A Model Program for Onsite Management in the Chesapeake Bay Watershed
Response to Comments

This document provides a response to comments on the November 2012 EPA document titled *A Model Program for Onsite Management in the Chesapeake Bay Watershed* (the Model Program). It is organized by theme rather than by comment, and attempts to respond to all comments received on the draft Model Program. Themes are labeled with letters, and listed in the table of contents. Under each theme, comments are numbered, and followed by EPA's response in italicized fonts. When multiple commenters submitted similar comments, the comments were summarized into a single comment. Most other comments were either used verbatim, or summarized.

A. NITROGEN LOADING

1. Comment: The nitrogen loading from septic systems to Chesapeake Bay is not consistent across years, and varies from 6% to 3%. The document uses both values.

EPA Response:

The Watershed Model developed and used by the Chesapeake Bay Program (CBP) to develop the total maximum daily load (TMDL) for the Bay has been continually refined. As the CBP Watershed Model was refined, the estimated load from onsite systems was reduced by approximately one third from previous model runs, but the overall load to the Bay increased significantly, resulting in a change in onsite system contribution from approximately 6% to 3% of the overall load. The revised document was edited to reflect the latest model numbers.

2. Comment: The document implies that all of the 9 pounds per capita of nitrogen from septic systems reaches the Bay. At the very least, it would be more accurate to state that a "portion" of the 9 pounds does.

EPA Response:

The document (Section 1.2) describes the attenuation assumed as part of the CBP Watershed Model discussion, and indicates that "the model then assumes that 40% of this load actually reaches the Bay." The words "following partial attenuation" were added to the Executive Summary to indicate that not all of the 9 pounds per capita per year reach the Bay. In addition, a footnote was added to explain the processes by which this attenuation occurs.

3. Comment: The estimate of 40% of the septic load reaching the Bay is too large in light of recent research.

EPA Response:

This estimate was developed by the CBP as part of the assumptions to its model. The purpose of this document is to describe a model program. This document merely describes the assumptions to the CBP Watershed Model.

4. Comment: Additional effort should be made to describe "transport" of nitrogen through the Bay, and how this may vary both spatially and temporally.

EPA Response:

The Executive Summary now includes language about partial attenuation of nitrogen as groundwater moves towards the Bay, as well as a footnote indicating how attenuation occurs. In addition, the Onsite System Nitrogen Management section (Section 1.2) discusses transport and attenuation in the context of the CBP Watershed Model.

B. PHOSPHORUS

1. Comment: The statements made about phosphorus are true but incomplete. Over time phosphorus adsorption sites near dispersal systems become saturated. Additional phosphorus

therefore migrates away from onsite systems, albeit at a slower pace than nitrogen. It should be acknowledged that phosphorus pollution can become a threat when viewed over longer time scales. The focus of the report is appropriate, it just seems that the phosphorus problem is not given the appreciation it is due.

EPA Response:

Additional language was added to describe the fact that phosphorus can migrate further in phosphorus-saturated soils. The document also recommends management practices to ensure proper functioning of onsite systems that will help to reduce the both nitrogen and phosphorus discharges from failing systems.

C. FEDERAL REGISTER

1. Comment: This document was not announced in the Federal Register, and many professionals, homeowners, and communities may not have been aware of the opportunity to comment.

EPA Response:

As described in the disclaimer, this document consists of recommendations to assist states in developing model programs for managing onsite systems. As such, there is no legal requirement for EPA to publish this document in the Federal Register or seek public comment on it. Nevertheless, EPA sought comment on a draft version of this document by notifying the public and a wide range of stakeholders, following the practices of other similar documents produced for the Chesapeake Bay Executive Order Strategy. The document was posted to the Chesapeake Bay Program Office website for the Executive Order strategy to solicit public comment and the Agency released a news brief, issued a notice via Water Headlines, a widely circulated listserve for the general public, and posted announcements via EPA social media. These notices were also forwarded to EPA national and regional partners for onsite system management including federal, state, and local government, industry, academia, and non-profit groups. Some of those partners sent the announcement out to their memberships. EPA conducted webinars with the Chesapeake Bay states. Finally, EPA incorporated information about the draft into various presentations and conference calls to inform a wider audience of its availability.

D. TREATMENT LEVELS

1. Comment: The horizontal distance from the Bay is an appropriate approach for remediation. The recommended treatment standards associated with the setbacks are reasonable. Other commenters held the opposing view, that horizontal setbacks are not appropriate standards. What scientific studies or data support the recommended standards?

EPA Response:

The recommended treatment levels are similar to those recommended in the "Guidance for Federal Land Management in the Chesapeake Bay Watershed," but were adjusted for systems between 100 and 200 feet of the Bay, and for existing systems outside the 1,000-foot setback. The proposed treatment levels recognize the benefit of soil attenuation of nitrogen with distance. They are also consistent with the Maryland Critical Areas Commission, which requires

additional nitrogen management for areas within 1,000 feet of the Bay. A discussion of scientific references was added to Section 2.0 to justify the potential for denitrification through surface water bodies, and certain types of soils.

2. Comment: Eliminating all discharge within 100 feet of the Bay or its tributaries is not realistic except for new or replacement systems. Advanced treatment that is capable of removing nitrogen might be necessary.

EPA Response:

The recommended treatment levels within 100 feet of the Bay are based on the recommendation to eliminate all discharges within 100 feet of the Bay and its tributaries, consistent with the Federal Guidance for Land Management in the Chesapeake Bay. One of the examples under Section 2.3 of the Model Program shows that this could be achieved by clustering multiple systems within 100 feet of the Bay, with other systems outside that setback. The Model Program document provides recommendations for a state-of-the-art program, but states may be able to meet their TDML allocations without the need to eliminate all discharges within 100 feet of the Bay and its tributaries. However, inspecting systems closest to the Bay could benefit overall water quality, as failing systems in those areas would be identified first.

