DATE: February 3, 2012

RE: Review Addendum:
Stormwater Management Manual for Western Washington
Volume IV – Source Control BMPs

Preface: The Phase I Municipal Stormwater Permit* contains the following language:

> S5.C.b.ii: IC/IDDE – conditionally allowable discharges
> (1) Discharges from potable water sources, including, but not limited to, water line flushing, hyperchlorinated water line flushing, fire hydrant system flushing, and pipeline hydrostatic test water. Planned discharges shall be de-chlorinated to a concentration of 0.1 ppm or less, pH-adjusted if necessary, and volumetrically and velocity controlled to prevent resuspension of sediments in the MS4

Comment

The guidance associated with the allowance is short on details. Our short comment for our SWMMWW Review Comments table is simply that we recommend addition of a **Line Flushing BMP** to ***Volume IV – Source Control BMPs*** or the equivalent section of a combined manual. We are providing the following narrative and draft update to our Stormwater Pollution Prevention Manual (SPPM) as an indication of the level of detail we feel is needed for the BMP, and in part (insofar as this is draft) offered as suggested language for the SWMMWW.

In revisiting our own Stormwater Pollution Prevention Manual (SPPM), we found a bit more detail, but needing more. The current SPPM BMP is for Potable Water Line Flushing or Tank Maintenance, and has allowance for discharge to ground 'in some cases'. While line flushing e.g. from household plumbing might be temporarily discharged to a 55-gallon barrel, de-chlorinated, and pH adjusted before discharge, we had been presented with proposed fire hydrant system flushing. This prompted us to consider the potential ramifications, and what we feel is necessary to be sure that discharge to the MS4 does not result in aquatic harm at the outfall. Our DRAFT updated Line Flushing BMP for high volume line flushing follows. Some of this guidance is also suitable and applicable to low volume discharges (e.g. acceptable chlorine and pH ranges, and chemicals for de-chlorination and pH adjustment).

As a draft work in progress, some of it is subject to change, and some is still conversational. While not finalized, it's far enough along that we felt it could be helpful to Ecology.

The Draft BMP will probably end up with the section on line flushing broken into two subsections: low-volume and high-volume line flushing.

The draft potable water line flushing BMP follows on the next page.

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* And as may apply to the Phase II Permit and any of the Washington Stormwater Management Manuals

- Discharging treated water to stormwater systems requires approval from the Washington State Department of Ecology and King County Water and Land Resources (KCWLRD)[*].

- Discharge must cease immediately upon a finding of exceedance of any parameters. (In addition to notifying KCWLRD).

Chlorine and pH

- Prior to discharge to the MS4, the water must be tested for total residual chlorine, and if necessary treated to a level down to ≤ 0.10 ppm. Treatment should be application of a stoichiometric quantity of sodium thiosulfate or ascorbic acid.
- Subsequent to de-chlorination, the water must be tested for pH, and if necessary adjusted to within a range of receiving water pH ± 0.2, *and* no more extreme than 6.5 < pH < 8.5. If pH needs to be lowered, WA Ecology BMP C252: High pH Neutralization using CO_2[†] shall be used. If pH needs to be raised, soda ash (sodium carbonate) may be used, or lime (calcium oxide/hydroxide/carbonate) may be used as long as the discharge will not exceed 500 mg Ca/L.
- Grab sampling is not appropriate for continuous discharge of water that is potentially toxic (chlorinated) and being chemically de-chlorinated. A continuous monitoring method should be used with a feedback loop controlling application of the de-chlorinating agent. This is necessary to continuously control the chlorine down to 0.1 ppm or less, and not discharge excess de-chlorinating chemical.

