APPENDIX A

Nutrient Trading Criteria Specific for the Chesapeake Bay Watershed

Purpose:

The purpose of Appendix A is to provide additional program specific information regarding the use and incorporation of nutrient trading in the Chesapeake Bay Watershed. This Appendix is based on the extensive stakeholder process conducted by the Department throughout 2006.

Background:

Most of the Chesapeake Bay and many of its tidal tributaries have been listed as impaired under Section 303(d) of the federal Clean Water Act. As part of a multi-state effort to restore the water quality of the Bay, Maryland enacted new regulations establishing water quality standards for nutrients and sediment. Under federal and state law, these changes trigger the need for nutrient reductions in Pennsylvania to comply with the new standards. These reductions need to come from both point sources (e.g., sewage treatment plants, industrial dischargers) and non-point sources (e.g., farms).

To quantify the nutrient reductions needs, EPA has established maximum nutrient and sediment loads ("cap loads") for each major watershed tributary to the Chesapeake Bay. This included allocation of cap loads for Total Nitrogen (TN) and Total Phosphorus (TP) in Pennsylvania for the Potomac and the Susquehanna watersheds. Pennsylvania's overall cap loads for TN and TP were further divided into cap loads for point and non-point sources. This effort was done in coordination with Pennsylvania and other participating states in the Bay watershed, to comply with the new Maryland water quality standards.

The Department has developed a plan to meet these requirements. First, the Department issued its Chesapeake Bay Tributary Strategy in July, 2004. This Strategy includes specific initiatives to address reductions from point sources and non-point sources. The Strategy does not prescribe mandatory requirements, but rather describes how the legal obligations can be met through a combination of actions, including changes to NPDES permits. The strategy describes the basis calculating the total allowable loading from PA to the Chesapeake Bay. Second, the Department conducted an extensive stakeholder process with sewage treatment plants in 2006, which led to the method used to allocate the point source portion of the load.

Definitions:

Please see the definitions in the Department's *Trading of Nutrient and Sediment Reduction Credits – Policy and Guidelines*. Definitions specifically for this Appendix are as follows:

"Chesapeake Bay Watershed"- *Those portions of the Susquehanna and Potomac Rivers and their affiliated tributaries within the Commonwealth of Pennsylvania. A small portion of Elk Creek and Northeast Creek in southern Chester County and Gunpowder River in southern York County also provide drainage to the Chesapeake Bay. For this appendix, these three small watersheds are included within the Susquehanna River Basin.*

"Chesapeake Bay Watershed Model"- *The Hydrologic Simulation Program in Fortran (HSPF), used to simulate the surface water run off, groundwater flow and the transport of nutrient and sediments to the Chesapeake Bay.*

"Delegated entity"- *An entity designated by the Department to carry out specific tasks related to the Nutrient Trading Program.*

"Edge of Segment (EOS) Load" *– The amount of land-applied nutrients expected to reach the surface waters at the boundary of a Chesapeake Bay Watershed Model segment through surface runoff and groundwater flows. The EOS load is the value to which BMP model efficiencies to calculate nutrient reductions are applied.*

"EOS Ratio" *– A factor that is unique to each watershed model segment that has been determined by the Chesapeake Bay Watershed Model in order to estimate the EOS load for individual non-point sources within a watershed segment.*

"**NRCS**"- *The Natural Resources Conservation Service, a division of the United States Department of Agriculture*

Trading Basics:

Trading may occur for either nutrient (total phosphorous and total nitrogen) or sediment credits. Credits are the unit of compliance that corresponds with a pound of reduction of nutrient or sediment as recognized by the Department which, when registered by the Department, may be used in a trade.

Credits generated by trading cannot be used to comply with existing technology-based effluent limits except as expressly authorized by federal regulations.

Credits must be expressed in a term that corresponds to a unit of compliance (e.g., pounds), and a time period, all contained in applicable permit compliance requirements. Credits will be expressed as pounds per year, and will be valid for one year, for trading in the context of the Chesapeake Bay watershed. This means that credits need to be measured, verified and accounted for according to that time period.

