

**Persistent Pollutant Science Workgroup (PPSWG)**  
**Notes for Meeting #5**  
**December 10, 2008 ~ ODOT Training Center, Salem**

Workgroup Members

David Stone (OSU) – Chair  
Chuck Henny (USGS) [by phone]  
Taku Fuji (Kennedy/Jenks)  
Bob Gensemer (Parametrix)  
Jeff Jenkins (OSU) [by phone]  
Joe Rinella (USGS)  
Bill Fish (PSU)

Other Attendees

Bruce Hope (DEQ) - workgroup staff  
Jennifer Wigal (DEQ)  
Cheryl Grabham (DEQ)  
Stephanie Brandon (DEQ)  
Anne Fairbrother (Parametrix) - invited

Dave called the meeting to order at approximately 9:00am and attendees introduced themselves. Dave asked if there were any corrections to November's meeting notes. There were no significant changes and the group accepted the notes with a few minor edits that Bruce will make.

The group then discussed communications with the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). Jack Miller is a technical person with CTUIR and has been very helpful by staying in touch with the group's work. CTUIR has done their own study on toxic effects on fish which they shared with us. They commented on the Columbia River toxics study and are very concerned with arsenic that they detected in fish tissues.

**Addition of Inorganic & Organic Metals to the List**

Anne Fairbrother (was one of the authors of U.S. EPA's metals framework document) reported on metals and how to consider them in the context of this project. Inorganic and organic metals comprise a very broad and diverse category. The main focus has been on major cationic metals. The cationic, anionic, and organometallics all act totally differently. For example, most cationic metals do not biomagnify, i.e. lead. Defining persistence is difficult for inorganics because the form of the metal must be considered. For example, chromium 6 (Cr<sup>6</sup>) is often on lists of aquatic pollutants, but it only lasts about 6 hours in the environment. Soluble and insoluble metals will act differently. Specificity in terms of size and [metal] species is important. The physical-chemical environment that the chemicals will be deposited into must also be specified and considered. Bioaccumulation processes can be very different for different metals and organisms. For essential metals, biological organisms have internal regulatory mechanisms that can regulate bioaccumulation. Even with non-essential metals, bioaccumulation is not a given. This makes selection of a BAF value very difficult. The key question is: Will there be persistence of a bioavailable form of the metal?

Washington has lead and cadmium on their PBT list, but are not clear as to why these particular metals were listed. Other PBT lists include some or all of the metals specified in RCRA

regulations. Because of these and other technical considerations, the group decided that metals will be added to the list on an individual, case-by-case basis, and that the form of metal must be specified.

After a lengthy discussion, the group decided to add the following six metals to the list: (1) arsenic, (2) cadmium, (3) lead, (4) methyl mercury, (5) selenium, and (6) tributyltin oxide (TBTO).

(1) Arsenic was included because it is a current concern in Oregon. Specific inorganic forms would be of most concern as truly organic forms of arsenic are not as toxic as the inorganic forms.

(2) Cadmium will continually bioaccumulate in human kidneys over a lifetime. Cadmium is very mobile and it is found in the human food chain (e.g., cadmium in fertilizer will accumulate in plants.) Bill said that the Oregon Department of Agriculture was interested in metals in fertilizers. Cadmium is a major contaminant in phosphate fertilizers and it accumulates in soils.

(3) Lead was included for consistency with Washington. Although lead compounds are naturally occurring, typical exposure routes included lead-contaminated plumbing and direct ingestion of lead paint chips.

(4) Methyl mercury was included because it is a current concern in Oregon, and the subject of a TMDL in the Willamette Basin.

(5) Selenium can biomagnify by several orders of magnitude, but it is very site-specific. It can be toxic at low levels, but it is not very persistent. If you stop the source of selenium, it will move through the system in about a year. Selenium occurs naturally in the western third of the US, but it is very patchy. Selenium is bioaccumulative and toxic, but not persistent. Chuck said that there are real data and studies on selenium in bird eggs.

(6) Tin is on the list in the TBT form. Would the TBTO form be seen in the environment? Truly organic forms of arsenic are not as toxic as the inorganics. Inorganics can change to organics which reduces human toxicity. Tin and arsenic are legacy pesticides and are used in wood preserving.

