Antidegradation Analysis Guidelines

State of Georgia
Environmental Protection Division

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This document supercedes the 1997 State of Georgia Antidegradation Procedures and the applicable portions of the 1999 Domestic Wastewater Systems Planning Guidelines.

1.0 OVERVIEW

The goal of the State of Georgia is to enhance, protect, and maintain water quality in Georgia. Implementation of antidegradation procedures serves to promote this goal. These antidegradation procedures provide guidance in implementing the State antidegradation policy found in Chapter 391-3-6-.03(2)(b) of the Georgia Rules and Regulations for Water Quality Control (Rules). The federal regulations (40 CFR 131.12) require state water quality standards programs to address 3 levels or "tiers" of antidegradation protection. The Georgia antidegradation review process provides protection for all waters of the State as "Outstanding National Resource Waters" (Tier 3) or "high quality waters" (Tier 2). In Georgia, the Tier 1 level of protection is bypassed for the more protective Tier 2 provisions; although, at a minimum, existing uses and the level of water quality necessary to protect those uses shall be maintained and protected (Tier 1 provision). All Georgia waters are considered to be at minimum "high quality waters" and are afforded the associated level of protection. Waters designated as wild rivers, scenic rivers, primary trout streams, and waters generally supporting shellfish receive special protection under the high quality provisions.

2.0 ANTIDEGRADATION ANALYSIS FOR WASTEWATER POINT SOURCES

The antidegradation review process is triggered when a new or expanded point source which will degrade or lower water quality is proposed for discharge to surface waters. A new discharge is a discharge of pollutants from a point source to a surface water of the state for which there has never been a finally effective NPDES wastewater discharge permit. An expanded discharge is one which has a finally effective NPDES wastewater discharge permit and for which an increase in loading has occurred. For the purposes of this guidance, an increase in loading is:

- An increase in a permitted pollutant loading
- A discharge of a pollutant not currently discharged
- An increase in the mass of a pollutant discharged that triggers the need for a new effluent limitation

Additionally, the Director has the discretion to require an antidegradation analysis for other discharges of pollutants. Antidegradation analyses for a group of discharges may be addressed in the development of Total Maximum Daily Loads.

Applicants requesting such new or expanded wastewater point source discharges into any surface water must perform an antidegradation analysis to demonstrate that the discharge is necessary to accommodate important social or economic development. The antidegradation analysis consists of two basic steps. First, an applicant must demonstrate that the discharge is necessary to accommodate important social or economic development. Second, an applicant must demonstrate that no reasonable alternatives exist that would provide the needed wastewater capacity without authorizing a new or expanded wastewater discharge into surface waters.

3.0 APPLICABILITY

An antidegradation analysis is only required for proposed new or expanded (increase in loading) wastewater discharges to surface waters. An antidegradation analysis is not required for the following:

- Land Application Systems (LAS)
- Urban Water Reuse
- Industrial Pretreatment
- Discharge to other treatment systems
- 100% recycle systems

- A flow expansion of a wastewater treatment facility if the mass discharge of the pollutants is equal to or less than the mass discharge of pollutants allowed in the permit for the existing facility.

The following discharges to surface waters are prohibited:

- New or expanded discharges from Private and Institutional Development Systems (PIDs), unless a cold weather surface water discharge from a reuse system is being considered
- Point source discharges from animal feeding operations (CAFOs and AFOs)
- New or expanded point source discharges from individual residences

4.0 ANTIDEGRADATION ANALYSIS DOCUMENT CONTENTS

A wastewater antidegradation analysis must include demonstrations to show that important social or economic development will be accommodated and that no reasonable alternatives exist, plus the following basic information:

- Facility Name
- NPDES Permit Number (for a proposed expansion)
- Location (Lat and Long)
- Location Map
- County
- Receiving Water Name (tributary and basin)
- Stream Classification (listed in Chapter 391-3-6-.03 of the Rules)

5.0 DOMESTIC WASTEWATER

5.1 Important Social or Economic Development Evaluation/Population and Flow Projections

(a) Regional Water Plan Projections

If a wastewater point source discharge is specifically identified in an applicable Regional Water Plan (i.e., developed by a Regional Water Planning Council or Metropolitan North Georgia Water Planning District), absent sufficient evidence to the contrary, it will be presumed necessary to accommodate important social and economic development due to the extensive multi-jurisdictional planning and review process, including public participation, required before approval of these plans. If the proposed flow and location are not specifically addressed and supported by an applicable plan, the following should be submitted:

(b) Population Projections

Typically a twenty-year planning period is used to size a domestic wastewater treatment plant. The applicant for a new or expanding domestic wastewater treatment plant shall determine the population to be served within the service area using a 20-year planning period. If 20-year population projections for the project area are not available, a linear extrapolation of population trends from the past decade should be used. Any deviation from a linear projection method must be clearly justified. Support must be provided for the proposed population projection.

(c) Flow Projections

Justification of flow using population projections, as well as a demonstration of need, shall be provided. Flow projections shall represent the projected average flows since the permit flow is based on the monthly average.

Current Flow (for proposed expansions) - Current flows including residential,

commercial, industrial, and non-excessive infiltration/inflow (I/I) based on actual flow data or water billing records must be provided. If the existing I/I is excessive, rehabilitation shall be addressed prior to any request for flow expansion. (Excessive I/I is considered to be a rate for domestic wastewater plus infiltration exceeding 120 gpd/capita during high groundwater or a total flow rate exceeding 275 gpcd during storm events. 40 CFR 35.2120)

Future Residential Flow - 20-year residential flows based on projected growth must be provided.

Future Commercial Flow - 20-year commercial flows based on projected growth must be provided.

Future Industrial Flow - Flow for future industrial contributions must be provided. A reasonable allowance for undocumented industrial expansions may be included if the basis is clearly justified and current land-use plans and local zoning include it.

Future Non-excessive I/I - A nominal allowance for non-excessive I/I for new sewer lines may be considered if the basis is clearly justified.

The population and flow projections with supporting documentation must be submitted for EPD review and concurrence.

5.2 Wasteload Allocation Process

After EPD has concurred with the projections, the applicant may then request a wasteload allocation evaluation. The request shall include the flow(s), GPS coordinates of the proposed discharge location(s), and a map showing the proposed discharge location(s). If the project is to be phased, up to three flows may be requested.

However, the highest flow cannot exceed the flow projection. If several discharge locations are under consideration, the request may include multiple locations, not to exceed three. If EPD determines that sufficient assimilative capacity is available, the wasteload allocation for the proposed project will be generated and a letter will be sent to the applicant.

Wasteload allocations and permit application reviews are not part of the antidegradation review process. They can be expected to yield conservative results and may result in the establishment of permit limits that can only be met through the use of enhanced treatment technologies.

After receipt of a wasteload allocation, the applicant should use the wasteload information to assist in comparing discharge and no discharge alternatives.

5.3 Reasonable Alternatives Analysis

(a) Technological Feasibility

The following alternatives must be evaluated before a new or expanded (increase in loading as defined above) discharge can be authorized. The purpose of this demonstration is to identify reasonable alternatives that could be used to accommodate important social or economic development without authorizing a new or expanded discharge. The projected flow shall be used in the evaluation. Additional alternatives may also be considered.

(I) Implementation of water conservation measures to reduce the flow of domestic wastewater. This applies only to utilities, municipalities, or other entities that have responsibility for both wastewater and water supply.

Documentation on the per capita quantities for water and wastewater for existing systems must be provided.

(II) Implementation of infiltration/inflow reduction measures for expansions of domestic wastewater facilities.

(III) Reuse of reclaimed water. Potential reuse customer(s) and what quantity of reuse water each could use must be described.

(IV) Reuse/recycling of waste by-products, or production materials and fluids. This is not applicable for domestic wastewater discharges.

(V) Use of a land application system. Land application includes subsurface, drip irrigation, and spray irrigation systems. An estimate of the best case hydraulic loading rate based on County Soil Surveys or from a soil evaluation performed by a soil scientist must be provided. Calculations showing the hydraulic loading rate and the total area of land needed for the land disposal system, including buffers, must also be provided. The availability and cost of land and the cost of transporting the wastewater to a suitable, available site must be included.