3. Comment: A number of commenters disagreed that a 20 mg/L total nitrogen discharge to the drainfield represents a 50% reduction of total nitrogen compared to a conventional system. They cited a 2009 WERF study to indicate that septic tank effluent concentrations are closer to 60 than 40 mg/L, and that higher septic tank concentrations will make it more challenging to achieve the recommended standards.

EPA Response:

The recommended treatment levels are not based on percentage of nitrogen reduction, but on effluent concentrations, and systems have been tested and approved by states to meet the 20 mg/L and 10 mg/L total nitrogen effluent concentrations. The Water Environment Research Foundation (WERF) study provides effluent concentrations in the septic tank, not at the edge of the drainfield. Nitrogen attenuation occurs between the septic tank and the edge of the drainfield. The CBP Watershed Model, which was used in developing the TDML and each state's total nitrogen allocation, assumes a 39 mg/L total nitrogen effluent concentration at the edge of the drainfield for a standard system, and cites other literature to support that concentration. From that standpoint and for TMDL purposes, a 20 mg/L total nitrogen effluent concentration does represent a 50% reduction. A footnote clarifying the assumptions in the CBP Watershed Model was added to the document.

4. Comment: In the recommended treatment standards, listing the distance as "beyond 1,000 feet" gives the impression that all systems in these states should achieve a 20 mg/L total nitrogen concentration in effluent. Is that what is meant? In other words, is there a distance from the Bay where the model program would not reach?

EPA Response:

The recommended treatment levels would only apply to the part of the state that is located in the Chesapeake Bay Watershed. The revised document now includes clarifying language to specify

that this recommendation was developed for areas within the watershed. In addition, the 20 mg/L treatment level is now only recommended for new construction and upgrades of failing systems.

5. Comment: According to this USGS report (http://pubs.usgs.gov/fs/fs05300/), large portions of the Patuxent Watershed have soils that have a high potential for denitrification. Nitrogen reducing systems may be an unnecessary burden in these areas.

EPA Response:

While the purpose of this document is to provide recommendations for a model program that is would be appropriate for the entire Chesapeake Bay Watershed, it is true that certain soils in the watershed can provide better denitrification opportunities than others. This is acknowledged in the recommended treatment levels, which decrease with distance from the Bay and its tributaries. In addition, states can choose which, if any, aspects of the Model Program to use to meet their goals for onsite management, including appropriate locations for nitrogen reducing systems.

6. Comment: If the intention is that the recommended treatment standards are the values leaving the onsite system and moving into groundwater, consider modifying the statement to say 'in the treated effluent prior to discharge to the groundwater' or 'in the treated effluent leaving the onsite system'. The way the document is currently written, the recommended standards could be interpreted as the recommended total nitrogen concentrations discharged to the drainfield.

EPA Response:

The recommended treatment levels would be for the effluent as it leaves the drainfield prior to entering groundwater. A clarifying sentence was added to Section 2.0 to reinforce that point, as well as an additional footnote. Actual sampling below the drainfield is impractical, and in an advanced system, the concentration is typically measured prior to dispersal in the drainfield. However, if the total nitrogen concentration is 20 mg/L or less as the effluent enters the drainfield, the maximum concentration entering groundwater will also be 20 mg/L.

7. Comment: Please consider modifying the distance ranges to '<100 feet', '100 to 200 feet', '>200 to 1,000 feet' and '>1000 feet' for the treatment standards described in Section 2.0 to avoid the issue of what happens if a point is on the line.

EPA Response:

The revised document has been modified to reflect the suggestion.

8. Comment: There does not appear to be a distinction in the application of nitrogen treatment levels to single family homes and community systems. Is a 20 mg/L limit appropriate for a 200,000 gpd onsite facility that is >1,000 feet from a tidal or Bay tributary?

EPA Response:

Language was added to Section 4.5 to address larger systems. The recommended treatment levels were developed for all systems in the Bay Watershed, however, states may decide that large systems warrant further nitrogen treatment.

E. WATERTIGHTNESS AND OTHER STANDARDS

1. Comment: Recommendations for improved tank standards for watertightness, structural integrity, and accessible and locked lids are neither mentioned in the executive summary nor discussed anywhere in the report. If a tank is not watertight, the whole system can be compromised.

EPA Response:

A sub-section was added to the System Design Criteria Section (4.4) to mention watertightness and structural integrity of septic tanks and other components of the onsite system. This sub-section references EPA's 2002 "Onsite Wastewater Treatment Systems Manual."

F. SHALLOW PRESSURIZED EFFLUENT DISPERSAL

1. Comment: A number of commenters requested that the term drip be replaced with a more generic, or inclusive term such as the terms used in the Guidance for Federal Land Management in the Chesapeake Bay Watershed.

EPA Response:

EPA replaced drip irrigation with shallow pressurized effluent dispersal throughout the document to address these comments and to be consistent with other documents such as the "Guidance for Federal Land Management in the Chesapeake Bay Watershed."

2. Comment: The following definition is recommended for "Shallow Dispersal Technologies": Technologies such as drip, chambers, or EPS engineered aggregate that can be installed within 12" of the ground surface. The systems shall be pressurized and have time dosing.

EPA Response:

EPA edited the description of a shallow pressurized effluent dispersal system under Section 2.1.

3. Comment: There is little emphasis on site evaluation and characterization in the context of site-specific conditions. For example, shallow depth to perched water table conditions may provide optimum conditions for in situ nitrogen reduction.

