Point Source Workgroup
Issues and Recommendation Paper

Implementation Issues

Definition of load allocations:

Background: It is the current understanding of the workgroup that the load allocations defined by the Chesapeake Bay Program were done based on model runs that looked at the sensitivity of the Chesapeake Bay to the impact from each tributary. The workgroup also understands that the model runs also showed that the contribution from Pennsylvania has a significant impact on the Bay itself and not just the non-tidal, fresh water portions of the Bay. A representative from EPA Region 3 provided an overview of how the allocations were determined and also identified the critical uses and protection areas used in this process. EPA also informed the group as to why there are reductions required for both nutrients based on the nutrient limitation shifting between nitrogen and phosphorus. These limitations are linked to dissolved oxygen criteria in various segments of the Chesapeake Bay. EPA developed the allocations for each state using the following principles:

1. Each designated use in the Bay and it's associated criteria would be evaluated, and a determination would be made to identify the critical segments (most difficult to bring into attainment).
2. A variance to water quality standards was sought by MD and VA, and was approved by EPA. The allowable loads that were determined and agreed to for each major basin were based on the variance.
3. The criteria being applied for all bay segments were based on achieving the designated use of that segment, not returning the waterbody to pristine conditions.

The load allocations presented in the Tributary Strategy and recently revised for Pennsylvania are as follows:

1. The total Nitrogen load is 109.2 million pounds of nitrogen and 3.58 million pounds of phosphorus. The total reduction needed from Pennsylvania is 37.3 million pounds of nitrogen and 1.11 million pounds of phosphorus.
2. The original estimate of the contribution from point sources was 11% of the nitrogen load and 18% of the phosphorus load. This was increased to 14% of the nitrogen load and 22% of the phosphorus load. These numbers are based on the loadings from all significant wastewater treatment systems and industrial systems in the Chesapeake Bay drainage basin. The number of systems was increased from 142 systems to 206 systems, 176 of which are municipal wastewater treatment systems.
3. Based on the 14% nitrogen and 22% phosphorus load contribution the target cap load for point sources is 10.2 million pounds per year for

nitrogen and 2.47 million pounds per year for phosphorus. This translates into a total reduction requirement from point sources of 5.2 million pounds of nitrogen and 250,000 pounds of phosphorus per year.

Issue 1: Are these numbers going to change? If so, how will Pennsylvania react to these changes?

Answer: According to EPA, the numbers could change. How Pennsylvania reacts will depend on if, or how, the numbers change.

Issue 2: What is the impact of the 2007 (2009) Model Runs?

Recommendation: EPA Region 3's representative provided some insight into this process. Depending on the outcome of the refined analyses resulting from these model runs, there may be a need to revisit the process that produced the current allocations to insure the WQ standards that was adopted by MD and VA are met in Pennsylvania. With 15 years of modeling experience, EPA feels the numbers are close. The runs in 2007 will be done as a result in further segmenting of the watershed and a more detailed analysis of sediment loadings.

Issue 3: How sensitive is the Chesapeake Bay model to the impact of revised cap loads from various contributors in Pennsylvania?

EPA Answer: The individual source or a load allocation to a specific entity does not drive results in the model. It is the total load, regardless of the source, that is important.

<u>Calculation of limits and allocation of loads:</u>

Issue 1: The proposed allocation strategy defines an 8 mg nitrogen limit and 1 mg phosphorus limit @ 2010 projected flows. There is concern over how the loads were defined and how the allocation methodology was derived.

Recommendation: The method for these determinations has been made clear. Most workgroup members would like to suggest using design flow instead of the 2010 flow. It was also suggested that there may be different levels of implementation based on cost, impact based on delivered load, and possibly other alternatives.

Issue 2: Current methods to meet the limits may or may not be the most cost-effective solution. In addition, the use of this methodology has some significant environmental and economic implications. Consideration needs to be given to what the desired end result is contrasted against the high costs to achieve the

load reductions assigned to point sources. Further consideration is needed to account for contributions from on-lot systems and stormwater.

> *Recommendation:* Due to preliminary results generated by the workgroup, it appears that earlier cost estimates generated by the Department are low. A more rigorous cost analysis is justified.

Issue 3: The use of the estimated 2010 flows to allocate loadings has some significant impacts. (That is, in many cases, it can result in immediate restrictions on accepting flows from new land development. In other cases, the actual determinations of the 2010 flow have been contentious.) Some possible alternatives include allocations based on:

1. Site-specific conditions by sub-basin.
2. Consideration of delivery ratios.
3. Concentration limits with the ability to buy credits to go lower.
4. The need for reserve capacity.
5. The need to re-evaluate the "zero" increase policy for new plants.
6. Implementation of the most cost-effective practices for nutrient reduction and the ability to pay for non-point source reductions by point sources through a viable Nutrient Trading Program. (Cost/lb/system)
7. Discussion on need, implementation and impact of point-to-point in relationship to point-to-nonpoint source trading.
8. Considerations for wastewater systems with multiple plants and permits.
9. Buy credits through participation in Virginia's program.

<u>Nutrient Reduction Implementation Needs</u>

Issue 1: Retrofitting with the most effective nutrient reduction technologies may require a reduction in plant capacity, depending on the design. This will have an impact on existing user rates and the ability of a treatment plant to attract new business and customers to the community due to higher rates. Wet weather conditions will also have more of an impact due to reduced capacity.

Issue 2: In the current wasteload management regulations, nutrient loading is not captured as an element of capacity. The only thing defined in the regulations is organic loading capacity and hydraulic capacity.

