



# Standards Oversight Council (SOC)

Developing effective technical standards that protect Wisconsin's natural resources

---

131 W. Wilson St., Suite #601, Madison, Wisconsin 53703  
(608) 441-2677 || Fax (608) 441-2676 || [socwisconsin.org](http://socwisconsin.org)

## 1010 Proprietary Filtration Devices Standard Team

### MEETING NOTES

Wednesday, November 28, 2018 ▲ 9:00am – 3:00pm ▲

DNR Service Center, 3911 Fish Hatchery Road, Glacier Room, Fitchburg, WI

#### 9:00 Introduction, Notes Approval (Kate)

Goal: Welcome, introductions, adjust 10/10 notes as necessary and approve.

Sam Brown has left Contech and the team. Introduce Chris Allen from Contech who will replace Sam since it's early enough in the process and he was able to overlap with Sam on the standard.

Draft notes from last meeting (10/10) – No comments raised. Kate will post final on the team website next week so if there are any comments, get them by the end of this week.

Team agrees it isn't necessary for hard copies for everyone at the meeting, but I'll bring a few copies for those who may want a look.

#### 9:15 WinSLAMM Modelling – Software Representative Perspective (John Vorhees)

Goal: Provide a summary of WinSLAMM-- model hydraulics, data interpretations and issues with data transfer from vendors.

Presentation with team discussion. Some key points below:

- Runoff time duration of 1.2x rainfall time duration is constant, though user can set the default peak-to-average flow ratio of 3.8 to another ratio (e.g. 2, 3.8 or 8)
- Time step is set at 6 min as default. User can change this.
- With a catch basin device, flow rate in is equal to flow rate out; model does not give credit for detention. Wet pond device gives credit for detention – lower release rate.
- Particulate settling considers length, depth, water velocity, settling velocity
- Output options can account for pollutants other than TSS (like P).
- The device process was evaluated for input to WinSLAMM. Pilot scale tests and actual runoff data modelled—model developed based on substantial field and lab tests.

UpFlo Filter modeling is outlined.

- The output can show number of cartridges staged by vault area.
- Overflow still gets credit for settling and larger vaults have greater settling/storage.
- Model tracks particle size with Stokes law applied to initial settling sump.

- Effluent quality was found to be relatively constant over broad range of influent concentrations and flows (flow rate had small effect on effluent qual).
- %reduction varies based on particle size. Filter efficiency changes with sediment build-up. **John V** will review and confirm how model adjusts for clogging (filter efficiency)

StormFilter modeling is outlined

- Preference would be to have more variables, but model still works. For instance, it doesn't account for optional sump.
- SSC is shown in documents though model converts to TSS
- TSS particle size cutoff around 75 microns
- Performance with rainfall data looks similar to UpFlo model

Issues:

WinSLAMM development process time consuming for new filters – 4 phases over 3-5 years  
Software development delays – funding based on software sales and is not lucrative, used primarily in WI, no fulltime staff

Options for Using WinSLAMM:

1. create a vendor input filtering option similar to the SOC settling standard.
2. If vendor wants to add their device, develop review process with vendor/DNR, hire a software developer to speed process, provide SOC standard for what needs to be in WinSLAMM

If we include WinSLAMM in the standard, would it be worth it for vendors to get their devices in the model? WI market isn't big enough for all manufacturers to get their devices in to WinSLAMM. Vendors are looking at national options like STEPP and ASTM. If they could adjust model for climate and other geographic issues, it could be more applicable outside of WI.

In WI, a lot of sites use WinSLAMM, but DNR doesn't require it.

Most approvals around the country are presumptive, based on manufacturer research (their device was tested to indicate it will perform at a certain % reduction at certain flow rate appropriate for the project)

**10:00 Modelling – Manufacturer's Perspective** (Chris Allen from Contech, Jake Brunoehler from ADS)

Goal: Provide a summary of modelling StormFilter device in WinSLAMM including different design scenarios with different site parameters, how modelling performance compares with other certifications (such as TAPE), and modelling concerns and considerations.

Presentation with team discussion—see slides for details.

Some key points from ADS presentation:

- They ran models with 0.5 acre, 1.0 acre and 1.5 acre. The sizing is linear—using NURP, 8 cartridges at 0.5 acre up to 76 cartridges at 5.0 acre. The cost differential is several \$100K (and that doesn't include cost for land required or O&M).
- To achieve 80% reduction, they have to treat 100% of flow.
- Using a combination of UpFlo Filter and StormTech chamber, they can significantly reduce # of modules needed.

Some key points from Contech presentation:

- WinSLAMM outputs include effluent concentration for various particle size groupings
- 80% reduction in NURP is difficult with just StormFilter but if they add wet pond, the sizing and efficiency are much better. For example, a 0.5 acre site would be 91 cartridges with just SF, but only 9 cartridges with 60" pipe modeled as a wet pond.
- Model shows a credit for larger vault – settling within the vault would be larger particle size so filtration part of model shifts to smaller particles
- He also looked at TAPE criteria – that model would be very different due to rainfall and PSD differences.
- Contech has Phosphosorb which can be used in WinSLAMM to show P reduction.
- Modeling considerations:
  - Consistent performance protocol and interpretation
  - Consistently modeled hydraulics among devices
  - First flush vs net annual
  - Particle size distribution
  - Overcomplication or oversimplification
  - Comparability to publicly available BMPs

**11:15 Additional State by State Comparisons (Phil, Jim and Jake)**

Goal: Gain additional understanding of how other state's (NJ, WA, TX, VA) programs measure up. Discuss which pieces, if any, may be applicable to the WI standard.

