# Wastewater Treatment Workgroup (WWTWG)
# BMP Verification Protocol Narrative

*DRAFT – February 14th, 2013*
*Updated from 1/15/13 version, discussed by WWTWG during 1/16/13 conference call*
*Delaware, Maryland, and Virginia on-site programmatic details added February 1st, 2013*

## *Wastewater sector background and importance of verification*

**Wastewater**:
Wastewater discharge facilities include municipal sewage treatment facilities and industrial facilities with direct discharges to waters of the United States. These facilities contributed 17.4 percent of the total nitrogen (TN) and 16.3 percent of the total phosphorus (TP) loads delivered to Chesapeake Bay tidal waters in 2011. Of these total nutrient loads from wastewater dischargers, the 468 significant facilities contributed 90% of nitrogen and 72 percent of phosphorus. The remaining loads came from the 5,215 non-significant facilities.

**CSO:**
In the Bay watershed, there are currently 50 reported active reported Combined Sewer Overflow (CSO) communities. A total of 64 CSOs have been tracked by the Bay Program Model and 14 of them are currently eliminated. In 2011, based on the modeling estimates, the remaining CSOs contributed 0.57 percent of the total nitrogen (TN) and 0.87 percent of the total phosphorus (TP) loads delivered to Chesapeake Bay tidal waters in 2011.

**On-site Systems**:
The Bay Program estimates that about 25 percent of the homes in the watershed have on-site/septic systems that provide basic treatment to household wastewater. Based on the phase 5.3.2 Chesapeake Bay Watershed Model, these on-site systems contributed approximately 8.3 million pounds or 3.4% of the total nitrogen load to the Bay in 2011.

Verification will confirm if the upgraded wastewater facilities, CSOs or septic systems are designed, installed, and maintained over time and meet the load reduction targets.

## *Existing BMP verification and inspection programs already in place and being built on*

**Wastewater - NPDES Regulation**
The NPDES compliance system and monitoring requirements provides the most stringent verification for the implementation of the facility upgrade.

All significant facilities have or will have nutrient permit limits.
Some jurisdictions also have or will have nutrient permit limits or monitoring requirements on some of their nonsignificants.

The wastewater load reduction goals in the Bay TMDL and jurisdictions' WIPs are only applied to the significant facilities. There are no load reduction goals for nonsignificant facilities in all Bay jurisdictions.

**CSO - Long Term Control Plan**

The Long Term Control Plan (LTCP) is required by the national CSO control policy to reduce overflows from CSO outfalls.

On-site Systems – Construction permit and Inspection Requirement

Existing regulations for on-site systems are different among the Bay jurisdictions. They vary from construction permits to more complex regulation through operating permits with inspection and monitoring requirements. MD and VA already have and DE will have the complex regulations for on-site systems.

## *Recommended verification protocol(s) and the underlying logic behind the approach*

Recommended verification protocols:

For non-significant wastewater facilities, the Wastewater Treatment workgroup feels the existing NPDES regulation and the DMR reporting system provide sufficient verification.

- The existing NPDES Discharge Monitoring Report (DMR) will be used to report the load reductions due to non-sig wwtp BMPs that include upgrades and offsets of new or expanding nonsig plants.
- Annually track the universe of nutrient- and sediment-contributing nonsignificant facilities against established inventories for grouped wasteload allocations, report loads using the various mechanisms described in jurisdiction WIPs and document any allocation redistribution or changes in reporting structure that result from trading.

For CSOs, the workgroup is confident that the existing CSO regulatory process verifies implementation and maintenance.

For on-site systems, the workgroup suggests the related state regulations or following minimum elements for verification of BMP systems:

- State or local authorities should verify, track and report proper installation and O&M of on-site BMP systems. Verification may be through inspections by the design professional.
- The design and installation on-site BMP systems should be done and reported by the certified service providers and verified in the permitting processes.
- The maintenance and inspection of on-site BMP systems should be conducted and reported annually by certified providers and tracked by the authorities. For some low maintenance systems, such as enhanced conventional systems, the inspection frequency could be lower. The CBP on-site BMP expert panel will recommend inspection frequency by practice, which will be available in April 2013. Upon approval from the WWTWG, the final recommended inspection frequency may be adopted by the states.
- Tracking and reporting through the databases managed by state agencies.