EPA Response:

The document discusses both site evaluation (Section 4.2) and shallow dispersal systems that may provide additional in situ nitrogen reduction. Shallow depth to groundwater is unlikely to provide optimum conditions, as it may result in potential contamination from other pollutants: the greater the depth to groundwater, the greater the pathogen removal.

4. Comment: Except for drip dispersal systems, the document does not address the depth of a conventional drainfield, which should be shallow. Deep systems represent an injection point for nitrate, and offer minimal nitrogen attenuation. Many states have removed deep systems from their codes, but a number of Chesapeake Bay states still allow deep systems. One commenter recommends defining a maximum drainfield depth, or creating a tiered approach to treatment requirements based on drainfield depth.

EPA Response:

While pressure or time-dosed shallow dispersal systems have been proven to reduce nutrient loads, this does not apply in sandy or loamy soil conditions. The purpose of this document is to provide a recommended model program that could be used in the entire Chesapeake Bay Watershed, but states have the flexibility to set maximum and minimum depths for dispersal systems based on local site conditions. In addition, no data or references were provided by commenters to validate that nitrogen reduction occurs for all shallow systems.

5. Comment: The 20 mg/L recommended standard for properties beyond 1,000 feet of the Chesapeake Bay or its tributaries should be replaced by shallow dispersal technology. Another commenter suggested comparing the efficiency of advanced treatment systems with the natural attenuation that can be achieved with enhanced dispersal technology.

EPA Response:

Shallow dispersal technology does not reduce nitrogen in all types of soil. With insufficient data to support the claim that shallow dispersal technology consistently achieves a 20 mg/L effluent concentration, the recommended treatment levels remain unchanged for new construction and upgraded systems beyond 1,000 feet of the Chesapeake Bay. Functioning existing systems beyond 1,000 feet of the Chesapeake Bay are not recommended for upgrade in the revised treatment levels.

6. Comment: Rigid pipe pressure distribution or drip dispersal should be required as a Nitrogen best management practice (BMP) in the dispersal of all pretreated effluents into the soil.

EPA Response:

States decide how to reduce nitrogen to meet the load allocations in a TMDL. This document provides recommendations to states and local communities on how to develop and implement a model program for the management of onsite wastewater disposal systems to protect water quality in the Bay. These recommendations are designed to constitute a model program that can be adopted in whole, or in part, at the discretion of the states and local communities based on their nitrogen reduction strategies and funding priorities. As such, drip dispersal/shallow pressurized dispersal is recommended in the document, alongside other technologies.

G. PERMEABLE REACTIVE BARRIERS

1. Comment: The cost estimate of $10,000 to $15,000 for the permeable reactive barrier (PRB) listed in Example 5 seems low, especially given the extensive engineering required to ascertain groundwater movement and proper siting of the PRB.

EPA Response:

This cost estimate represents expected construction costs, assuming that the direction of groundwater flow is known on the property. Language was added to Example 5 in Section 2.3 to define what is included in the cost estimate.

2. Comment: A "Permeable Reactive Barrier" may be useful in the remediation of existing situations, but to me is invasive to the natural environment and is not sustainable.

EPA Response:

States decide how to reduce nitrogen to meet the load allocations in a TMDL. This document provides the state of the art technical information to support states in identifying nitrogen reduction strategies that work for them. This document provides the PRB as a recommended option for nitrogen removal. Language was added to the document to reinforce the point that it is only an example of available technology for nitrogen reduction.

3. Comment: PRBs are a new technology that represents many design challenges and potential adverse unintended environmental consequences if the PRB is not properly designed. We urge that with any new technology, the use of PRB be performed by skilled practitioners and be as closely monitored. Challenges include (i) understanding groundwater flow patterns, which may require installation of groundwater monitoring wells, and may change seasonally, (ii) knowing septic plume behavior, which may be more vertical than presented on Figure 4, and (iii) designing the width, depth and media appropriately to avoid system failure. Given the state of the science, it is our recommendation that PRB should be used on a cluster/ community scale.

EPA Response:

Language was added to the description of PRBs to address the design and installation requirements and challenges identified in this comment.

4. Comment: Example 5 infers that the PRB will achieve a 50% removal in total nitrogen, but our experience indicates that a 95% or more nitrate removal occurs. Nitrate should represent a significant (much greater than 50%) percentage of the total nitrogen.

EPA Response:

Based on field experiments, the reference in EPA's Permeable Reactive Barrier Technologies for Contaminant Remediation (1998) publication documents a 95% nitrate removal, not total nitrogen. The reference does not provide estimates of total nitrogen removal by the PRBs. It is possible that the PRB could remove a greater percentage of total nitrogen than 50%, but sufficient documentation has not been provided, and EPA chose to assume 50% as a conservative estimate.

5. Comment: The basis of the cost for the PRB in Example 5 should be provided.

EPA Response:

The revised document provides a cost reference and additional details on costs in Section 2.3.

H. MANAGEMENT APPROACHES

1. Comment: Management Model 4 is recommended as the minimum level of management for clustered systems with multiple owners, which raises two issues. The dispersal system is jointly owned and placed outside of an owner's property. The paragraph needs to clarify this arrangement. Second, and more importantly, it is well established that multiple owners are not effective. A single owner with the appropriate powers to fine and assess penalties to and sue and be sued is a necessary criterion for collective systems. To separate individual tanks, etc. from system performance is not fair and will create problems unless regular inspections are performed.

EPA Response:

EPA's recommendation regarding the use of Model 4 is for the recommended minimum level of management for clustered systems, as described in the National Voluntary Guidelines. Model 5, which allows transfer of ownership of the system to a management entity, could also be implemented for these systems. The ownership arrangement for a clustered system can vary according to the preferences of the system owners (e.g., condominium association) and the regulatory authority. EPA concurs that regular inspections are important, and clustered systems may warrant more frequent inspections than individual systems.