Additional pH notes:

The receiving water quality standard is:

- "pH shall be within the range of 6.5 to 8.5, *with a human-caused variation within the above range of less than 0.2 units*." This means that the pH of the receiving water to which the outfall will discharge needs to measured, and pH of the de-chlorinated discharge should be adjusted to within 0.2 units of that pH (while the "within 0.2 units" is for the receiving water, assuming the outfall discharge is a significant contribution to stream flow and therefore loading, setting this range for the discharge is a conservative approach). Need to establish if there is a de minimis discharge relative to stream flow, that would allow simple adjustment to pH 7, without monitoring stream pH, and if that would be protective enough.
- As with the chlorine testing, grab sampling is not appropriate for continuous discharge of water that is potentially toxic (out of acceptable pH range). A continuous monitoring method should be used with a feedback loop controlling application of the pH adjusting agent.

[*] Requirement is stated in the KC Stormwater Pollution Prevention Manual
[†] Needs citation; i.e., Manual, version, date, section and URL

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- pH measurement requires also testing ionic strength by use of a conductivity meter, and if conductivity is found to be low (< 100 *u*mhos/cm), special low ionic strength methodology is required (specialized pH probe and buffer solutions). Low ionic strength streams are common in Western WA. If the water being flushed is not low ionic strength, separate pH instruments and buffers may be required for that water and for in-stream measurements.

Turbidity

- The receiving water quality standard is: "5 NTU over background when the background is 50 NTU or less; or: A 10 percent increase in turbidity when the background turbidity is more than 50 NTU." This means that like pH, turbidity needs to be measured in each outfall's receiving water prior to discharge and during discharge. In-stream measurement during discharge must be far enough downstream to ensure thorough mixing.
- As with chlorine and pH, continuous monitoring instrumentation should be used.

Other comments re: monitoring and controlling treatment

- Need to establish QA/QC procedures for instrument calibration and replicate samples or measurements (off-hand don't think blanks are needed here, except likely as part of NTU meter calibration; not sure about chlorine test). Need to be sure the lower reporting limit and resolution (± error) of the field instruments are suitable for the concentrations being measured.

Other comments re: potential harm to aquatic life in the receiving water

- Need to consider if all other things considered, line flushing should also be limited to some time of year that poses the least risk to aquatic biota. Must consider both sensitive species and the biota upon which they feed or otherwise depend upon for survival; and must consider potential for induced hydrologic change that might be detrimental.
- Need to find out if this is the same water source as is delivered to homes for drinking water, and if so, assuming the municipality does chemical analysis periodically, get their most recent analytical data and that going back up to a year. Needed because surface water standards differ considerably from drinking water standards. This information to be considered in conjunction with stream flow rates (below). This could even be an issue for a private water system, which could be using e.g. galvanized or copper plumbing and/or galvanized tank water storage.

Flow

- Discharge flow volumetric velocity (gpm or cfs) must be limited to prevent re-suspension of sediments in the MS4, and to prevent harm to the receiving water.

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- It is hard to imagine that flows of e.g. 300 - 800 gpm* will not re-suspend sediments in MS4 conveyances. We need to know what is being proposed to limit flows such that MS4 conveyance sediments will not be re-suspended.
- Need to know the estimated flow rates of the receiving waters to assess the maximal outfall flow rates that will not cause hydrologic harm to the streams. What is the basis for the estimates?

Additional Notes

Continuous monitoring and chemical treatment methods should be available. Some are available for environmental work (e.g. continuous turbidity and pH monitoring), and some are common to industrial process control (e.g. chlorine monitoring with feedback loop to control treatment; same for pH control. Industrial food processing is a good place to look for these.). If an Applicant does not want to go this route - they will likely need to purchase of at least some equipment they don't already have - then batch methods that have some protection built in must be used. Off-hand, likely flushing to a tanker truck (considered Baker tank originally, but while these can be moved, they are not very mobile), with subsequent chlorine and pH adjustment. This would also provide some capacity to store and then more slowly release flows to the MS4, in keeping with the mandate prevent re-suspension of sediments in the MS4. The tanker truck would have to be one that is certified as only having been used to transport water (e.g. for road construction dust suppression). Otherwise there is risk of toxicity from residual material from a prior load.

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* This range was presented to KC by an Applicant. Not sure yet whether to retain as an example, or re-phrase this high flow concern.