Requests for Permit Discharge Limits

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Information needed to determine effluent limits

To determine effluent limitations, the Minnesota Pollution Control Agency (MPCA) needs to have a map showing the location of the discharge point (not the location of the treatment plant) based, if possible, on the U.S. Geological Survey's 7.5 x 7.5 minute quadrangle map of the area. Whenever possible, the latitude and longitude coordinates for the discharge point should be verified by a Geographical Positioning System (GPS) and submitted along with the map. The MPCA also needs to know the rate of discharge.

If the project is a wastewater treatment plant treating sewage, three design flows are needed:

1. the average dry weather flow
2. the average annual flow
3. the average wet weather flow

A worksheet for calculating these flows is available at: www.pca.state.mn.us/publications/wq-wwtp5-20.pdf.

If this is a discharge of industrial or other waste, two design flows are needed:

1. the average daily flow
2. the maximum daily flow

Additional information is needed if this project requires a nondegradation review (See the nondegradation review section of this fact sheet for more information.).

Nondegradation

"Nondegradation" means not degrading a receiving water whose quality is better than its numeric (i.e., dissolved oxygen, turbidity, etc.) water quality standards. This is a "use-protection" concept.

Nondegradation is a tool used to protect surface waters from significant degradation due to both point and nonpoint sources and to maintain existing water uses, aquatic habitats, and the water quality necessary to protect these uses.

Maintaining existing water uses is a higher standard of protection than just protecting the numeric water quality standards. In most cases, this means protecting the aquatic habitat, rather than letting wastewater discharges degrade the habitat to the minimum allowed by the numeric water quality standards.

The MPCA's rules regarding surface water classifications, wastewater treatment discharge limits, and surface water quality standards are found in Minnesota Rules chapters (Minn. R. chs.) 7050 and 7053 Minn. R. 7050.0180 and 7050.0185 deal specifically with nondegradation. Minn. R. 7050.0180 applies the nondegradation concept to outstanding resource value waters (ORVW). ORVW rate special protection because of their exceptional recreational, cultural, aesthetic, or scientific value. New and expanded discharges to ORVW are either prohibited or strictly controlled.

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Minn. R. 7050.0185 deals with nondegradation to all (non-ORVW) of the state. These waters are protected from significant use (recreational, fisheries, etc.) degradation. Most expansions and new discharges come under this part of the rule.

Minn. R. 7050.0185 allows the MPCA to consider additional control measures beyond the minimum needed to maintain water quality standards, to protect receiving waters from further use degradation.

Projects needing a nondegradation review

ORVW - Any expanded or new discharge, regardless of size, that is directly to, or directly upstream of, an ORVW and increases the mass load of pollutants must meet the stringent requirements of Minn. R. 7050.0180. A nondegradation review is *not* needed if the discharger chooses to install additional treatment to reduce effluent concentrations and maintain the current permitted mass loading rates.

There are two types of ORVW:

1. those where all discharges of wastewater are *prohibited* — such as within the Boundary Waters Canoe Area Wilderness
2. those where discharges are *restricted*

Prohibited-discharge ORVW are no-discharge zones.

Anyone wanting to discharge to an ORVW that allows restricted discharges must demonstrate that there is no prudent and feasible alternative to discharging to that ORVW. In a prudent and feasible examination, "feasible" means technically feasible, while "prudent" refers to cost and all other factors. Under the principle of "prudent and feasible," cost is a factor; but cost may not be the sole deciding factor in determining which alternative the MPCA selects to write a discharge permit.

Non ORVW - If the discharger chooses to install additional treatment to reduce effluent concentrations and maintain the current permitted mass loading rates, a nondegradation-to-all-waters review is not needed.

If the discharge is to a Class 7 limited resource value water (*i.e.*, a water without a Class 2 recreational and aquatic use classification) ***and*** this discharge does ***not*** adversely impact a downstream water of a higher quality, a nondegradation-to-all-waters review is not needed.

The MPCA usually does not conduct a nondegradation review for short-term construction dewatering activities. Construction dewatering activities lasting less than a year usually do not have nondegradation reviews. The MPCA may require nondegradation reviews for stormwater projects on a case-by-case basis.

Minn. R. 7050.0185 requires an agency nondegradation review for all (non-ORVW) waters of the state for "significant" new or expanded wastewater discharges. A "significant" new discharge is one in which either the facility's average wet-weather flow (AWWF) (for sewage) or maximum daily flow (for industrial or other waste) will exceed 0.200 million gallons per day (mgd).

