

Spokane River DO TMDL Implementation - BAP Subcommittee Meeting
Minutes: April 1, 2011

Subcommittee Members or Alternates:

In Attendance: Meghan Lunney, Speed Fitzhugh, Bob Anderson, Bruce Rawls, Casey Pharr, Doug Krapas, Ken Windram, Brian Nickle, Galen Buterbaugh, Dale Arnold, Mike Neher, Paul Klatt.

On Phone: Dave Dilks, Joe DePinto, Bob Anderson, Dave Clark, Joel Massman, Sarah Hubbard Gray

Observers: Jim Bellatty, Kevin Rasler.

Ecology TMDL Staff: Dave Moore, Richard Koch, Pat Hallinan **On Phone:** Tony Whiley, Kelly Susewind, Melissa Gildersleeve.

Spokane River Forum Staff: Tonilee Hanson

UW Presenters: (On Phone) Dr. Mike Brett, Bo Li.

Welcome and Introductions: Dave Moore welcomed participants to the meeting, each of whom introduced themselves.

All meeting materials, including those referenced in these minutes can be found on-line at <http://www.spokaneriver.net/?p=3890>.

What do we know? University of Washington BAP Study

Dr. Mike Brett and Bo Li on phone with power point

IEP Proposal for incorporating UW study findings into permits

IEP Doug Krapas and Limnotech Consultants Dave Dilks & Joe DePinto

Doug Krapas provided an overview of the extensive P removal efforts, technical data and related BAP research studies that IEP has provided to Ecology over the past seven years and stated that this is “more than enough” to move ahead with modifying the IEP permit. IEP has demonstrated proactive efforts in P removal which involved piloting ten different technologies, including a biological process. IEP has invested over \$9 million in the P removal processes. Doug reiterated the point that pulp and paper mill effluent is significantly different from human waste effluent, citing several studies that supported the “low-algal availability” of pulp & paper mill effluent. The UW study required 5 samples and IEP sent 8 samples. Doug discussed the differences in effectiveness of P removal between secondary and tertiary treatment.

BAP is not a new concept. It has been accepted in another TMDL, Buckeye effluent and Buckeye nutrient load nitrogen TMDL.

IEP feels the UW BAP study information for their effluent samples should be incorporated into their NPDES permit and justifies raising their total phosphorus wasteload allocation to 70 ug/L. They are not asking for the entire amount in the UW study findings (9% bioavailable phosphorus) but for some amount above that and below what the TMDL assumed for immediately available

Spokane River DO TMDL Implementation - BAP Subcommittee Meeting Minutes: April 1, 2011

phosphorus (ortho p; 25% assumed in TMDL). IEP does not believe a TMDL revision is needed and understands that there are research questions and margin of safety concerns. IEP believes the BAP offset is conservative and that IEP has proven the low BAP in pulp & paper mill effluent with secondary and tertiary treatment.

IEP Questions Raised by UW Study:

1. Values of P provided by IEP were used as inputs into the TMDL model. Ortho P was assumed to be 25% of TP based on information we provided from pilot testing in 2005. Based on more current data, this ratio of ortho P to total P is now 7.4%.
2. Raising the alum by 10 times caused a significant overload to all systems. A 2 stage approach is needed to optimize the phosphorus removal. The 2007 trident system was unable to make it work. 2 stages removing solids up front are necessary.
3. 2009 performance testing collected ortho P data.
4. Potential effluent toxicity – sensitivity modeling done by Limnotech showed negligible impact. Quarterly tests on toxicity by IEP never show a kill of aquatic life.
5. Eckholm 2004 wastewater can inhibit algae growth, not toxic to algae photo bacteria test.
6. Statistical validity of only 8 samples. QAPP intended only five 5 samples be submitted. IEP exceeded the requirements by sending 8.
7. Previous studies show significant BAP removal results.
8. IEP has 20 ortho P samples for tertiary treatment study that substantiates the UW BAP study [these samples were not provided at the meeting]
9. TP swings in pulp and paper plant waste does not occur like people waste. The plant swings occur due to changes in the grade of recycled material in paper orders.

Limnotech Consultants for IEP

Joe DePinto is new to project and was hired to deal with BAP and review the UW work. Joe commented that there are no models that can fully represent natural processes and all models have limitations. He also added that we can produce a useful model. Joe studied BAP in Great Lakes in 70s & 80's using a different procedure than the UW algal growth as a measure of BAP. In the Great Lakes studies, rather than look at algal growth they looked at particulate P going into the Great Lakes. Rather than how much algae would grow, they devised a technique to look at the P that P starved algae would take up. Luxury uptake might not be represented in a dual cultured diffusion apparatus, such as was done in the UW study. The Great Lakes studies used a darkened chamber with 0.25 microns of P starved algae and measured the rate of uptake of organic and mineral P in suspended sediments. Rates of BAP uptake at 0.1%/day vs. 2-3%/day are important differences in terms of immediately available or ultimately available phosphorus. Suspended sediments in tributaries had between 20 -50 % of total particulate (ultimately available) P. Ultimately if you extend the uptake rate to where it levels off, between 20-50% of that P would become available based on land use and geology of lake.

There was a discussion of the relationships of TRP, SRP, DOP and BAP as related to waste water treatment plants and the TMDL model inputs. The question was then raised about adapting the UW study findings for IEP effluent (TRP) into the TMDL model (based on SRP) with a "three bucket" approach. The TMDL model currently has two buckets, one for immediately available phosphorus (ortho P) and one that is available over a longer period (organic P).

Dave Dilks (Limnotech) proposed applying the conceptual model and 2 alternative approaches

Spokane River DO TMDL Implementation - BAP Subcommittee Meeting
Minutes: April 1, 2011

1) Simple approach; two buckets as per TMDL: immediately available P and slow P (two forms of P). Dave proposed simulating a combination of UW and IEP SRP measurements for the ortho P input (this would be the difference between TRP and SRP in UW report supported by ortho P data from IEP (not provided during meeting)).