(VI) Discharge to other treatment systems. Existing sewer lines within a five-mile radius must be identified. A preliminary indication of flow acceptance from the existing system must be provided. If the existing system will not agree to accept the wastewater, include a letter documenting this. If the existing system will accept the wastewater, determine the transportation cost (including any tap-on fees) to connect.

(VII) Use of best management practices that would reduce or eliminate the need for a new or expanded discharge. This is not applicable for domestic wastewater discharges.

For items above found not to be technologically feasible, supporting documentation must be provided.

(b) Return flow considerations

Wastewater treatment practices can affect the flow regimes of streams, and should be consistent with the protection of natural systems. For example, the use of land application systems can affect the quantities and timing of returns to surface waters. Some portion of the water treated in land application systems is not returned to surface waters in a time frame that allows users of that water source, and users of hydrologically connected adjoining waters sources, to make reasonable use of the returned water. For practical purposes, the short-term lag in returns contributes to the cumulative consumptive use in the sub-basin or watershed.

The Georgia Comprehensive State-Wide Management Plan requires EPD to consider the extent to which wastewater discharges will influence the location, amounts, and timing of waters returning to streams or other waters, and the implications these considerations may have on the continued sustainable use and physical, chemical, and biological integrity of the affected waters.

Therefore, if the permit applicant can demonstrate that water quantity in the receiving water is limited to the degree that the water quantity benefits of allowing a surface water discharge outweigh the effects of lower water quality resulting from the discharge (provided that the level of water quality necessary to protect the existing uses will be maintained and protected), the analysis of alternatives described above in 5.3(a) is limited to Items I (water conservation), II (infiltration/inflow) and IV (recycling or reuse of waste byproducts, or production materials and fluids). This demonstration might

include, but is not limited to, references to surface water flow needs identified in an applicable Regional Water Plan, applicable recommendations for water management (for example, restoration opportunities identified in “Running Dry”, a report by American Rivers and the Flint Riverkeeper), or the need to support aquatic life and drinking water supplies.

5.4 Economic Feasibility Analysis

To provide valid cost comparisons among all technologically feasible wastewater alternatives identified above and the proposed discharge project, a 20-year Present Worth analysis must be performed. A preliminary design level effort is considered sufficient for comparing feasible options and their associated costs**.** For the cost comparison, all future expenditures should be converted to a present worth cost at the beginning of the 20-year planning period.

The analysis should include all monetary costs associated with construction, startup, and annual operation and maintenance of a facility. All unit cost information must be provided, and costs must be supported (e.g., vendor quotes, realtor land quotes, past bids, Means Construction Index, etc.) and submitted. For each treatment alternative identified as technologically feasible and the proposed discharge project, costs should include, but not be limited to, the following:

Capital Costs

- Land acquisition
- Equipment
- Construction
- Design

Recurring Costs

- Operation and maintenance
- Equipment replacement

- Laboratory for permit compliance and process control
- Operator and support staff
- Sludge disposal
- Utilities

Present Worth Calculation

The following standard formula for computing the present worth must be used in all cost estimates made under this evaluation:

$$PV = C_o + C\left[\frac{(1+r)^n - 1}{r(1+r)^n}\right]$$

Where:

PV = Present value of costs
C_o = Costs incurred in the present year = Capital costs
C = Costs incurred annually = Recurring costs
n = Life of the facility = Typically 20 years
r = interest rate dependent on the type of debt instrument to be used

The results of the present worth analysis shall be used in evaluating the cost of each alternative in relation to its benefits.

The results of the reasonable alternatives analysis, consideration of return flows, and economic feasibility analysis shall be submitted for EPD's review and concurrence.

Note that these domestic guidelines replace Attachment 1 of the *Planning for Domestic Wastewater Systems* (2/24/99) document.

6.0 INDUSTRIAL WASTEWATER

The above methodology for domestic wastewater should be followed for an industrial wastewater project with the following modifications:

6.1 Discharge to Publicly Owned Treatment Works

EPD works with the Georgia Department of Economic Development to encourage new industries to locate in communities where adequate capacity is available in the publicly

owned sewer system. Therefore, industries are encouraged to thoroughly explore this option prior to requesting a discharge.