Underlying logic

The workgroup felt that the existing national regulations have specific verification/inspection requirements for wastewater and CSOs, which meet or exceed the BMP Verification

Principles. The verification/inspection programs for all non-significant wastewater plant upgrades will rely on the existing NPDES regulation and DMR reporting system, and existing CSO regulatory process will be used for CSOs.

There is no national regulation for on-site systems. Existing regulations or programs vary dramatically among the Bay jurisdictions, as does the willingness to participate in this verification effort. The recommended verification protocols were developed based on the best existing state regulations for on-site system that meet or exceed the Verification Principles.

### *How the recommended verification protocol(s) address the partnership's verification principles*

The existing regulatory systems for CSOs and non-significant facilities meet or exceed the verification principles through a rigorous system of permits, inspections, and monitoring requirements that ensure accountability, proper design, implementation, operation and maintenance. For on-site systems, the recommended protocols are based on the best existing regulations and programs. The workgroup feels that these programs meet or exceed the verification principles.

#### *The workgroup's process to develop the protocol(s)*

1. Evaluate the existing BMP verification/inspection programs among the Bay jurisdictions.
2. Find what is need to be improved to meet the Verification Principles
3. Develop the protocols based on the best existing BMP verification/inspection programs that meet the Verification Principles

#### *How the jurisdictions would implement the recommended protocol(s)*

Non-significant wastewater facilities: Existing NPDES regulation and DMR reporting system.

- The existing NPDES Discharge Monitoring Report (DMR) will be used to report the load reductions due to non-sig wwtp BMPs that include upgrades and offsets of new or expanding nonsig plants.

- Annually track the universe of nutrient- and sediment-contributing nonsignificant facilities against established inventories for grouped wasteload allocations, report loads using the various mechanisms described in jurisdiction WIPs and document any allocation redistribution or changes in reporting structure that result from trading.

CSOs: Non-significant wastewater facilities: Use existing CSO regulatory process

On-site Systems: State regulations on septic systems or following minimum requirements

- State or local authorities should verify, track and report proper installation and O&M of on-site BMP systems.

- The design and installation on-site BMP systems should be done and reported by the certified service providers and verified in the permitting processes.
- The maintenance and inspection of on-site BMP systems should be conducted and reported annually by certified providers and tracked by the authorities. For some low maintenance systems, such as the enhanced conventional systems, the inspection frequency could be lower. The CBP on-site BMP expert panel will recommend the inspection frequency by practice, which will be available in April 2013 Upon approval from the WWTWG, the final recommended inspection frequency may be adopted by the states.
- Tracking and reporting through the databases managed by state agencies.

There is consensus among workgroup members on implementing the recommended protocols for non-significant wastewater facilities and CSOs, which were based on the existing national regulation programs. However, the willingness and resources to implement the recommended protocols for on-site systems varies by jurisdiction. As noted during WWTWG discussions, verification for on-site systems only applies to nitrogen-reducing (BMP) systems, not traditional septic systems that do not receive credit. The jurisdictions that intend to seek credit for BMP systems plan to participate in this effort and will implement the recommended protocols through their regulations (existing or upcoming) or programs required for advanced on-site systems. These on-site system regulations or programs have specific maintenance and inspection requirements for specific on-site systems. Currently, VA and MD have their regulations on on-site systems in place; DE has a draft regulation that will become effective soon. WV is willing to meet minimum verification requirements. DC has no on-site systems. PA and NY currently do not plan to seek credit for implementation of on-site BMP systems, so verification is not needed.

VA: REGULATIONS FOR ALTERNATIVE ON-SITE SEWAGE SYSTEMS
http://lis.virginia.gov/000/reg/TOC12005.HTM#C0613

MD: REGULATION OF WATER SUPPLY, SEWAGE DISPOSAL, AND SOLID WASTE
Chapter 02 Sewage Disposal and Certain Water Systems for Homes and Other Establishments in the Counties of Maryland Where a Public Sewage System is Not Available Authority
http://www.dsd.state.md.us/comar/SubtitleSearch.aspx?search=26.04.02

DE: REGULATIONS GOVERNING THE DESIGN, INSTALLATION AND OPERATION OFON-SITE WASTEWATER TREATMENT AND DISPOSAL SYSTEMS (in draft)
http://www.dnrec.delaware.gov/wr/Information/GWDInfo/Documents/AmendedRegDraft2Clean1.pdf