2. Comment: A commenter opposed the recommended option for state regulatory agencies to issue "a limited-term operating permit to the property owner that requires sustained performance levels for nitrogen reduction" under management model #3, and provided a number of reasons, including that (i) homeowners are ill equipped to understand the potential complexity and liability associated with an operating permit, (ii) the lack of performance data for Best Available Technology (BAT) systems indicates that the performance reliability of these systems puts permit holders at risk of noncompliance, and (iii) homeowner holding their permit have the potential to incur great expense or, in the worst case, the loss of the use of their home if their septic system cannot continuously maintain the permitted nitrogen reduction performance level.

EPA Response:

The recommended management models described in this document are provided for reference purposes for states and communities to use to meet the allocations of the TDML. These recommendations are designed to constitute a model program that can be adopted in whole, or in part, at the discretion of the states and local communities. States can choose to modify their approach to permitting as appropriate to meet their state goals. This issue is outside the scope of this document.

3. Comment: A Responsible Management Entity is suggested for disadvantaged communities on page 19. "An RME management approach might be appropriate for economically disadvantaged communities where funding for certain costs (e.g., capital and management costs) can be acquired to support nitrogen reduction systems for property owners who could be challenged to support this service on their own." Is this referring to capital costs or to

operation and maintenance (O&M) costs? Is the idea that by pooling the O&M under one RME, that the cost per system for O&M is reduced? Please consider clarifying this section.

EPA Response:

Clarifying language was added to that paragraph to identify potential savings in both capital costs (i.e., bulk negotiating power), and reduced O&M costs due to economies of scale in managing multiple systems across the community.

I. STATE FLEXIBILITY

1. Comment: States should be provided management program flexibility to ensure treatment compliance so that administration and sampling costs do not become cost-prohibitive.

EPA Response:

EPA's model program provides recommendations for managing onsite systems to limit nutrient pollution. States and local authorities can choose how to adapt the management models to best suit their goals, and to assist in meeting local allocations under the TMDL. The revised document emphasizes this in the Executive Summary when it states that "These recommendations are designed to constitute a model program that can be adopted in whole, or in part, at the discretion of the states and local communities based on their nitrogen reduction strategies and funding priorities."

J. INVENTORY AND INSPECTION

1. Comment: The text box in Section 4.1 (p. 21) should be reworded to read the time between inspections could increase for traditional individual onsite systems

EPA Response:

The text box was reworded as suggested. If systems are functioning well in areas less sensitive to nutrient loading, fewer inspections are needed, and they can be spaced further apart.

2. Comment: The purpose of the inspection seems twofold: (i) locate systems in order to build a database and then (ii) assess the systems for compliance with the recommended total nitrogen treatment levels. While supportive of the goal to create an electronic inventory of all onsite systems, and acknowledging that the Commonwealth of Virginia is actively working towards that goal, the commenter points out that physical inspections to identify systems that lack nitrogen reduction are both unnecessary and a waste of state resources because most systems in Virginia do not comply with the recommended treatment standards. If the purpose of inspections is to prioritize systems for upgrade, then the logic for prioritizing should be discussed [i.e. failing systems, type of existing systems (conventional vs. alternative), proximity to surface waters, size, etc.].

EPA Response:

Section 4.1 of the document was modified to recommend an initial "desktop" analysis using available data and information (e.g., board of health information, GIS data, population density,

proximity to water bodies) to create an initial inventory and prioritize physical inspections prior to expending resources in the field.

3. Comment: The recommended inspection frequency breaks down to approximately 100,000 systems per year in Virginia, for which there are insufficient state staff. If the private sector conducts these inspections, who should pay for them? Virginia currently requires alternative systems to be inspected by the private sector with a frequency based on size. The cost of the inspection is borne by the homeowner as part of their O&M costs, but this requirement only applies to an estimated 12% of systems in the Chesapeake Bay Watershed. While Virginia agrees that an ongoing inspection program would be ideal, the reality is that it cannot be accomplished with existing resources and regulatory authorities.

EPA Response:

States may determine the most cost-effective method of reducing nitrogen to meet the load allocation in the TMDL. EPA's recommendations for inspections represent a recommended state-of-the-art model program that states can choose components of to meet their needs including prioritizing inspection locations and frequency.

K. SITE EVALUATION

1. Comment: The discussion of redoximorphic features should include interpretation in addition to identification (p. 23, second bullet at top).

EPA Response:

The recommended change was made to the revised document in Section 4.2, and in the model regulatory language from Attachment E.

2. Comment: Section 4.2, page 23, final paragraph of section. Soil evaluators are one group that uses terminology that is consistent across state lines. For this reason, the substitution of non-technical language would work against that principle. This good intention should be avoided.

EPA Response:

The recommendation for use of non-technical language is made "when possible." While it may not be possible in some instances, there is value to the use of plain language so that a homeowner can understand the site evaluation report.

3. Comment: The statement that four feet of unsaturated soil is necessary below an absorption field is only valid for systems applying septic tank effluent to very coarse sandy soils. There are very few if any coastal areas in Virginia that have 4 feet of unsaturated soil below an absorption field. A combination of proper application rates and treatment mitigate the reduced depths to seasonal high water table.

EPA Response:

The minimum depth to groundwater currently required by Chesapeake Bay states varies from state to state. EPA recommends two to four feet of unsaturated soil below an absorption field, with four feet preferred to maximize bacteria removal and prevent pathogen outbreaks. Clarifying language was added to Section 4.2.

4. Comment: The use of monitoring wells to estimate seasonal high water table should be qualified to reflect that the monitoring must occur over an extended period of time to be of any value due to normal seasonal and annual variations.