Groups of credits for discrete nutrient and sediment reduction activities will be assigned a unique identifier by the Department, and will be associated with a certain time period. For trading in the Chesapeake Bay watershed, the time period or "shelf life" for annual credits will be the "water year," which is October 1 through September 30. The permit compliance period is the "water year" and the Department may allow permittees to

apply credits to the permit for a limited period after expiration of the compliance period, to correct a non-compliance situation.

Credits need to be measured and accounted for each year. If a BMP has a longer life span than a year then credits can be generated for the life of the project but they have to be re-verified and accounted for each year. This can be accomplished through a request to the Department. Additionally, credits cannot be banked for future years. For example, if a BMP generates 10 credits each year and has a life span of five years, 50 credits cannot be applied in the fifth year. Credits must be applied for the year that they are generated.

Trading may occur within the Pennsylvania portion of the Chesapeake Bay Watershed, specifically within the Susquehanna or Potomac watersheds. Trading between a source in the Susquehanna and one located in the Potomac watersheds, however, at this time is not permitted.

Trades must be of comparable credits (e.g. nitrogen must be traded for nitrogen) and can occur between:

- Point Sources;
- Non-point Sources;
- Third Parties; or
- Any combination of the above.

The Trading Program is not intended to accelerate loss of productive farmland. Therefore, credits will not be generated under this policy from the purchase and idling of whole or substantial portions of farms to provide nutrient credits for use offsite. Individuals are eligible for nutrient credit generation when converting one land use to another, where the post-construction reduced nutrient loading can be established.

Non-point Source Trading Cap:

To ensure that the Trading Program is not trading away reductions that are needed to meet the Pennsylvania Tributary Strategy goals for non-point source reductions, the Department has established maximum tradable loads for each watershed segment. The tradable loads were estimated by comparing a revised Chesapeake Bay Program Tier 4 maximum level of implementation of Best Management Practices (BMPs) to the level of reductions needed to meet Pennsylvania's Tributary Strategy.

The tradable loads were estimated as the difference between the level of reductions listed in the Tributary Strategy and an estimate of the maximum reductions that could possibly be achieved using the BMPs listed in the Tributary Strategy and the corresponding BMP efficiencies at the time the Strategy was developed.

Baseline and Thresholds of Eligibility for Generating Credits:

Point Sources

For a point source, the baseline and threshold for generating nutrient reduction credits is the same. It is the effluent limits expressed in an NPDES permit needed to satisfy the legal requirements related to the Chesapeake Bay and Maryland water quality standards.

Agricultural Sources

The baseline and threshold are as follows:

Baseline Requirements

- Compliance with Chapter 102 Erosion & Sedimentation Regulations, Section 91.36 (Agricultural Operations), Act 38 Nutrient Management Regulations, and Chapter 92 (CAFOs), as applicable.
- Compliance can be determined through a site visit by Department staff or a Department approved entity, by review of applicable plans required by regulations such as a Nutrient Management Plan, Erosion and Sedimentation Control Plan or an acceptable Conservation Plan, and a Manure Management Plan, as applicable, or a combination thereof.
- Compliance must be verified by the Department, Conservation District, or other entity approved by the Department.

Threshold Requirements

- 100 Foot mechanical setback or equivalent; this is achieved when ***ONE*** of the following is met:
  - Manure is not mechanically applied within 100 feet of surface water[1]
  - There are no surface waters on or within 100 feet of the farm.
  - Farm uses no manure application and applies commercial fertilizer at or below the Penn State recommended agronomic rates.

OR

- 35 Foot buffer or equivalent; this is achieved when all of the following are met:
  - A minimum of 35 feet of permanent vegetation is established and maintained between the field and surface water.
  - Area can be grazed or cropped under a specific management plan, and permanent vegetation must be maintained at all times. *(Permanent vegetative buffers 50' or greater in width may qualify to generate nutrient reduction credits.)*

OR

- 20 % Reduction Option
  - A reduction of 20% in the farm's overall nutrient balance beyond baseline compliance.

[1] As applicable; for instance, setbacks for CAFOs apply to a broader range of surface waters than non-CAFO operations.