WWTWG members from DE, MD, and VA provided descriptions of their existing verification programs for BMP on-site systems; these descriptions are attached as Appendices A, B, and C, respectively (see pages 6-14).

| Draft BMP Verification Protocols for WWTPs, CSOs and On-Site Systems | | | | |
|---|---|---|---|---|
| | ***Sig WWTP*** | ***Non-sig WWTP*** | ***CSOs*** | ***On-Site Systems*** |
| **Draft Protocols** | Daily/weekly monitoring and monthly reporting of flows and loads via DMRs. In addition, (a) annual loading reports are also submitted where trading or general permit conditions apply to a facility, and; (b) annual WIP reporting also applies**.** | • The existing NPDES Discharge Monitoring Report (DMR) will be used to report the load reductions due to non-sig wwtp BMPs that include upgrades and offsets of new or expanding nonsig plants.<br>• Annually track the universe of nutrient- and sediment-contributing nonsignificant facilities against established inventories for grouped wasteload allocations, report loads using the various mechanisms described in jurisdiction WIPs and document any allocation redistribution or changes in reporting structure that result from trading, offsetting or assimilation by other facilities. | • Construction Verification: properly designed, installed, and maintained by the certified service providers.<br>• Post construction monitoring and Inspection.<br>• Existing compliance and enforcement procedures.<br>• Tracking and reporting | State regulations on septic systems or following minimum requirements that were developed based on the existing or upcoming state regulations in DE, MD and VA.<br><br>• State or local authorities should verify, track and report proper installation and O&M of on-site BMP systems.<br>• The design and installation on-site BMP systems should be done and reported by the certified service providers and verified in the permitting processes.<br>• The maintenance and inspection of on-site BMP systems should be conducted and reported annually by certified providers and tracked by the authorities. For some low maintenance systems, such as the enhanced conventional systems, the inspection frequency could be lower. The CBP on-site BMP expert panel will recommend the inspection frequency by practice, which will be available in April 2013. Upon approval from the WWTWG, the final recommended inspection frequency may be adopted by the states.<br>• Tracking and reporting through the databases managed by state agencies. |
| **State Applicable** | All | All | All | DE, MD, VA and WV |
| **The Workgroup Recommendations And Comments** | Use existing NPDES DMR and state WIP defined procedures | Use existing NPDES DMR and state WIP defined procedures | Use existing CSO regulatory process | • DE, MD, VA and WV agreed to verify on-site BMP systems. PA and NY do not currently plan to seek credit for on-site BMP systems so do not have plans for verification.<br>• Use existing or upcoming state regulations on on-site systems.<br>• The expert panel may make recommendations for consideration by stakeholders regarding septic BMP inspection frequencies. |

## APPENDIX A
## Summary of Delaware's regulatory program for onsite systems

Delaware has language in the on-site regulations allowing guidelines to be developed for Innovative/Alternative (I/A) systems by the Delaware Department of Natural Resources & Environmental Control which permittees must follow. Because of this language, the Department developed Operation and Maintenance (O&M) Guidelines for all I/A systems permitted after February 1st, 2007 (attached). Onsite BMP systems are part of the I/A system category. This guideline has been incorporated into DE regulation update and will become a regulation once the update has passed.

Systems permitted and installed prior to Feb 1st, 2007 do not have to follow the O&M requirement and are inspected by the Department every three years. This is tracked by an Access database at DNREC.

Systems permitted after Feb 1st 2007 fall under the O&M guidelines. BMP systems are inspected every 6 months by the service provider. Tracking of systems with O&M requirements is also done through an Access database.

All Onsite BMP systems are inspected by the Department and system designer when installation is complete and before the system has been covered and backfilled. A "Certificate of Satisfactory Completion" (COC) is not granted until: the installation has been found to be satisfactory by the Department and system designer (a DNREC licensed PE), a service contract for a minimum for two years has been submitted for the system, the manufacturer representative submits in writing, if not present at the time of inspection, that the installation has been performed correctly. A system cannot be put into use until a COC has been issued. The construction phase of all I/A system is tracked with a database accessible by the Ground Water Discharge Section.