EPA Response:

Language was added to the revised document in Section 4.2 to address this comment.

5. Comment: An advantage of using redoximorphic soil features is that it allows an evaluation to occur any time and the evaluation is reflective of the actual long term conditions on the site. Please consider noting this in the document.

EPA Response:

Language was added to the revised document in Section 4.2 to address this comment.

6. Comment: Section 4.3, page 25. I would recommend adding the following language (in bold font): "If a state requires a four-foot separation to high groundwater, it may want to consider raising this requirement (perhaps to five or six feet) to adapt to rising groundwater levels associated with sea level rise **in those areas directly adjacent to tidal effects (only), see Section 3.1.2**."

EPA Response:

Rising sea level can impact groundwater levels inland of areas subject to tidal effects. States should consider how best to protect groundwater in light of the potential for rising groundwater levels associated with sea level rise.

7. Comment: Without a way to predict the sea level rise, it would be difficult to make regulatory changes to address potential future changes to the water table and sea level changes. Additionally, local governments control planning and zoning for new construction.

EPA Response:

Sea level rise is likely to occur over an extended period of time, during which regulations can be adjusted, as need be, but initial steps should be taken to account for upcoming changes. EPA edited the document to replace the word "state" with "regulatory authority" because such changes could be implemented at both the state and local level.

L. SHARED OR CLUSTER SYSTEMS

1. Comment: Omitted from Section 4.5 is the discussion that cluster systems should have the legal recourse to ensure that fees are paid by all system users for maintenance, repair and replacement of components.

EPA Response:

RMEs are discussed in other EPA documents in more detail, including EPA's 2003 "Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems." The legal and financial structure of an RME is beyond the scope of this document.

2. Comment: An additional incentive for larger community systems is that the design flow per home can often be reduced, which results in a savings in construction costs.

EPA Response:

No reference was provided to justify a reduced design flow. The document was not edited.

M. CONSTRUCTION INSPECTION AND START-UP

1. Comment: The manual should state that both the regulatory authority and the designer conduct regular construction inspections. However, as the industry relies more and more on licensed professionals for design, installation, and operation of onsite systems, the role of the regulatory authority to conduct interim construction inspection diminishes.

EPA Response:

The document includes this information in Section 4.6. The revised document now also emphasizes the roles of licensed professionals and regulatory authorities earlier in that same section.

N. OPERATION AND MAINTENANCE

1. Comment: Table 4 should be considered only as an example. It would be too great of an extrapolation to use it as accepted guidance.

EPA Response:

Both the table title and the main text were edited to reflect that Table 4 is an example, rather than a recommendation.

2. Comment: Table 3 and its reference should be updated to reflect the final Virginia regulations. For facilities with flows greater than 40,000 gpd, the Virginia Department of Health requires the same operator visit frequency as for the Virginia Pollutant Discharge Elimination System program which is found at the Virginia Department of Environmental Quality.

EPA Response:

Changes were made to Table 3 and its reference to reflect the latest Virginia Regulations. However, no mention was made to flows greater than 40,000 gpd as those are greater than flows targeted in the scope of the Model Program.

3. Comment: Influent and effluent sampling (prior to discharge to the soil) is recommended for all onsite systems, even small systems, to verify the nitrogen reduction performance. While one commenter supports sampling of large systems, the cost of sampling to a single family homeowner does not appear warranted and this commenter mentioned having received significant comment on the costs to single family owners. If a system design undergoes testing to verify it as an approved BMP with a given total nitrogen reduction value and the system is properly operated and maintained, does the cost of testing outweigh the benefits? For these small systems, they are either working or they aren't. If they are properly operated and maintained, they should comply with the reduction target. With the cost of a technician to collect the sample running $40 to $50 per hour and the analytical cost of a TN sample about $90, the burden to the homeowner who is also paying for O&M seems unreasonable for accepted BMPs.

EPA Response:

The Model Program recommends sampling during scheduled maintenance or incident response to limit the number of sampling events. However, there are benefits to sampling all systems regularly, including small systems. A malfunction may occur that may go undetected unless sampling is conducted, and performance is based on site specific conditions, which can change from home to home. This document represents a model program that provides recommendations for managing nitrogen loads from septic systems. States may find it more cost-effective to implement other strategies for nitrogen reduction.

O. DATA MANAGEMENT

1. Comment: The Wastewater Information System Tool (TWIST) program is an unsupported system inventory and tracking database. You could recommend states look into web-based onsite system tracking programs such as TrackAssist-Online or Carmody Systems instead.

EPA Response:

The document has been revised to mention that a number of databases are commercially available at a cost, and that TWIST provides a free alternative with some limitations. It is not the purpose of this document to recommend particular databases, and EPA leaves it up to the reader to research commercially available products if the free TWIST database does not meet their needs.

P. PROFESSIONAL TRAINING AND CERTIFICATION PROGRAM

1. Comment: It is clear that Section 4.9 is describing the Delaware certification program, but reviewers are not in favor of temporary certifications for homeowners.

EPA Response:

The excerpt from the Delaware certification program was removed from the document.

Q. TREATMENT TECHNOLOGIES AND PERFORMANCE

1. Comment: The document provides little treatment credit for "in-situ" design and other Best Management Practices.

EPA Response:

While certain types of soils and depths of drain fields are potentially more conducive to nutrient reduction than others, states do not currently approve these technologies for nutrient reduction purposes. The Model Program is not intended to recommend practices for nitrogen credit, nor to quantify potential credit for implementation of particular practices.

2. Comment: States should allow the expansion of approved technologies.

EPA Response:

EPA supports the expansion of technologies, and their approval by states, as stated in Section 4.10. However, treatment technologies are typically approved for certain uses and levels of performance by individual states.