For non-agricultural non-point sources without NPDES requirements, for concentrated animal feeding operations with NPDES permits, for allocations resulting from a TMDL and for other specified performance requirements, the trading threshold is the level of nutrient and sediment load associated with existing land uses and management practices that is needed to comply with applicable state regulations.

Nutrient Reduction Activities for Credit Generation:

Credit generation is applicable to activities above and beyond what is required for baseline and threshold.

Point Source

For a point source to generate credits, it must treat at a level that exceeds the requirements stated in the NPDES permit. Credits will be based on the difference in permit limit and treatment level based on DMR information.

Non-point Source

The Department has pre-approved calculation methodologies for use by persons seeking approval of credits in the context of trading within the Chesapeake Bay watershed. For an example, see Attachment 3 to this Appendix. The Department will also consider other calculation approaches, although the proposal review time may take longer. These include those identified by NRCS and those that can be measured as generating nutrient reductions such as manure hauling

For non-point sources generally, the Department expects that proposals will contain scientifically-recognized methods to demonstrate nutrient and sediment reductions. The Department's website contains additional information about credits approved.

BMPs or other potential credit-generating activities occurring after January 1, 2005 may be submitted for review to determine credit eligibility. BMPs or other activities that were completed prior to January 1, 2005 may also be submitted for review and determination of credit eligibility. Non-structural BMPs (e.g., no-till practices, cover crops, advanced nutrient management) that were implemented prior to January 2005 and continue to be utilized and maintained on an annual basis are eligible to earn nutrient reduction credits.

Trading Ratios:

When calculating credits, trading ratios need to be considered and used as appropriate to help ensure that trading provides the desired level of nutrient reductions or other water quality benefits.

Three types of ratios, delivery, reserve and edge of segment (EOS), will be applied to credit generating activities occurring in the Chesapeake Bay Watershed.

1. **Delivery Ratio** compensates for a nutrient or sediment's travel in water and will be applied to point and non-point sources. The ratio varies depending on the distance of the source from the mainstem of the Chesapeake Bay. Generally, the greater the distance the pollutant has to travel, the greater the pollutant loss will be. This ratio works to equalize a trade between a source in the headwaters and one near the mainstem. Delivery ratios will be based on information from applicable and accepted data sources, such as the Chesapeake Bay Watershed Model.

2. **Reserve Ratio** is applied to implement policy-driven decisions to require part of the credits generated be reserved to cover for failed credit generating activities. This ratio adds another layer of security to the credits. The reserve ratio will be ten percent and will apply to all credits. This percentage applied may change over the life of the trading program.

3. **EOS Ratio** is a factor that is unique to each watershed model segment that has been determined by the Chesapeake Bay Watershed Model in order to estimate the EOS load for individual non-point sources within a watershed segment. This ratio can also be referred to as "EOS Factor".

Quantification and Application of Credits:

Point Source

For a point source to generate credits, it must treat at a level that exceeds the requirements stated in the NPDES permit. Credits would be based on the difference between the permit limit and treatment level reported in the DMR. A point source will also have to apply the appropriate trading ratios such as delivery and reserve.

Non-point Source (Agriculture)

The following methodology will be used for calculation of nutrient reduction credits on agricultural operations:

1. Determine if farm is in Baseline Compliance and meets the Threshold for trading
2. Determine current rates of nutrient application
3. Account for any overall reductions in applications
   - Commercial Fertilizer Applications – Reduction in commercial fertilizer applications below PSU agronomic rate
   - Manure Applications – Reduction in total manure applications below current practices (and below minimal acceptable PSU agronomic rates) through better manure management practices.
   - Combination – Reduction in total nutrient applications (manure and commercial fertilizers) below current practices (and below PSU agronomic rates) through better manure management practices.

4. Calculate new nutrient load not going to crop production
5. Apply EOS factor to load
6. Calculate nutrient reductions from BMP efficiencies. BMP Efficiencies can be calculated from the following methods:
    - *Table 1: Non-point Source Best Management Practices that have been Peer-Reviewed and CBP-Approved for Phase 5.0 of the Chesapeake Bay Program Watershed Model, Revised 1/12/06*
    - *Table 2: Non-point Source Best Management Practices requiring additional Peer-Review for Phase 5.0 of the Chesapeake Bay Program Watershed Model, Revised 1/12/06*
    - Additional methods or Tables that have been approved by the Department
7. Total all nutrient reductions in terms of Pounds
8. Apply Delivery Ratio
9. Apply Reserve Ratio
10. Total Credits available

Monitoring and Evaluation / Risk Allocation:

Trades involving sources with NPDES permits (point sources)

The Department will enforce permit limits through established Departmental compliance procedures.

