual cost of treatment = $134,242

Table 4-1: Annual Budget for the Milan Sanitary District		
Rate payer	Unit cost ($/year)	Total ($/year)
Residential households (47)	$300	$14,100
Church	$300	$300
Business	$300	$300
Club house	$100	$100
Factory	$64,000	$64,000
	Total:	$78,800

Table 4-2: Impact of Treatment to Meet Water Quality Based Effluent Limits for Phosphorus on the Annual Budget for the Milan Sanitary District			
Rate payer	Current Sewer Charge ($/year)	Increase for Treatment ($/year)	Future Sewer Charge
Residential households (47)	$300	$510	$810
Church	$300	$510	$810
Business	$300	$510	$810
Club house	$100	$170	$270
Factory	$64,000	$109,030	$173,030

Determining Actual Median Household Income for Eligibility

Figure 1-3: Frequency Histogram
Milan SD Economic Survey Results



$$\text{Percent of MHI } \frac{\$810}{\$30{,}000 \text{ to } \$35{,}000} x100 = 2.3\% \text{ to } 2.7\%$$

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Table 4-5: Preliminary Alternatives Present Value Summary				
	Option 1 Sand Filtration	Option 2 Membrane	Option 3 Algae Treatment	MDV
Capital Cost Payment:				
Total Capital Cost	$ 1,132,200	$ 1,821,700	$ 3,886,200	$ 1,132,200
Interest rate	2%	2%	2%	3%
Number of payments or deposits	20	20	20	20
Annual payment or deposit	$ 69,242	$ 111,409	$ 237,667	$ 42,150
Total Annual payment:				
Annual Operating Cost	$ 65,000	$ 80,000	$ 20,000	$ 28,200
annual cost (payment/deposit + operating cost):	$ 134,242	$ 191,409	$ 257,667	$ 70,350
Present Value Esimate				
Term of the analysis	20	20	20	20
Rate of infation	3%	3%	3%	3%
Total Present Value of annual payments	$ 2,000,000	$ 2,850,000	$ 3,830,000	$ 1,050,000

Why Choose the MDV?

- Defers significant capital expense
- Predictable compliance cost
- Allows the marketplace to develop low cost solutions
- Helps support watershed marketplace
  - Helps nutrient marketplace develop
- Allows economic markets to help with costs
  - Loan payment vs. savings

Side Benefits

- Money must be spent within the watershed to reduce non-point TP
- Should drop the receiving water TP concentration
- If receiving water TP drops below NR 102, receiving water is no longer impaired and permit limit maybe less restrictive

Final Permit – Application of the MDV

- New permit containing the MDV issued July 1, 2018
- Permit contains:
  - Interim TP limits
  - New reporting requirements
  - Formula for calculating annual fee
  - Schedule for continuing optimization
  - Schedule for annual payments
  - Schedule for compliance with interim limits

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