3. Comment: Commenters requested edits specific to the performance of their technologies, particularly in Appendix B (e.g., this system provides X% removal, or Y mg/L, and should be added to/edited in the document). A number of comments recommended adding shallow dispersal system manufacturers to Appendix B.

EPA Response:

EPA does not recommend one technology over another, and technology approval is typically done at the state level. With no data to support performance, other than state approval, no technologies were added to the document. Appendix B of the original draft document provided a snapshot of the technologies approved by various states at the time the document was drafted. The downside of a snapshot is that it is potentially already outdated by the time the document is finalized. Appendix B has been removed from the original document. EPA is evaluating opportunities to make this document available online while keeping it current.

4. Comment: The recommendations in Table EX1 are unachievable for many individual onsite wastewater treatment systems utilizing biological processes of nitrification and denitrification due to variations in flow rates and wastewater quality from individual homes. These variations make it hard to design and operate each individual system. The performance of the systems will depend on many factors, the most important of which is the willingness of the occupants to use less toxic and more biodegradable products.

EPA Response:

A number of technologies have been approved by states to meet 20 mg/L, as well as 10 mg/L nitrogen in effluent concentration. EPA agrees that homeowner education is key to successful

operation and maintenance of advanced systems, and the document recommends outreach and education to homeowners.

5. Comment: NSF 245 evaluation and Environmental Technology Verification (ETV) evaluations are not equivalent. The purpose of test center evaluation of a product under strictly controlled conditions is to get baseline performance indicators. An in-field evaluation on actual homes does not control conditions and therefore provides more variable -- some might say real-world -- outputs. NSF International recognizes this difference and has developed standard NSF 360 evaluation of system performance on actual homes.

EPA Response:

Clarifying language was added to Section 4.10.

6. Comment: Page 40, 2nd paragraph: This section discusses two national verification and certification programs for new environmental technologies. Language should be added to explain that for new pollution reduction technologies used in the Chesapeake Bay Watershed, they must be evaluated by an Expert Panel formed by the Chesapeake Bay Program. The Expert Panel will assess the new technology for its pollution reduction performance and cost. Verification and certification by one of the national groups mentioned in the draft does not allow the devices to be used to meet the Chesapeake Bay TMDL without approval first by the Chesapeake Bay Program.

EPA Response:

Please refer to the Chesapeake Bay TMDL webpage, http://www.epa.gov/chesapeakebaytmdl/, for information on implementation.

7. Comment: An approval and verification protocol is important for small onsite systems especially where ongoing sampling will occur on a limited basis or not at all. For larger community systems, the treatment will mimic systems utilized for surface water discharging systems. These larger systems have been vetted in the industry, but not in a testing facility such as NSF. Please consider recognizing the resources available for larger treatment systems such as the EPA 2009 Nutrient Control Design Manual. As the onsite systems become larger, the type of technologies used will mimic what is used for discharging systems.

EPA Response:

While this document was not intended to address large community systems, additional language and a footnote were included to Sections 4.5 and 4.10 to address this comment.

8. Comment: The Pennsylvania Department of Environmental Protection (PADEP) requests that a reference to the PADEP's Technology Acceptance Reciprocity Partnership (TARP) webpage included on p. 40 be removed.

EPA Response:

The webpage reference was removed.

R. RECIPROCITY FOR TECHNOLOGY APPROVAL

1. Comment: A number of commenters expressed support for the adoption of reciprocity between states for technology approval.

EPA Response:

Comment noted.

2. Comment: Third-party testing facilities - Consider expanding the scope of facilities in the draft reciprocity agreement under Attachment F. The European standard EN-12566 has been considered by some states to be acceptable

EPA Response:

A note was added to the Attachment to address this comment. However, since Attachment B was removed, the former Attachment F is now identified as Attachment E in the revised document.

S. NUTRIENT TRADING

1. Comment: After providing a very large estimate of the cost of upgrading all conventional systems in Virginia, one commenter suggests that while upgrading some conventional systems may be a component of an overall TMDL plan, it is not the only way. The most cost effective combination of methods to reduce nitrogen to the Bay should be pursued. This commenter appreciates the fact that offsets and trading are discussed in section 4.11.

EPA Response:

States choose the most appropriate path to implement their allocations under the TMDL. This document provides a recommended model program to assist the states in managing onsite systems, and other options for states to consider when working to reduce nitrogen pollution, including nutrient trading.

2. Comment: Allowing offsets and trading of nutrient loads is a "shell game" that will create a bureaucracy.

EPA Response:

States can choose to create offset programs as needed to help meet state goals and/or the TMDL.

3. Comment: The boxed example about the Town of Brewster, MA is somewhat confusing.

EPA Response:

Language in that text box was edited, and a title was added to the text to clarify the example.

4. Comment: The section on nutrient trading and offsets is helpful but it should be expanded to point out that even though it is necessary for a state to develop a program that accounts for and addresses the potential N loadings from onsite septic systems, installing new BAT septic

systems is extremely expensive and the loadings from septic systems would be ideal candidates for water quality trading. Section 4.11 of this document should point out that offsetting septic N loadings through the purchase of N credits can be expected to be a cost-effective solution to septic loadings until funding is identified to upgrade homes.

EPA Response:

Language was added to recommend that states identify and review all nitrogen-reducing technologies available to them, and select the most cost-effective ones.

5. Comment: The footnote in Section 4.12 (p. 46) states that nitrogen offsets for new development can only occur if the state has implemented an offset or trading program. In addition to that stated presumption, the funding mechanism should also presume that the existing wastewater system providing the offsets has additional design capacity beyond its current use.