A "new" discharge is one that occurs after January 1, 1988.

A "significant" expansion is one in which either the facility's AWWF (for sewage) or maximum daily (industrial or other waste) flow will increase by more than 0.200 mgd over its nondegradation "baseline" flow, which results in an increase in the mass of pollutants discharged. The nondegradation baseline flow is the flow allowed by the facility's National Pollutant Discharge Elimination System permit on January 1, 1988.

If a city's AWWF was 0.150 mgd on January 1, 1988, then any expansion over 0.350 mgd (0.150 mgd + 0.200 mgd) is a significant expansion and justifies a nondegradation-to-all-waters review. An expansion from 0.150 mgd to 0.350 mgd does not justify a nondegradation-to-all-waters review. But an expansion from 0.350 mgd to 0.351 mgd does justify a nondegradation-to-all-waters review. The nondegradation review requirements are cumulative; therefore in this example, expansion from 0.351 to 0.352 justifies an additional nondegradation-to-all-waters review.

A new or expanded discharge that increases the concentration of a toxic pollutant in the receiving water by more than one percent over baseline is also defined as a "significant" discharge. For the purposes of defining "significance" under this rule, the common wastewater treatment effluent substances of total residual chlorine and ammonia-nitrogen are not considered toxic pollutants.

Waters that are ORVW

Minn. R. 7050.0180 contains the current list of ORVW. To find the current list:

1. Go to the Minnesota Legislature's Internet site: www.leg.state.mn.us/.
2. Under "Statutes, Laws, and Rules" in the "Retrieve by Number" request box, type in "7050.0180."
3. Select the "Rule" button.

Mercury-monitoring information

Mercury monitoring pertains to projects discharging to either ORVW or non-ORVW. Due to the statewide mercury-related fish consumption advisories, mercury is a nondegradation issue. If the project's average annual discharge will be over one mgd, then the existing effluent must be monitored for mercury using low-detection-level analytical methods. The discharger has a choice of either volunteering for a total suspended solids mass load (*i.e.*, mass per month or mass per year) "freeze" or its equivalent, by accepting a phosphorus effluent limit stringent enough to maintain the facility's current total suspended solids mass loading. Otherwise, the discharger must provide:

1. A nondegradation demonstration for mercury pursuant to Minn. R. 7050.0185.
2. At least four instantaneous grab low-level mercury effluent samples collected by U.S. Environmental Protection Agency Method 1631. To provide a representative sample, the samples should be spread over a few days or weeks.

If the maximum concentration exceeds potential daily maximum effluent limits, the MPCA will assign a mercury effluent limitation in the discharge permit. The discharger will also have to either (1) identify and reduce any high mercury contributions to the collection system or (2) seek a mercury variance from the mercury effluent limitation.

For questions on mercury issues or for projects that are new discharges with an estimated average annual flow of over one mgd, contact the Wastewater Effluent Limits unit at 651-296-6300 or 800-657-3864.

Information the discharger should provide for a "restricted discharge" ORVW project

The following discussion presents the minimum number of alternatives that must be considered during a nondegradation review for a proposed discharge to an ORVW. The alternatives examined may vary slightly with each type of proposal.

In a "prudent and feasible examination," the word "feasible" means technically feasible and "prudent" refers to cost and all other factors

Experience shows that the time required for an adequate discussion of alternatives can be minimized provided the recommended level of work is done on the first submission. Otherwise, the time needed to complete the project may increase unnecessarily. This is not the place to cut corners on labor.

Alternative 1: Holding tanks with transport to a permitted wastewater treatment system.

Does your county allow holding tanks? If it does not, include a copy of the relevant ordinance with the "prudent and feasible" analysis.

Will other nearby wastewater-treatment plants accept the project's wastewater? If they will not, try to get letters stating so, and put copies of these letters into the "prudent and feasible" analysis. This provides documentation. If they will accept the wastewater, then size the system and compute the initial cost, annual cost, and life cycle cost.

For this exercise, cost comparisons are less complicated if loan interest rates are not used; however, some planners prefer to use interest rates. If you chose to use an interest rate, include the annual loan repayments, length of the loan, and any down payment. State the interest rate used. (This pertains to all of the alternatives.)