> *Recommendation:* A definition for nutrient loading and management process needs to be included in Chapter 94 and the Part 2 permit. In addition, the definitions developed as part of this implementation plan also need to be included.

<u>Timeframe for Implementation</u>

Point Source Workgroup
Issues and Recommendation Paper

Issue 1: The proposed schedule requires system upgrades to be completed within three years. Looking at the type of upgrades needed, it is estimated that less than half of the systems can complete the process within three years. The consensus of the workgroup was that three years was too short a time frame. In reality, five years is cutting it close to complete the necessary feasibility studies, Act 537 planning, permitting, bidding, actual design and construction, land acquisition and pilot testing.

> *DEP Answer*. The current position is that section 92.8a requires that the permittee must determine if they can comply with the requirements in their permit; and, if not, provide a schedule to DEP documenting the time frame needed to comply. These schedules are not limited to 3 years. However, DEP may establish an ultimate compliance date. After that date, all facilities that are not in compliance would be required to seek an order from a court of competent jurisdiction to extend their schedule.

Issue 2: DEP proposed linking the requirements of Section 92.8a with Section 92.55 of the regulations to develop schedules for compliance with the new cap loads. Concern was expressed that these two sections are separate, and do not relate to one another. DEP agreed to have Counsel review this issue and provide a recommendation at the next work group meeting.

> *DEP Answer:* DEP Counsel has reviewed the issue, and agrees that linking these two regulatory sections may not be appropriate. DEP plans to modify its permitting procedure to reflect this.

Issue 3: It is recognized that as part of the Chesapeake Bay Agreement, and the Tributary Strategy approved by the US Environmental Protection Agency; Pennsylvania will be required to show compliance by 2010. Given that a majority of the treatment systems won't be able to complete the necessary upgrades in time, criteria for determining compliance and "good faith" effort are needed. Further definition of the level of acceptable compliance is needed.

> *Recommendation 1:* When defining an implementation schedule, consideration for the number of contractors available, the ability of manufacturers to provide equipment and materials and the costs for materials is essential. In addition, some communities under contract for sewer service may decide to split off and build their own wastewater treatment system resulting in loss of anticipated future funding and additional shortages of contractors and materials.
>
> *Recommendation 2:* The background and learning curve of certified operators will have an impact on the effectiveness for treatment systems to achieve compliance quickly. Sophisticated computer programs and

equipment may be necessary for plants to operate state-of-the-art nutrient removal processes. This will increase costs, require more operator education and impact the attraction and retention of new, computer-educated employees to the workforce. This also needs to be factored into any compliance schedule.

Cost Issues

Estimates of Actual Costs

Issue 1: Cost estimates range from a desktop estimate developed by the Department of Environmental Protection of $190 million, to $500 million (or more) from the Pennsylvania Municipal Authorities Association. Better cost projections are necessary to delineate actual spending on nutrient removal at wastewater treatment plants.

Recommendation: The $190 million cost figure is too low, even considering that it is a median value. A comprehensive analysis of what the actual costs may be would be time consuming to develop. There is a difference between the factors surrounding the DEP cost projections and the real cost estimates generated by a number of facilities. DEP's analysis was limited to compliance with the defined cap load by the year 2010. The real cost information provided by a number of facilities may also include the ability of the treatment facility to expand to its design flow and still stay under the cap load.

Issue 2: There are a number of factors to consider when estimating costs including the costs for construction of nutrient reduction technology infrastructure; the impact on capacity; the need for other infrastructure improvements due to the age of the system and the need to deal with combined sewer overflows and inflow and infiltration problems.

Recommendation: Any cost estimates need to include the costs for maintaining capacity.

Recommendation: To try and get an accurate read of the actual costs a survey of systems was conducted by workgroup members. The results of this survey were coupled with data from the grant applications for Innovative Technology Grants and Pennvest loans and grants to refine the estimates for the cost. More time is needed to obtain a representative sample of cost estimates from more of the significant discharges. However, preliminary results from the survey data collected indicate the costs for nutrient removal will average around $3 per pound. Based on funding applications, average cost is approximately $7 million per system.

However, it must be emphasized that costs are significantly impacted by site-specific conditions. Using these average costs to project actual total cost would be very misleading.

Issue 3. Cost comparisons are needed between the cost of infrastructure construction and the costs for buying credits. The willingness of point source systems to trade among themselves and to support efforts to implement non-point source practices needs to be accounted for in these estimates. The ultimate goal should be to utilize the available money where the most effective reductions can be achieved.

Issue 4: A complete economic impact analysis is needed that also considers the impact of customers leaving due to the increase in their rates, the potential for less economic development due to less capacity to account for increased loads from new industries and the potential for new development to install septic systems instead of connecting to the wastewater system due to increased rates.

Costs for Implementation:

Issue 1: The cost for construction of nutrient reduction technologies is costly and will vary by system. For example, the costs to modify an extended aeration system are minor; where plants using fixed film technologies or ponds and lagoons may need to construct a whole new treatment plant. The typical activated sludge system may have to do significant retrofitting and expansion.

Recommendation: Final cost estimates are site specific. Costs should not be treated in terms of an average project. These average project costs can not be used to develop a total cost estimate.

Issue 2: Cost savings in reduced chemical and energy costs can be realized through the optimization of treatment processes for nutrient reduction, especially at extended aeration systems. It may also be possible for similar savings at an activated sludge system, depending on the types of processes used. Through these optimization processes, it is possible to reduce the concentrations of nitrogen to 6 to 8 mg/l on an annual basis. Costs to achieve reductions below 6 mg/l on a consistent basis increase significantly.

.