EPA Response:

The footnote was edited in Section 4.12 of the document to address this comment.

T. STAKEHOLDER EDUCATION

1. Comment: Homeowners should be informed about reducing inputs into their septic system which interfere with the system's N-reducing effectiveness. Such inputs may include certain problematic types of detergents, home care products, cooking greases, animal bones, etc.

EPA Response:

The revised document now includes a reference to EPA's Septic Smart webpage, which provides information related to homeowner education and stewardship of onsite systems.

2. Comment: The last sentence in the second to last paragraph of Section 4.12 should be edited to remove: "with priority given to historically underserved or economically disadvantaged communities." The goal of this funding program is to assist the neediest families to reduce their nitrogen inputs. It makes absolutely no sense for regulators to favor people in one location with less need over people in another location with more need, regardless of what type of community the regulator believes they each inhabit.

EPA Response:

The document was edited in Section 4.12 to reflect that change.

U. COST, FUNDING, AND FINANCIAL ASSISTANCE

1. Comment: Significant costs are associated with implementing the model program, which will be borne by homeowners, builders, and developers. Upgrading all systems in the watershed may not be the most cost effective method to reduce nitrogen loading. The document lacks a cost-benefit analysis. One commenter suggested that the power required to supply and run the treatment systems may produce more nitrogen than it removes. (Note: Some commenters

also ask that EPA relate the costs to a low overall percentage contribution from septic systems to the overall nitrogen load).

EPA Response:

EPA developed a model program to assist the states in managing onsite systems and reducing nitrogen pollution. Whether and to what extent a state or local government chooses to implement the recommendations contained in this document is a decision that is ultimately left up to the state or local government. The document presents the Model Program with its various components, so that individual states can identify the most cost-effective strategies for onsite system management, or choose to focus on other sources of nitrogen pollution.

2. Comment: Costs include the upgrades and installation of advanced systems, but also operation and maintenance costs which may have negative consequences on home values. Some commenters requested that costs be more fully detailed to include all elements of the design, installation, and operation and maintenance.

EPA Response:

EPA has revised the document to identify the different types of costs associated with upgrading, operating, and maintaining advanced onsite systems in Section 4.13.

3. Comment: No federal funding has been made available for the Chesapeake Bay cleanup.

EPA Response:

Comment noted.

4. Comment: The second cell in the last column of Table 1 on page 8 should read $9,000 if this information is retained in the document.

EPA Response:

Typographical error changed. Costs in Table 1 were also updated to be consistent throughout the document.

5. Comment: According to costs in Table 1, removing one pound of nitrogen is approximately $1,500, but any homeowner can purchase one, or multiple, 40 pound bags of nitrogen fertilizer for their lawns so the removal cost is difficult to justify.

EPA Response:

This is an important point for nitrogen reduction under the TMDL, but is not part of the scope of this document, beyond the recommendations regarding homeowner education and nutrient trading, which are both discussed in Sections 4.12 and 4.11, respectively.

6. Comment: The Clean Water State Revolving Fund (CWSRF) program shows a great disparity of funding allocations, with only 0.02% of wastewater infrastructure funds spent on onsite systems according to the 2009 CWSRF report (U.S. EPA 2010). The document's examples are notable, but are also the exception to the rule from an historical perspective:

many state-level SRF oversight entities do not recognize onsite systems as a legitimate element of wastewater treatment infrastructure. It is suggested that the authors identify and fully vet resources that states can use to leverage SRF funding to support the many homeowners who will not qualify for low-income assistance typically offered by many of the other listed sources.

EPA Response:

States decide how to utilize their SRF funds. It is not the purpose of this document to make recommendations on SRF fund allocation, or to dictate what the states should fund. This section points out to the states that SRF funds can be used for onsite systems, which may provide an incentive for the Chesapeake Bay states. A link to the EPA factsheet on SRF funding for decentralized systems was added to the document.

7. Comment: On page 45 there is a discussion of the Clean Water State Revolving Funds (CWSRF). The commenter understood that CWSRF loans could only be made to public or non-profit entities. In order to fund an individual onsite system upgrade for a private homeowner, a CWSRF loan is made to a locality who in turn loans money to the individual homeowner. Virginia's past experience with this process has been poor. The paperwork was too cumbersome for most homeowners and localities to bother with it. The CWSRF has great potential to fund onsite upgrades if there were a way to streamline the process.

EPA Response:

Streamlining SRF funding for onsite systems is beyond the scope of this document. A link to the EPA factsheet on SRF funding for decentralized systems was added to the document.

V. FIGURES AND TABLES

1. Comment: Figures 1 and 2 confused a few commenters, who were unclear as to which concentration applies at which location in the system. One commenter interpreted the numbers for nitrogen loads in the figure as contradicting the text because of this confusion.

EPA Response:

The nitrogen loads in the figures are correct, and match the text of the document. However, for clarification purposes, arrows connecting the numbers and their applicable locations were added to the two figures.

2. Comment: Figures 1 and 2 should include attenuation through denitrification in groundwater and at groundwater-surface water interface so that net contribution to the Bay is stated.

EPA Response:

The purpose of these figures is to illustrate the difference between a traditional septic system and an advanced system, rather than the whole attenuation process, which is described in the text.

3. Comment: A number of recommendations were made to improve Figure 1, including placing the system higher in the soil profile, changing the sewer line from a vertical one to a

horizontal one, showing access risers to grade on the tank to promote O&M access, adding that the distribution box is not always required, and showing thick vegetation covering the ground surface.

EPA Response:

While this figure is provided for illustration purposes, it was edited to be more representative of real conditions without losing the educational value it provides to most of the audience. However, thick vegetation should not be planted on top of the drainfield, particularly if it is shallow as roots can clog the system. This suggested change was not implemented in the figure.