**Innovative and Alternative On-Site Wastewater Treatment and Disposal Systems**

**Operation & Maintenance Guideline**
**February 1, 2007**

## Purpose:

**This guideline is intended for all Innovative and Alternative On-Site Wastewater Treatment and Disposal Systems ≤ 2,500 gallons per day.**

## Overview:

Innovative and Alternative (IA) on-site wastewater treatment and disposal systems are classified as anything other than conventional systems. These systems include but are not limited to advanced treatment units, peat biofilters, drip dispersal or a combination thereof. In order to ensure the proper operation and maintenance of IA systems, the Department of Natural Resources and Environmental Control (DNREC) requires the permittee, through permit conditions, to maintain service contracts with certified service providers for the life of the system.

## Definition:

For the purpose of this guideline, a **certified service provider** shall be defined as the following:

1. An individual representative of a manufacturer/supplier who holds a DNREC Class E System Contractor or Class H System Inspector license; or,

2. A Class E System Contractor who is certified, through DNREC approved training, on the operation and maintenance of the advanced treatment unit or system; or,

3. A Class H System Inspector who has become certified through DNREC approved training on the operation and maintenance of the advanced treatment unit or system; or,

4. A Homeowner who has obtained DNREC individual homeowner service provider certification and has been certified through DNREC approved training on the operation and maintenance of the advanced treatment unit or system. The DNREC homeowner certification allows the homeowner to operate and maintain their IA system at their primary place of residence only.

**Operation and Maintenance Guideline with Permit Conditions**

1. Prior to the Ground Water Discharges Section (GWDS) of DNREC granting a Certificate of Completion, the permittee must enter into a service contract with a certified service provider initially, for a minimum of two (2) years starting at the onset of initial system operation. Specifically the service contract shall prescribe an Inspection Program and Homeowner Training Program as outlined below:

   a. Inspection Program
      The inspection program shall include the following: a schedule indicating inspection frequency; inspection objective(s); inspection details; necessary operation and maintenance activities; additional sampling if required; and record keeping requirements.

      i. Inspection Frequency/Objective: The service contract must outline that the certified service provider is to inspect the system once every six (6) months, or otherwise as approved by the GWDS.

      ii. Inspection Reports: The contract must outline that the certified service provider must document all inspections. Operation inspection reports shall indicate the following: date and time of the inspection; sampling and laboratory analysis results; operation and maintenance performed; repairs; an assessment indicating the current performance status of the entire treatment and disposal system; and any corrective actions that must be taken prior to the next inspection. All inspection reports shall be on forms approved by the GWDS.

   b. Homeowner Training Program
      The service contract must state that the certified service provider is required to meet with the homeowner during the first 6$^{th}$ month inspection. The certified service provider is to educate the homeowner on the components of the system and on the proper operation and maintenance requirements. At this time, the certified service provider shall provide the homeowner with an operation and maintenance manual.

2. Following the initial two (2) year period, the permittee is required to maintain a service contract for the life of the system by either: renewing the existing contract annually, at a minimum, or by contracting with another certified service provider. The service contract must contain the inspection program requirements from 1(a) above.

3. The permittee must submit all inspection reports and updated contracts from the previous year by February 1st of each year to the GWDS. The GWDS will mail out reminders.
4. The GWDS reserves the right to collect and analyze samples to ensure proper treatment levels and system performance.

5. Right of Entry

The Secretary of the DNREC or his or her authorized representatives, in regulating water pollution or any other matter over which he or she has jurisdiction under 7 Del. C., Chapter 60, may for the purposes of inspection of on-site wastewater treatment and disposal system(s) installed and or to determine whether a violation exists under 7 Del. C., Chapter 60 or regulation enforceable by the Secretary of the DNREC, may enter, private or public property at reasonable times, upon given verbal notice, after the presentation of official identification to the owner, occupant, custodian or agent of the property,.

6. The GWDS may increase inspection frequencies as warranted. A notice outlining new frequencies and cause will be provided to the permittee prior to initiation.

7. Transferability

This permit is personal and may not be transferred without the prior written consent of the GWDS. Thirty days prior to the transfer of the real property, the owner shall obtain the written consent of the GWDS to transfer this permit to the new property owner. Transfer of the maintenance agreement must also be completed and approved prior to transfer. Failure to obtain such written consent may result in the revocation of this permit.