The Department will also help to ensure the effectiveness and validity of the credits used in NPDES permits. This will include the use of (1) methodologies to calculate credits before approval, (2) verification processes and requirements, and (3) the credit reserve.

Permittees will have several types of responsibilities to ensure the credits satisfy their permit conditions. First, permittees will be responsible for ensuring that the credits they obtain and apply to their permits for compliance purposes are approved by the Department (e.g., are certified and registered by the Department).

Second, permittees have responsibilities for enforcing the terms of their credit purchase agreements, where needed to ensure compliance with their permit. Exceptions to this may include situations where the nutrient and sediment reduction activities fail due to uncontrollable or unforeseeable circumstances such as extreme weather conditions and timely notice is provided to the Department, or where the credits are enforceable by the Department through an approved legal mechanism. The Department plans to exercise enforcement discretion with respect to permittees in the year in which credits are determined to be invalid, as long as (1) the credit failure is not due to negligence or willfulness on the part of the permittee and (2) the permittee replaces the credits for future compliance periods.

Trades involving entities without NPDES permits (non-point sources and third parties)

Willful failure by non-point sources or third parties to meet trade contract obligations will result in action by the Department. Any signatory to the contract may also take action.

If the Department determines that BMP failure is due to uncontrollable or unforeseeable circumstances such as extreme weather conditions (and timely notice is provided to the Department), the Department does not plan take action against the credit generator or third parties. The Department expects that it will be able to credit failures through use of the Credit Reserve, and other mechanisms described in the Policy.

Documenting Credits and Trades:

The Department, using approved methodologies, must approve all credit calculations. Included in the Policy is general guidance related to the submission and review of credit generating proposals as well as registration and tracking of credits. The Department will publish public notice in the *Pennsylvania Bulletin* of receipt of complete proposals for credit generating activities, approvals of credits and trades of credits. This information will also be placed on the Department's Nutrient Trading website, and the on-line marketplace (e.g., NutrientNet).

The Department will generally require that it review trading contracts before approval of a credit, registration of a trade, or use of credits to meet legal requirements. These are contracts between the buyer and seller of the credits, such as a developer, and a non-point source or aggregator/broker. The purpose is to obtain assurance that the credits meet the provisions of the Trading Policy.

The Department will have guidelines for acceptable contract terms available on the Department's Nutrient Trading website. This may include a model trading contract, purchase agreement or a list of certain essential elements of a trading contract. Use of these model agreements will expedite Department review. Upon request, the Department will review trade agreements that vary from the models in advance in order to facilitate transactions.

Trades must be registered before the credits can be used to meet permit limits. The Department will operate an on-line marketplace tool that will assist with the registration, tracking and application of credits. The registration system will be used by Department staff when credits are proposed to be used in a new NPDES permit, and to verify compliance with a NPDES permit during its term.

The marketplace tool may also be used by buyers and sellers to verify that their trades have been approved by the Department.

Use of Credits in NPDES Permits:

Credits may be used by NPDES permittees to meet effluent limits under specific conditions.

Because the credits will be used to meet a permit effluent limit, permittees will only be authorized to use credits through the provisions of their NPDES permit. The permit terms and conditions for trades will require appropriate terms such as record keeping, monitoring and tracking, which will be documented through reporting in the monthly Discharge Monitoring Reports.

The Department will also help to ensure the effectiveness and validity of the credits used in NPDES permits. This will include the use of (1) methodologies to calculate credits before approval, (2) verification processes and requirements, and (3) the credit reserve, all of which are discussed elsewhere in this Policy.