Holding tanks with truck transport of the stored wastewater is impractical for a city with a population of thousands of people. If this is your case, state so.

What are the positive and negative environmental impacts of this alternative? (This examination of the positive and negative impacts pertains to all of the alternatives.)

Alternative 2: Pipeline conveyance to a permitted wastewater treatment system.

Follow the same procedure as in Alternative 1.

Alternative 3: Land application systems, including spray irrigation, drip irrigation, and mound systems.

This alternative deals with treatment systems that do not discharge to surface waters.

Depending on the site characteristics, a rapid- or slow-infiltration system may be a better choice than spray irrigation.

Is suitable land available on site or at a reasonable pumping distance nearby? "Suitable land" includes land that the project's proposer does not presently own, but can purchase.

What is the site's soil profile, drainage characteristics, percent slope, soil depth to bedrock, minimum depth to the water table, vegetation type (some plants have high evaporation and transpiration properties and prefer wet soil), etc.?

Will salt plugging of the soil be a problem? If ion exchange water softeners are being used, this could be a salt-plugging factor. Analytical tests of the wastewater may be needed to make this determination.

The soil classification must be done by an ARCPAC-certified (a member of the Federation of Certifying Boards in Agriculture, Biology, Earth and Environmental Sciences) professional soil classifier or a person experienced in doing county soil surveys. It is important that the soil classifier and his experience be identified.

Determine the initial cost, annual cost, and life cycle cost.

For this exercise, cost comparisons are less complicated if loan interest rates are not used; however, some planners prefer to use interest rates. If you chose to use an interest rate, include the annual loan repayments, length of the loan, and any down payment. State the interest rate used. (This pertains to all of the alternatives.)

What are the positive and negative environmental impacts of this alternative? (This examination of the positive and negative impacts pertains to all of the alternatives.)

If the county does not allow some kinds of no-discharge systems (such as mounds or holding tanks), include a copy of the relevant ordinance with the "prudent and feasible" analysis.

Alternative 4: Alternative receiving waters are not designated as ORVW.

An alternative receiving water with a travel time of only a few hours before reaching an ORVW is not adequate, while one with a travel time of over one day is adequate for rapidly decomposable pollutants like five-day carbonaceous biochemical oxygen demand ($CBOD_5$) and ammonia-nitrogen in warm weather. Due to the lower temperatures, and thus lower decay rates of winter, other factors, such as the cumulative impacts of the unstabilized wastes from other local dischargers, may complicate matters. If such an alternative seems viable, it should be discussed with MPCA staff.

Conservative substances like phosphorus and heavy metals do not decay. If they are more of a concern than $CBOD_5$ and ammonia-nitrogen, it is more difficult to find a suitable alternative receiving water. But if the cost of this alternative is low enough, it should still be presented in your report as a viable alternative.

Discharges to ORVW that opt for a phosphorus mass load "freeze" may be subject to additional phosphorus permit requirements, per Minn. R. 7053.0255. Additional phosphorus considerations will be handled on a site-specific basis.

The ideal alternative receiving water is one that discharges to a drainage basin other than the ORVW drainage basin.

If a likely alternate receiving water is found, calculate the initial cost, annual cost, and life cycle cost.

For this exercise, cost comparisons are less complicated if loan interest rates are not used; however, some planners prefer to use interest rates. If you chose to use an interest rate, include the annual loan repayments, length of the loan and any down payment. State the interest rate used. (This pertains to all of the alternatives.)

What are the positive and negative environmental impacts of this alternative? (This examination of the positive and negative impacts pertains to all of the alternatives.

Alternative 5: Downsizing the project and/or implementing water conservation practices so that a land disposal method might be used.

What is the impact of using low-flow toilets, showers, and wash basins? Is storm-sewer water overloading the treatment system? If groundwater sheet flow is a problem, is an up-slope groundwater interceptor drain a solution? If there is a significant industrial discharger to the treatment system, can this discharger implement water-conservation practices?

If the no-discharge existing treatment system is overloaded, can the discharge be limited to just that fraction that will allow the existing treatment system to operate properly? If the existing no-discharge system can treat 0.100 mgd, but the flow is 0.150 mgd, can the discharge to the ORVW be limited to just the system's 0.050 mgd overload? If so, could just the overload be dealt with by one of the other six alternatives?

If any option involving downsizing seems prudent, calculate the initial cost, annual cost, and life cycle cost.