6.2 Important Social or Economic Development Evaluation

To assess the socioeconomic importance of a proposed discharge for the affected community, each of the following should be evaluated and any supporting documentation should be provided:

(a) Affected Community

The boundaries of the region of the affected community, including all cities, towns, counties and the associated populations must be provided. The region must include the proposed receiving water.

(b) Employment Projections

Current unemployment rates in the affected community must be compared to current state and national unemployment rates. A discussion of how the proposed project will positively or negatively impact those rates, including quantifying the number of jobs created /maintained and the quality of those jobs must be included.

(c) Household Incomes

Current median household income levels must be compared with projected median household income levels. A discussion explaining how the proposed project will positively or negatively impact the median household income in the affected community, including the number of households expected to be impacted, must be included.

(d) Tax Revenues

Current tax revenues of the affected community must be compared with the projected increase in tax revenues generated by the proposed project. The positive and negative social and economic impacts on the affected community by the projected increase must be discussed.

(e) Environmental and Public Health

The proposed project's positive or negative impact on existing environmental or public health issues in the affected community must be discussed.

(f) Other Socioeconomic Benefits

A discussion of any other socioeconomic benefits predicted to result from the project must be included. Where possible, these benefits should be justified with supporting documentation.

6.3 Wasteload Allocation Process

If the new or expanded discharge will have wastewater characteristics that include oxygen demanding constituents, a wasteload allocation must be requested as described in section 5.2.

6.4 Reasonable Alternatives Analysis

(a) Technological Feasibility

The six alternative elements listed in section 5.3 shall be evaluated with the following modifications:

(I) Implementation of water conservation opportunities and pollution prevention measures. The potential water conservation and pollution prevention measures evaluated, including the feasibilities of

implementation and the financial costs, must be discussed. Measures to be addressed include, but are not limited to, changes in processes, source reductions or substitution with less toxic substances. Indicate which measures and opportunities are to be implemented.

(II) Infiltration/inflow reduction measures are not applicable.

(III) Reuse/recycling of reclaimed water. Potential recycle or reuse opportunities must be evaluated including the feasibilities of implementation and the financial costs, and the opportunities that can be implemented must be indicated.

(IV) Reuse/recycling of waste by-products, or production materials and fluids. Potential recycle or reuse opportunities must be evaluated, including the feasibilities of implementation and the financial costs. Indicate which of the opportunities can be implemented.

(V) Use of land application systems. Additional consideration should be given to the wastewater characteristics and whether the constituents are conducive to land application. Acreage requirements may be driven by either hydraulics or agronomics.

(VI) Opportunities for industrial co-location should be explored including the feasibilities of implementation and the financial costs. Co-location may provide opportunities for discharge to existing industrial wastewater treatment systems, or source water substitution.

(VII) Best Management Practices (BMPs). The consideration and implementation of BMPs that will assist in minimizing or eliminating the effects of lowering water quality from the proposed activity must

be discussed. BMPs should include site-specific considerations, as well as accepted industry-wide practices.

(b) Quantity Demonstration

If the permit applicant can demonstrate that water quantity in the receiving basin is limited to the degree that the water quantity benefits of allowing a surface water discharge outweigh the effects of lowering water quality as a result of the discharge, provided that the level of water quality necessary to protect the existing uses will be maintained and protected, then the analysis of alternatives described above is limited to Items I (water conservation / pollution prevention), IV (reuse / recycling of waste by-products and production material and fluids), and VII (best management practices).

7.0 NONPOINT SOURCES

EPD provides a framework for identifying, assessing, and controlling nonpoint sources to protect and restore the quality of Georgia waters. The framework addresses nonpoint source discharges from urban, agricultural, forestry, stormwater, erosion/sedimentation, and surface mining sources. EPD's nonpoint source program is implemented through a combination of regulatory and nonregulatory mechanisms, in cooperation with numerous Federal, State, and Local government agencies, universities, environmental groups and individual citizens. The regulatory mechanisms address surface mining, erosion and sedimentation, 401 water quality certifications, and stormwater. The nonregulatory mechanisms include floodplain management and implementation of best management practices, in cooperation with local governments, agricultural and silvicultural agencies. In addition, EPD supports nonpoint source education. EPD does not issue permits for nonpoint source discharges into Tier 2 waters.