2) Rigorous; three buckets: Organic P, difference between SRP and TP (for immediately available P), and a third bucket of inert or completely unavailable P. Dave ran the model with SRP in 2nd bucket with a 2% decay rate and got workable results.

Bob Cusimano (Ecology) agreed with the 3 bucket approach as proposed by Dave Dilks but had questions on whether the percentage of ortho P reported by IEP (7.4% of TP is bioavailable) are consistent with how Ecology calculates a 95th percentile confidence limit. This number could be higher and until we have the ortho P raw data from IEP, it's too soon to know. Dilks had questions on which confidence limit would apply and whether the EPA permit writers manual guidance could be used.

Group discussions of technical information followed regarding: BOD differences in decay rate for various forms of P; conversion rates; variability and standard deviation around measurements; questions on how to characterize the upper limit, determining the long term effect by looking at the standard error or mean variability over week or month not day to day. It was decided that for now the concept is needed and the math can be addressed at a later stage.

Spokane County raised the question, "Does this discussion mean we will re-run the analysis for all dischargers or just one? Are we going to run a model for IEP but not include the other dischargers? We need to decide who's in and who's out." Dave Moore stated that answering the question of who's in or out and timing of sampling / modeling was the purpose of the roundtable discussion later in the meeting.

Kelly Susewind: Provided a summary of the discussion to that point and reiterated Ecology's position on issuing permits. He stated that he generally agreed with the three bucket approach concept for modified ortho P inputs and wanted to focus on ortho P / SRP as a quicker path to possible modifications (because these are used in the TMDL model) rather than BAP from the UW study (which can inform ortho P but is not as straightforward for model inputs). He also re-affirmed Ecology's commitment to using the TMDL model and was not going to budge on questions regarding its usability. Ecology wants to get permit limits that all dischargers can live with and in the long term wants to utilize the BAP information. In the near term, Kelly said dischargers should run the model as is with the two bucket approach working with the ortho P (immediately available fraction) and that we should use the upper percentile (95%) confidence limit to be conservative. Kelly understood that IEP would be the "poster child" as far as being the first to pursue a modified permit limit based on ortho P and that we need to get the permits issued so everyone is under a permit in order to get Spokane County permitted. An attorney is needed to determine if the policy is legal, and if a TMDL amendment is needed. Attorneys are currently in discussions. The plan is to issue permits June 1st with limits that people are comfortable with. Enabling language will allow BAP to be included after further testing.

Dave Moore asked subcommittee members to weigh in on including all dischargers in the early adoption model or if they were OK with IEP being the initial lead for BAP. Most were OK with IEP starting the process and concerns were raised by Bruce Rawls about how it would affect everyone

**Spokane River DO TMDL Implementation - BAP Subcommittee Meeting
Minutes: April 1, 2011**

else. Dave Moore stated that, “..no matter who decides to pursue BAP, modeling with modified BAP inputs has to be consistent with the TMDL model and cannot negatively affect Avista’s DO responsibility found in Table 7 of the TMDL.”

Ecology made another request for IEP’s orthophosphate data.

Timelines for modification / credit: Kelly Susewind and Dave Moore

A schedule for permits and modification was presented by Dave Moore. Alternate limits and BAP permit timeframe were considered in relation to what Ecology needs to know to move forward.

**Spokane River DO TMDL Implementation - BAP Subcommittee Meeting
Minutes: April 1, 2011**

What do we need to know? Roundtable

The Subcommittee members provided the following information using charts posted in the room as a way of capturing ideas. Ecology intends to consider these questions when dischargers come forward with new data and/or modeling plans to potentially revise permit limits during the first permit cycle. For the Policy / Regulatory questions, Ecology's current position is that a TMDL modification would be necessary to revise phosphorus limits for BAP, which would make issuing permits by June 1 untenable. Issues of consistency with the TMDL are being discussed with EPA and should be resolved prior to discharger model runs for revised BAP inputs during the first permit cycle.

BAP Sub Committee What Do We Need To Know About.....?	
QAPP / Protocols / Study Design	When should the tests run? Who's in and who's out? The study needs to apply to all dischargers. Consider controls for growth inhibition in future studies. Who designs the next studies? Full participation on the design process
Timing	What is the significant time frame? Do we collect data starting in January?
Modeling	How to specify upward PO4 variability? Should secondary or tertiary treatment of P be used? If tertiary treatments are used how do we specify rates? Rate constant? Does this apply to all dischargers? Need to make the model work for all of the parameters. What is the length of the modeling? Does it reset each year? Sensitivity to ultimate BOD in model after tertiary treatment
Policy / Regulatory	Does the TMDL need to be amended to include BAP? Table 7 - Define what "...being consistent with the TMDL" means. What is a significant difference?
Monitoring	Sample Lake Spokane for BAP Field experiments in Lake Spokane Include a BAP sediment study Characterize tributaries and ground water for BAP

Doodle Poll		
Dischargers	Earliest Date to Sample	Best Date to Sample (Summer not Winter)
Coeur d'Alene	2011	Not During Stress Test
Hayden	2015	
Post Falls	2014	
Liberty Lake	2016	
Kaiser	2016	
Inland Empire Paper	4/2011	4/2011
Spokane County	1/2012	
Spokane City	2016	2017-18

**Spokane River DO TMDL Implementation - BAP Subcommittee Meeting
Minutes: April 1, 2011**

	Or existing pilot data	
--	-------------------------------	--

Next Steps

- April 14 - Alternate Limits Subcommittee
- May 6 next Advisory Committee meeting