For this exercise, cost comparisons are less complicated, if loan interest rates are not used; however, some planners prefer to use interest rates. If you chose to use an interest rate, include the annual loan repayments, length of the loan, and any down payment. State the interest rate used. *This pertains to all of the alternatives.*

This item has some overlap with Alternative 7.

What are the positive and negative environmental impacts of this alternative? (This examination of the positive and negative impacts pertains to all of the alternatives.)

Alternative 6: Trading reserve capacity with an existing permitted wastewater treatment system discharging to the same ORVW.

This could include trades between point and nonpoint pollutant sources. This alternative ties into Alternatives 1 and 2.

Contact at least the nearest dischargers to the same ORVW, and ask whether they will sell you any of their permitted effluent mass loading. If they will not, try to get letters stating so and put copies of these letters into the "prudent and feasible" analysis. This provides documentation. If they agree, what are the terms of this agreement?

In the context of a prudent-and-feasible-alternatives examination, the most likely type of usable nonpoint source trades will be agricultural. On the basis of pollutant mass loading, agricultural nonpoint sources are hard to quantify in terms of the mass of pollutants discharged per year. Such trades may be subject to higher ratios of mass units of nonpoint source pollutant to mass units of point source pollutant, rather than a one-to-one ratio. More information about setting up pollutant trading agreements is available on the MPCA Web site at:
http://www.pca.state.mn.us/water/wqtrading/index.html

If a nonpoint source control solution is possible, calculate the initial cost, annual cost, and life cycle cost.

For this exercise, cost comparisons are less complicated if loan interest rates are not used; however, some planners prefer to use interest rates. If you chose to use an interest rate, include the annual loan repayments, length of the loan, and any down payment. State the interest rate used. (This pertains to all of the alternatives.)

What are the positive and negative environmental impacts of this alternative? (This examination of the positive and negative impacts pertains to all of the alternatives).

Alternative 7: Upgrading the existing wastewater treatment system so that it does not exceed its discharge permit's current mass loading rates.

This applies even if the existing system is a land application or individual sewage-treatment systems.

Why did the existing system fail — poor design, bad operation and maintenance, high groundwater table, under sized on-site treatment systems, irrigated soils plugged with salt, etc.? Be specific.

Determining why the existing system failed is important. For example, if the failure was due to saturated soil, then adding a surface or groundwater-interceptor drainage system may correct the problem.

Determine the initial cost, annual cost, and life cycle cost. Cost comparisons are less complicated if loan interest rates are not used; however, some planners still prefer to use interest rates. If you chose this approach, include the annual loan repayments, length of the loan, and any down payment. State the interest rate used.

What are the positive and negative environmental impacts of this alternative? (This examination of the positive and negative impacts pertains to all of the alternatives.)

If the ORVW water is Lake Superior, additional restrictions may apply, such as those of the Binational Program to Restore and Protect the Lake Superior Basin and the "Great Lakes Initiative". Contact the Wastewater Effluent Limits unit at 651-296-6300 or 800-657-3864 for more information.

These seven alternatives are not the only alternatives — only the most common. You should explore additional alternatives. The best site-specific alternative may be a combination of several alternatives or an alternative not discussed above.

Information the discharger should provide for a nondegradation-to-all-waters review

Submit information that demonstrates how and why the public benefits of the project exceed the public costs associated with the project's anticipated environmental degradation. Such demonstrations should include a description of the jobs, taxes, recreational opportunities, and other impacts that are realized as a result of the proposed project, and how these benefits are related to the expected adverse impact on the environment.

Costs of additional treatment beyond the bare minimum

Since nondegradation is a use-protection concept rather than a numerical-protection (published numerical water quality standards) concept, the discharger has to evaluate the incremental costs associated with providing additional control measures beyond just meeting the minimum treatment requirements. The discussion of additional control measures should include, but not be limited to, preliminary estimates of the annualized incremental capital and the operations-and-maintenance cost needed to at least limit the discharge of pollutants ($CBOD_5$, TSS, NH_3-N, phosphorus, etc.) to existing permitted mass loads (for an expanding discharge) or:

1. provide $CBOD_5$ removal to 15, 10 and 5 mg/L (for a new discharge)
2. provide phosphorus removal to an effluent limit of 1.0 and 0.3 mg/L (applicable to both proposed and expanding discharges, where phosphorus limits are not currently required)
3. provide other potential control measures for conventional and/or toxic pollutants as may be requested by the MPCA

Cost comparisons are less complicated if loan interest rates are not used; however, some planners still prefer to use interest rates. If you chose this approach, include the annual loan repayments, length of the loan, and any down payment. State the interest rate used.

