Proposed Mercury Post-TMDL Permitting Strategy (September 12, 2012)

The mercury TMDL establishes an estimated aggregate load assigned to point source discharges to surface waters. The combined mass of mercury from all the point source dischargers with assigned NPDES limits cannot exceed this allocated aggregate load. This permitting strategy is designed to maintain mercury loadings from point sources below the wasteload allocation to surface waters as well as prevent localized areas of mercury excursions above the state water quality standard which is currently 12 nanograms per liter (ng/L).

Point source dischargers are considered less significant than nonpoint sources because cumulative baseline loading indicated point sources are only responsible for 2% of overall mercury loading to surface waters. Point sources have already achieved significant reductions over the last several years. This permitting strategy complements the TMDL to ensure those reductions are retained.

Monitoring for Mercury

Mercury is monitored using a grab sample and analyzed using EPA Method 1631, which can detect mercury concentrations as low as 0.5 ng/L. Ultraclean sampling methods specified in EPA Method 1669 do not necessarily need to be used for final outfall measurements. Analysis of samples from internal outfall with expected high mercury concentrations can continue to use EPA Method 245.

Calculation of Mercury Effluent Limits

In general, the decision as to whether a NPDES permit should contain a particular effluent limit or monitoring is made by reviewing data for the reasonable potential of a constituent to exceed water quality standards, taking into account stream dilution. Limits in NPDES permits are typically set in one of two ways: Water Quality Based Effluent Limits (WQBELs) or Technology Based Effluent Limits (TBELs). WQBELS are calculated by dividing the water quality standard by the Instream Waste Concentration (IWC) of the discharge determined by the low flow of the river (example at the end of this strategy). TBELs are developed based on pollutant removal technology.

Since the TMDL will establish an aggregate mass loading for mercury for distribution in waters throughout the state, TBELs will be more appropriately used to achieve desired reductions. The TBEL Level Currently Achieved (LCA) was determined by evaluating North Carolina discharger mercury monitoring data from the last five years in order to establish a level that is currently achieved by wastewater treatment facilities in North Carolina. The evaluation indicated that 98.5 percent of effluent data was below 47ng/L and that 93 % of facilities with mercury monitoring or limits could regularly comply with this limit without the addition of new treatment technology. This is consistent with approaches taken by other states implementing mercury TMDLs.

Evaluation for Mercury limits

The permit writer will calculate a facility's effluent annual average mercury concentration from each of the last five years of monitoring. If all the averages are less than the current water quality standard of 12 ng/L, taking into account the upstream mercury concentration, and no single daily value is greater than the Level Currently Achieved (LCA) of 47ng/L, the permit would contain only a monitoring requirement.

Specific Permit Considerations

A. Existing Municipal Facilities

1. Major facilities currently without a limit

- Monitor for mercury in conjunction with their priority pollutant analysis.
- Develop a Mercury Minimization Plan (MMP) that would identify contributors and goals for reduction. (If facility has consistent detectable mercury concentrations in effluent.) DWQ will work with municipalities to develop a standard MMP that is appropriate in scope.

2. Major facilities currently with an Hg limit

- Monitor quarterly.
- Develop a MMP that would identify contributors and goals for reduction.
- Maintain current water quality based limit determined by the instream waste concentration as described above if it is less than or equal to the LCA. Otherwise, the limit will be the technology-based LCA. Limit will be established as an annual average concentration.

3. Major facilities receiving a new limit

- Permits for facilities receiving a limit for the first time will have a phased approach allowing for development and submission of MMPs for the first four years of the five-year permit.
- In the fifth year of the permit, will be assigned a water quality based limit determined by the instream waste concentration if less than or equal to the LCA. Otherwise, the limit will be the technology-based LCA.

4. New or expanding municipal facilities

- Develop a MMP that would identify contributors and goals for reduction. (If facility has consistent detectable mercury concentrations in effluent.) DWQ will work with municipalities to develop a standard MMP that is appropriate in scope.
- If there is reasonable potential for mercury in the discharge to cause or contribute to exceedances of the water column water quality standard for mercury, they will be assigned a water quality based limit determined by the instream waste concentration if less than or equal to the LCA. Otherwise, the limit will be the technology-based LCA.
- New sources will be allowed as long as the overall aggregate point source load for the state is not exceeded.

5. Minor municipal facilities

- Monitor once per five years.
- Will not be assigned a limit unless monitoring data indicates a need.

B. Industrial facilities

The need for Industrial facilities' mercury limits and monitoring will be based on the presence of mercury in the effluent as indicated in the permit application or previous monitoring. Certain categories of industry may have federal categorical limits and monitoring frequencies established that, if more stringent, would supersede this strategy.

1. Industry with an existing Hg limit

- Monitor quarterly.
- Develop a MMP that would identify contributors and goals for reduction.
- Maintain current water quality based limit determined by the instream waste concentration as described above if it is less than or equal to the LCA. Otherwise, the limit will be the technology-based LCA. Limit will be established as an annual average concentration.

2. New industries or industries receiving a new limit

- Permits for facilities receiving a limit for the first time will have a phased approach allowing for development and submission of MMPs for up to the first four years of the five-year permit.
- In the fifth year of the permit, will be assigned a water quality based limit determined by the instream waste concentration if less than or equal to the LCA. Otherwise, the limit will be the technology-based LCA.

C. Special Situations

- Case-by-case permit limit decisions will be made for dischargers into specific stream segments with ambient sampling values above the water quality standard of 12 ng/L, to assess whether the point source discharger is a significant contributor to the instream mercury load.
- Permit limits above the LCA may be assigned in cases where the Division of Water Quality determines that achievement of the LCA is technically infeasible or economically unreasonable. Site-specific information, such as fish tissue and water column data, will be considered in assigning limits. The statewide aggregate wasteload in the approved TMDL shall not be exceeded.

WQBEL Example

(Assumes upstream concentration in receiving water = 0.)

- 1 million gallon per day (MGD) facility effluent flow
- 1 cubic foot per second low flow of stream = 0.646 MGD
- 1+0.646=1.646 MGD total downstream flow. (1 MGD/1.646 MGD)*100= instream waste concentration (IWC) of 61%
- The water quality standard for mercury is 12 ng/L
- Divide the standard by the IWC and multiply by 100% to get the effluent limit
- (12 ng/L/61%) * 100% = 19.7 ng/L permit limit