## APPENDIX B
## Overview of Maryland's processes and regulation in regards to best available technologies for removal of nitrogen (BAT)

- WWTWG protocol: State or local authorities should verify, track and report proper installation and O&M of on-site BMP systems.
    - COMAR 26.04.02.07F. "Within 1 month of the completion of an installation, a person installing a BAT system shall report to the Department, or the Department's designee, in a manner acceptable to the Department, the address and date of completion of the BAT installation and the type of BAT installed."

- WWTWG protocol: The design and installation on-site BMP systems should be done and reported by the certified service providers and verified in the permitting processes.
    - COMAR 26.04.02.07E "A person who has completed a course of study approved by the Department for the installation of BAT, and has a certification of qualification for installing BAT systems from the manufacturer, must be present on the property while a BAT unit is installed." The design of the BAT must be approved by MDE."

- WWTWG protocol: The maintenance and inspection of on-site BMP systems should be conducted and reported annually by certified providers and tracked by the authorities. For some low maintenance systems, such as the enhanced conventional systems, the inspection frequency could be lower. The CBP on-site BMP expert panel will recommend the inspection frequency by practice, which will be available in April 2013. Upon approval from the WWTWG, the final recommended inspection frequency may be adopted by the states.

  COMAR 26.04.02.07D

  D. Operation and Maintenance of BAT Systems.

  (8) A BAT system shall be operated by and maintained by a certified service provider.

  (2) The owner shall ensure that each BAT system is inspected and has necessary operation and maintenance performed by a certified service provider at a minimum of once per year.

  (3) The Department shall maintain a list of certified service providers.

  (4) Individuals may become certified upon completion of a course of study on operation and maintenance of BAT systems approved by the Department. The course of study must include instruction on how BAT systems function as well as elements on operation, maintenance, and repair of BAT systems.

  (5) Certification as a service provider for BAT systems may be revoked at any time by the Department for violation of these regulations.

(6) The certified service provider shall report on inspection, operation, and maintenance activities to the Department, or the Department's designee, in a manner acceptable to the Department on a yearly basis prior to the yearly anniversary of the date of installation.

(7) The certified service provider must have a certificate of qualification from the manufacturer of the BAT system being serviced.

(8) A property owner may obtain certification as a service provider to maintain the property owner's system, subject to all the requirements of this regulation pertaining to operating and maintaining BAT systems."

- WWTWG protocol: Tracking and reporting through the databases managed by state agencies.

  26.04.02.07D (6) "The certified service provider shall report on inspection, operation, and maintenance activities to the Department, or the Department's designee, in a manner acceptable to the Department on a yearly basis prior to the yearly anniversary of the date of installation."

  COMAR 26.04.02.07F. "Within 1 month of the completion of an installation, a person installing a BAT system shall report to the Department, or the Department's designee, in a manner acceptable to the Department, the address and date of completion of the BAT installation and the type of BAT installed."

## APPENDIX C
## Summary of Virginia's regulatory program for onsite systems

The onsite program is regulated by two different regulations. The *Sewage Handling and Disposal Regulations* (SHDR), 12 VAC 5-610, and the *Regulations for Alternative Onsite Sewage Systems* (AOSS Regulations), 12 VAC 5-613. The regulations can be found at http://lis.virginia.gov/000/reg/TOC12005.HTM#C0610 and http://lis.virginia.gov/000/reg/TOC12005.HTM#C0613 respectively.

The SHDR provide the administrative and procedural regulations along with prescriptive design criteria for conventional and some alternative systems. Mechanisms to ensure that systems are designed and constructed properly are found here. Those mechanisms include:

1. Submittal of a construction application with supporting soils work; site layout; verification of horizontal separation to wells, surface waters, shellfish, etc.; supporting calculations; and other pertinent design information.
2. Review of the application by environmental health specialists and, as needed, by staff engineers.
3. Confirmation of installation according to plans through completion statements based on inspections by the design professional.