Use of Credits in the Sewage Facilities (Act 537) Planning Program:

Under Act 537 and its implementing regulations, all municipalities must develop and implement a sewage facilities plan that addresses present and future sewage disposal needs for the municipality. These plans are modified as new land development projects are proposed or whenever a municipality's sewage disposal needs change. The Department reviews the official plans and any subsequent revisions in accordance with the requirements of 25 PA. Code Chapter 71. This process involves the consideration of the size and timing of a development project, the anticipated wastewater characteristics, the method of treatment and disposal (e.g. on-lot disposal system or through a sewage treatment plant) and the hydraulic and organic treatment capacity of the receiving sewage treatment plant.

Under these regulations municipalities must show that, for new land development projects that propose a connection to a treatment facility, or that propose a new treatment facility, the facility will have the capability to accept the additional wastewater and still meet its effluent limitations. The use of nutrient reduction credits may be included in any Act 537 proposal concerning a new or expanded discharge to address this legal requirement. The Department will expect to see assurances in the proposal that the credits will be provided to assure the long-term compliance for the treatment facility to meet the regulations in Chapter 71, Section 71.72. For instance, a formal agreement between the municipality and the developer/permittee that establishes the developer/permittee's responsibility for operating and maintaining the system by providing credits, and the responsibility of the municipality or local agency for oversight of the system, would normally be an acceptable assurance.

Public Participation:

Public notice and comment on the use of trading in permits will be part of the routine procedure followed by the Department with all NPDES permit applications. The

Department is required to allow for public participation under the regulations governing NPDES permits. *See* 25 Pa. Code § 92.61. The requirement is to publish notice of completed applications for permits, indicating certain details such as the proposed effluent limitations and permit conditions.

The Department will note in the public notice any conditions allowing trading in the draft permit. These conditions will be subject to the normal public comment process and period (usually 30 days), along with all other conditions of the permit.

In addition, when credits are applied to a permit during the annual compliance period, the permittee will include that information in the monthly Discharge Monitoring Report (DMR). DMRs are records that can be accessed by the public. The information in the DMRs will include unique identifiers and the numbers of credits purchased. More detailed information about the credits can then be accessed from the Department's Nutrient Trading website.

The Department will operate a transparent system for review and approval of credits, and registration of trades. Public notice will be made of credit generating proposals, their methods, number of credits to be certified and any trades that occur. Once a generator has received an approval for a particular method of generating credits, future public notices of proposals for that generator will only contain the number of credits that have been certified.

The Department will not subject each credit review or trade registration to public notice and comment, in order to ensure an efficient market. This approach is endorsed by EPA in its January 13, 2003 Water Quality Trading Policy and is consistent with the federal public participation requirements upon which the Pennsylvania NPDES regulations are based.

Managing for Success:

The Department recognizes that there is some level of uncertainty in the ultimate success of nutrient and sediment reductions that will serve as the basis for tradable credits. This uncertainty is addressed in several ways:

a) *General.* Non-point source practices generate greater uncertainty with reductions and may need to be addressed by establishing a threshold above legal baseline for generation of credits.

b) *Conservative assumptions*. The Department will use conservative assumptions and methodologies when calculating credits. This includes the use of scientifically demonstrated methodologies where/when available. The Department will confer with experts in agronomics and other specialized areas when applying its credit calculation protocols.

c) *Credit reserve*. The Department will adjust all credits approved by reducing the amount by a percentage, to populate a reserve of annual credits. This percentage will be defined for watershed specific needs.

d) *Verification*. The Department will conduct verification of baseline, threshold and reduction activities/technologies. Sampling and other monitoring will be conducted where/when appropriate.

   For instance, the Department regularly conducts water quality monitoring at monitoring stations throughout the state, and this data can be used to evaluate any impacts from use of trades in NPDES permits. It should be noted that the data derived from water quality monitoring sites within the Chesapeake Bay drainage area is provided to the EPA Chesapeake Bay Program to help calibrate the model and evaluate changes in nutrient loadings over time.

e) *Other*. The Department will conduct a review of the program and its progress on a bi-annual basis. Based on these reviews, the Department may determine program enhancements are needed and the appropriate changes will be made. These will be shown on the Department's Nutrient Trading website. Stakeholder input will be obtained prior to the changes, as appropriate.