Economic and social development impacts and the cost of additional treatment

When deciding whether it is reasonable to apply the "additional-control-measures" part of Minn. R. 7050.0185, subp. 4, the rule requires the Agency to consider the project's economic and social development impacts (to society), the receiving water's characteristics, the effluent's cumulative impact, and the cost of treatment beyond what would be required of a nonsignificant discharge. Other unspecified, but related matters can also be considered.

Usually the MPCA is in a better position than the discharger to determine the project's impact on the receiving water's quality and the discharge's cumulative impact on the receiving water. The MPCA already considers these items when determining effluent limitations. The MPCA deals with these aspects.

The discharger is expected to provide information on the economic and social development impacts and the cost of additional treatment. The nondegradation rule defines "economic and social development" as the jobs, taxes, recreational opportunities, and other impacts on the public at large that will result from a new or expanded discharge. The discharger is in a better position to have this information than the MPCA.

Information should be provided according to the following guidelines.

I. Economic and social development impacts
   A. Jobs
      1. How many local and regional jobs will this project create?
         a. How many construction jobs will be created during the project's construction, and how long will they last?
         b. How many permanent jobs will be created by this project?
      2. How many local and regional jobs will be lost due to this project?
   B. Taxes
      1. Will this project directly or indirectly benefit the local tax and fee base? If this is a

municipal wastewater treatment expansion, how will the municipal growth resulting from this project benefit the local tax and fee base? If this project is a benefit, how much will the city benefit over the life of the project?

2. What is the estimated life of this project before it is either replaced or a major expansion is needed?
3. How much money will have to be raised by local taxes and fees to build and operate this project over its life time?

C. Recreational opportunities

1. Will the project improve local recreational opportunities? If it does, then describe them (*e.g.*, fishing, boating, camping, improving, or building public parks).

D. Other impacts

1. Are there other costs or benefits that the public will incur from this project (e.g., correction of an existing environmental or public health problem)? If there are, discuss them.

II. Estimated cost of additional treatment beyond what is required of nonsignificant dischargers (See the "Costs of additional treatment beyond the bare minimum" section above for more details.)

A. What are the incremental life cycle costs for providing additional treatment beyond the minimum treatment requirements?

B. What is the life cycle cost of the project and alternatives that either provide better treatment or use treatment practices that reduce the impacts on the receiving water? This includes, but is not limited to:

1. The proposed project (This is the baseline value.).
2. The project with phosphorus reduction.
3. Land application (*i.e.*, no discharge to surface waters).
4. Service area pollution prevention measures (e.g., reducing infiltration and inflow, water conservation, water reuse, etc.).
5. Other

III. Additional related matters can be added and discussed.

References on economic and social impact information

These references are grouped roughly by usefulness; most useful are listed first. This list is not complete.

- County economic development officer (most counties have such a position)
- Metropolitan Council for projects in or near the Twin Cities metro area
- The economics and/or geography departments of a local college or university
- County agricultural extension agent (some agents serve more than county) — *County Profile* book (reported to be very useful)
- Local chamber of commerce
- Local bankers
- Local library — *County Business Patterns* book by the Minnesota Planning Office of Strategic & Long Range Planning *County and City Data* book
- The latest January issue of the Minnesota business magazine *Corporate Report* has information on people engaged in economic development (612-338-4288). The mailing address is: Corporate Report, Soo Line Building, Suite 100, 105 South 5th Street, Minneapolis, Minnesota 55402
- Minnesota Department of Trade & Economic Development, Office of Regional Initiatives, St. Paul — *Community Profiles* book (651-297-1291 or 800-657-3858)
- Minnesota Planning Office of Strategic & Long Range Planning, State Demographer, St. Paul — this source has information on county, township, and city population projections (651-296-4100)
- Minnesota Department of Revenue, Research Group (612-296-3396), St. Paul — sales tax records *Annual Sales Tax Statistics* — counties and most cities with a population of over 5,000 — the listings are by Standard Industrial Classification (SIC) code. Also, *Historical Retail Sales* has information on communities with populations under 5,000.