Phil presents summary table of NJ, WA and ETV. These aren't easily comparable programs in the details. WA has field sampling requirement so there are a lot of storm-related criteria. Team agrees real stormwater is preferable over lab. Even real storm water has variations in particle size, due to where the water is coming from and length and severity of storm. Phil also presents the particle size distribution chart showing the programs side by side. We add average points from a WA TAPE report (so actual storms). They are all different—NURP meets with the WA storm particle size at 4 microns.

**11:45 Lunch**

**12:15 ETV Particle Size Review (Roger/Judy)**

Goal: Present a summary of particle size distribution evaluated by ETV and relationship to NURP.

Roger presented on original decision to use NURP for DNR criteria and how that has matched up to real storm water distribution in studies. There are variables in even two similar parking lot studies. There were problems with initial research that led to decision in using NURP. Real storm water isn't NURP.

Roger has tracked down the Driscoll paper on NURP and will distribute it.

Different sampling methods (namely DISA) give more accurate results—regression analysis shows DISA matches depth and intensity factors in PSD.

There are also seasonal changes in PSD not accounted for.

Are TMDLs based on NURP? In-stream monitoring determines TMDLs. Urban stormwater baseline load was calculated as a municipal-wide average load based on about 20 municipalities modeled in WinSLAMM.

DNR is sticking to NURP as a sideboard. In future, the use of NURP as comparison criteria may be addressed, but that's not the charge of this team.

**12:45 Examples of Particle Size Distribution From TAPE Analyses (Eric)**

Goal: Present a summary particle size curves from TAPE reports, tie to DNR's use of NURP.

Present a draft table showing design rates and sizing for WI hydrology.

Eric presents a generic WinSLAMM analysis with some basic assumptions and basic site criteria (1 gpm filter capacity based on Madison rainfall data). It doesn't take into account storage or filter details.

- Could we use this or similar and adjust the modelling efficiency curve?
- We could build this generic model with UpFlo and test with StormFilter to see how they two compare on base level.
- Can we make parallel P adjustment that would be based on particulate? This is tricky—P needs to take into account the media and adsorption/dissolved phase.
- Generic model would have some issues of things not addressed: bypass, hydraulics of devices, maintenance.
- If modeling required, WinSLAMM limitations could stifle innovation. It's a long, complex process to add a specific device.

Discussion regarding whether TAPE or ETV be applied in WI:

- Can we shift data to keep with NURP particle size distribution?
- Can we look just at TAPE data for a specific range and determine a device is appropriate based on that range?

- What do we need to accept TAPE?
  - TAPE PSD charts show no data <4 microns. No one knows why. **Jay** will check with Herrera (they do much of the testing)
  - Documentation of 80% relative to NURP. We could have a “grandfathering” period where we accept TAPE approved devices for a certain period of time, but would require additional information after a certain date. This would allow manufacturers time to do additional testing, but standard could still be implemented right away.
  - How to incorporate modelling? Could we require UpFlo and StormFilter use WinSLAMM but others don’t need to? We need to evaluate how to keep modelling option/requirement comparable for all.

**1:30 Which Direction to Go In?**

Goal: Confirm some of the areas where team has come to a consensus and made tentative decisions. Where do we need more presentations and discussions?

We will review decisions at next meeting but here are some general areas we are close:

- Real stormwater in field vs lab? Team likes field testing but if someone only had lab testing, could they still be used in WI?
- Parameters to include (now just TSS and P, and could add other TMDLs previously discussed. We could list in Considerations.)
- Use of existing programs
- How to incorporate modelling?
- Maintenance requirements? For example, design for at least 1 year operation with requirement for periodic O&M. NJ is a 10% drop in flow and they have to measure periodically. WA requires treatment of 91% of avg annual volume.
- Bypass/overflow – should we allow a certain amount?
- Other base criteria or considerations?
- Particle size – existing programs vs modelling - shift to NURP?

**2:30 Next Meeting Topics** (Kate, Eric)

Goal: Identify and understand the topics, concerns, and goals for next meeting. Where is more research or deeper discussion needed?

See discussion on decisions above—we will review and confirm some decisions at next meeting. TAPE testing details – possible presentation by Herrera on testing methodology (**Jay** is pursuing)

**2:45 Plan of Action** (Kate, Eric)

Goal: Review Action Items and agenda items for next meeting

Action Items:

**John** – how clogging/filter efficiency accounted for in WinSLAMM

**Roger** – track down Driscoll paper on NURP and distribute

**Jay** – talk to Herrera to see if they have full range PSD curves from TAPE testing (incl. <4 micron), he'll also see if they can do a webinar presentation on TAPE testing for our next meeting

**Chris** – review WinSLAMM interpretations for StormFilter (Eric suggestion)

**Eric** – Develop parameters for generic approval based on the model curve – draft initial criteria on the interim period for consideration.

Next meeting will be held Jan. 9 at DNR Fitchburg Service Center (same time and place as today).

March 2019 meeting – Kate needs to reschedule due to conference conflict –**Wed. March 20** works for the team. Kate will revise the meeting invitation.