4. Comment: Figure 2 shows a reduction in TN applied to the drainfield from 60 mg/L (conventional septic tank effluent) to 20 mg/L which reflects a 67% reduction. However, the total load to the groundwater is shown as 5 lb/person/yr with the additional treatment only reducing loads by 45 percent. We suggest clarifying that the percent reductions are being compared to the model estimate of 39 mg/L TN for the concentration leaving the drainfield.

EPA Response:

A footnote was added to the text above the figure to clarify how the 50% reduction is calculated.

5. Comment: Figure 3 showing the drip tubing could still be included; however similar illustrations of chamber and EPS should be included as well.

EPA Response:

Language was added to the figure to explain that tubing is not the only dispersal method, and that chambers and other engineered materials could be used in place of the discharge lines.

6. Comment: Table EX-1 is confusing. The continuing reference to 'the tidal portion of any tributary to the Bay' in the footnote suggests that it does not apply to non-tidal portions of the Bay watershed. We suggest repeating a phrase that is found in Section 1.2 which states "…, the approach includes advanced nitrogen treatment systems for all onsite systems within the Bay watershed, with higher levels of nitrogen removal recommended for areas in close proximity to the Bay and its tidal tributaries."

EPA Response:

This sentence was added to the paragraph below Table EX-1 to clarify that the recommended treatment levels apply to the entire Watershed. This sentence now reads: "The approach is designed to apply to all existing and future onsite systems in the watershed, with higher levels of nitrogen removal recommended for areas in close proximity to the Bay and its tidal tributaries."

7. Comment: In Table 1, the terms advanced treatment and advanced treatment with denitrification are confusing. Most advanced treatment systems use denitrification to remove nitrogen. These terms should also be consistent with the body of the text that describes the standards and how they can be met.

EPA Response:

EPA explained the terminology used in Table 1 in the body of the document, and in a footnote to the table, to address this comment. The text from the examples was also edited to ensure consistent use of terminology.

8. Comment: In Table 1, advanced treatment with drip should provide 10 mg/L effluent (i.e., an independently tested drip system is a 50% denitrification technology).

EPA Response:

The purpose of Table 1 is to provide general categories of technologies that have been proven to achieve certain levels of nitrogen reduction, and have been approved by states to meet these levels. The EPA's Guidance for Federal Land Management in the Chesapeake Bay Watershed indicates that a 5 mg/L credit can be expected for shallow dispersal technology, but a 5 mg/L credit does not translate into a 50% reduction from a 20 mg/L effluent. The discussion about the 5 mg/L credit for shallow dispersal technology was removed from the revised document.

9. Comment: In Table 1, the description of technologies capable of achieving a nitrogen discharge of less than 5 mg/L should include advanced treatment with denitrification/upflow filter. The commenter requested that the category of advanced treatment with anoxic filter be added with the following information: 5 - 87%- 0.5 – 1 - 3.5 – 8 - $18,000 – denitrification and anoxic filter $22,000, and provided EPA's Guidance for Federal Land Management in the Chesapeake Bay Watershed as a basis for the request.

EPA Response:

The purpose of Table 1 is to provide general categories of technologies that have been proven to achieve certain levels of nitrogen reduction, and have been approved by states to meet these levels. While the EPA's Guidance for Federal Land Management in the Chesapeake Bay Watershed[1] does mention one technology that "regularly produces effluent with N concentrations of less than 5 mg/L," it also mentions that "Others claim to have similar systems with comparable performance, although, to date, independent field verification is lacking." In addition, the 5 mg/L example in that table was removed to reflect the revised treatment levels, which no longer recommend a 5 mg/L effluent concentration.

W. ATTACHMENTS AND REFERENCES

1. Comment: Attachment A: The statement regarding Virginia's Phase II Watershed Implementation Plan (WIP) on page A4 should be modified as follows for clarity: "Virginia's Phase II WIP does not include a specific target for nitrogen reduction from onsite systems. Nitrogen reductions will be achieved through amendments to regulations for alternative systems that require a 50 percent reduction in nitrogen for all new small alternative systems

[1] The exact quote from the Federal Guidance is as follows: "Engineered and proprietary systems featuring add-on anoxic filters with an external carbon source (e.g., methanol, sawdust, newspapers) have performed successfully in single-home and cluster applications. For example, at least one commercially available product (NITREX) regularly produces effluent with N concentrations of less than 5 mg/L (Heufelder et al. 2007, see also Figure 6-2 and Table 6-2)."

in the Chesapeake Bay watershed. All larger alternative onsite systems (with a design flow greater than 10,000 gallons per day) will need to comply with a <3 mg/L total nitrogen standard at the project boundary as evidenced by an 8 mg/L applied TN and a drainfield design with adequate separation distance to limiting features."

EPA Response:

The revised document includes the suggested change on p. A4.

2. Comment: Attachment C: Page C5 incorrectly references a non-existent regulation. Please reference the current Virginia regulations entitled "Regulations for Alternative Onsite Sewage Treatment Systems" as found at http://lis.virginia.gov/000/reg/TOC12005.HTM#C0613. There are significant differences between the Emergency Regulations and the final regulations.

EPA Response:

This change was made to the revised document. Since Attachment B was removed, the former Attachment C is now identified as Attachment B in the revised document.

3. Comment: Attachment E: A number of commenters requested that the references to "drip irrigation" be replaced with "shallow dispersal technology" throughout the Attachment.

EPA Response:

This change was made to the revised document. Since Attachment B was removed, the former Attachment E is now identified as Attachment D in the revised document.

4. Comment: Commenters provided a number of additional references and resources.

EPA Response:

EPA evaluated those references, and added them to the document where applicable.