The AOSS Regulations expand upon the design options for alternative systems using performance standards and require monitoring and operation and maintenance to verify compliance. All onsite BMPs are expected to be alternative systems and would be subject to the requirements of this regulation. For small systems (≤1,000 gpd), the following requirements apply:

1. The procedural requirements of the SHDR apply as described above.
2. An operation and maintenance manual is required.
3. At a minimum all AOSSs must be visited by a licensed operator at least once a year and a report submitted to VDH. Additional operator visits may be needed as described by the O&M manual.
4. Generally Approved treatment units (systems that have gone through 3$^{rd}$ party testing) have an initial sample collected within 180 days of startup and then every 5 years. Sampling is for $BOD_5$ and, if disinfection is in place, for total residual chlorine (TRC) or fecal coliform.
5. Non-generally Approved treatment units (systems that have not gone through 3$^{rd}$ party testing) have an initial sample collected within 180 days of startup and then semi annually for two years. If the mean of the samples complies with the given effluent limit, then the sampling is reduced to annually. Sample parameters are as in 4 above.
6. The annual inspection frequency is retroactive and applies to all AOSSs in Virginia. The sampling requirement only applies to systems constructed under the new regulation.

For large AOSSs, the requirements increase as the design flow increases. For large AOSSs, the following requirements apply:

1. The procedural requirements of the SHDR apply.
2. An operation and maintenance manual is required.
3. A renewable operating permit is required.
4. Sampling required in accordance with Table 3 below.
5. Operator attendance in accordance with Table 4 below for facilities over 1,000 gpd and up to 40,000 gpd.
6. For facilities with design flows >40,000 gpd, the frequency reverts to the same frequency for systems under the VPDES discharging permit program as found in 9 VAC 5-790. http://lis.virginia.gov/cgi-bin/legp604.exe?000+reg+9VAC25-790-300.
7. Reports required by 15th of month.

**Table 3**
**Sampling and Monitoring for Large AOSSs**

| PLANT SIZE | >2.0 MGD | >1.0 - to 2.0 MGD | > 100,000 GPD to 1.0 MGD | > 40,000 GPD to 100,000 GPD | >10,000 GPD to 40,000 GPD | >1,000 GPD to 10,000 GPD |
|---|---|---|---|---|---|---|
| Flow | Totalizing, Indicating, & Recording | Totalizing, Indicating, & Recording | Totalizing, Indicating, & Recording | Totalizing, Indicating, & Recording | Measured | Measured or Estimate |
| $BOD_5$, TSS | 24-HC* 1/day | 24-HC 5 days/wk | 8-HC 3 days/wk | 4-HC 1 day/wk | Grab quarterly | Grab 1/yr |
| Total Nitrogen | 24-HC weekly | 24-HC weekly | 8-HC monthly | 4-HC quarterly | Grab quarterly | Grab 1/yr |
| TRC, End of Contact Tank** | Grab daily | Grab daily | Grab weekly | Grab weekly | Grab weekly | Grab 1/yr |
| Fecal Coliform*** | Grab weekly | Grab weekly | Grab monthly | Grab monthly | Grab quarterly | Grab 1/yr |

*HC – hourly, flow weighted composite samples
**if disinfection required and chlorine used
***if disinfection required and a disinfectant other than chlorine used

**Table 4**
**Minimum Operator Visit Frequency for AOSSs up to 40,000 GPD**

| Avg. Daily Flow | Initial Visit | Regular visits following initial visit |
|---|---|---|
| ≤1,000 GPD | Within 180 calendar days of the issuance of the operation permit | Every 12 months |
| >1,000 GPD to 10,000 GPD | First week of actual operation | Quarterly |
| >10,000 GPD to 40,000 GPD | First week of actual operation | Monthly |

Therefore, the annual inspections for the small systems will verify that the system is operating according to its intended design and the BMP is functioning as designed. For the larger systems, monitoring will verify compliance with the required effluent limit.

Nitrogen limits will be effective December 7, 2013, for all new AOSS construction applications received after that date. For small systems, the requirement is for a 50% reduction in TN as compared to a conventional system. The AOSS Regulations reference approved BMPs as suitable for compliance, but the detail on acceptable BMPs is in development. Larger systems have more stringent TN limits and will utilize end of pipe (prior to application to soil) sampling for TN. Those limits are 20 mg/l TN for systems 10,000 gpd or less and 8 mg/l TN for larger systems. Additional removal through the soil dispersal field and then attenuation rates from the edge of drainfield to edge of stream will effectively reduce the input of TN from large systems to negligible.