The group also discussed aluminum, manganese, zinc, copper, and nickel. Aluminum is toxic, but not persistent or bioaccumulative. Manganese should not be on the list. Zinc and copper are also both borderline. Essential elements such as zinc are tricky when discussing them in terms of bioaccumulation. Copper is a concern in urban runoff relative to migrating salmon, as

it has been shown to disrupt olfaction (and hence foraging and orientation) in salmon. Bob says that copper is toxic, but it does not fall under our criteria of persistent or bioaccumulative. Nickel is a human carcinogen, but it mostly comes from refinery dust in the air. In an aquatic environment, it is not as toxic.

### **Discussion of the Draft P<sup>3</sup>L**

Bruce re-screened the entire Step 4 list (1,225 chemicals) against the human health criteria established by the workgroup. This was to avoid excluding chemicals that might pose more of a threat to humans than to fish. A total of 25 chemicals were retained on this basis. Bruce used the Prop 65 database because it lists developmental toxics. Jeff was concerned about this because the California Prop 65 database was based on a proposition approved by citizens and not scientists, and may tend to over-state the hazards posed by certain chemicals. However, only 7 chemicals were added to the Oregon list based on their listing by Prop 65 developmental toxins. A discussion of our ability to accurately measure certain chemicals is not within the charge of this group. That will be the job of the Methods Group. The list may be refined based on whether analytical methods are available or not for each chemical. SB 737 leaves room for the June 1, 2009 list to be revised. The June 2010 report will include a list that considers sources and treatment options in addition to what this group decides is on the list.

### **Discussion of Possible Refinements to the Draft P<sup>3</sup>L**

The workgroup was presented with several possibilities for reducing the length of the list. These included: (1) Excluding chemicals with only non-aquatic pathways, (2) Selecting a representative number of PCBs, (3) Selecting a representative number of PAHs, (4) Excluded chemicals sampled for but not detected, or (5) Setting a total PBT cutoff score higher than 3.

(1) The group discussed excluding chemicals with non-aquatic pathways. Musks and fragrances fall into this category. These are getting into people by human application. The only reason these are showing up on the list is because we used the Oregon and Washington human body burden studies to develop the initial list. Bob said that the source pathway is not important if the chemicals are eventually showing up in water. The musks are human-applied, but they also appear in the water because they go down the drain. Pathways were not used as a basis for refining the list.

(2) Bruce suggested that we restrict the number of listed PCBs to only those used in transport and fate models or which exhibit dioxin-like (co-planar) toxicity. The workgroup agreed that this could be done provided that by doing so we did not lose sight of PCBs as aquatic pollutants.

(3) Bruce also suggested that we restrict the number of listed PAHs to only those on the U.S. EPA 7-PAH and 16-PAH lists, as these include the principal carcinogens and also those for which analytical methods are routinely available. The workgroup agreed that this could be done provided that by doing so we did not lose sight of PAHs as aquatic pollutants.

(4) The group discussed excluding chemicals that are sampled but not detected. Jeff said that we could eliminate chemicals where the detection limit (or reporting limit) was lower than the effects level.

(5) The group discussed raising the total score cutoff and why 3 was chosen in the first place. The workgroup allowed that we could use a higher total score cutoff. Following the meeting, Bruce did further research on how and why the PBT criteria were established as they are. Per U.S. EPA: "The degree of persistence is a continuum. Chemicals with a half-life of 2 to 6 months are not non-persistent. They are less than chemicals with a half-life of greater than 6 months. The degree of persistence that should be used as criteria is not an absolute scientific determination. Rather it is a combination of science and policy. As discussed in the proposed rule and the remainder of this section, organizations have generally used as persistence criteria half-lives of 2 months and/or 6 months for water, soil, and sediment... But [U.S. EPA believes that] a shorter half-life criterion is necessary to protect communities from bioaccumulative toxicants derived from sources closer to home, since, all other things being equal, a pollutant reaches nearby populations in less time than distant ones." Given this rationale, it did not seem reasonable to raise the cutoff from 3 to 4.

#### **Wrap-Up Comments from the Group**

Bob asked what the next step is with RAIDAR. RADAR calculates a relative risk factor and gives a continuous numerical ranking, and then batches the results. The time step on the model is 1 year. Bruce has done test runs with RAIDAR for 235 chemicals. The list generated from Step 9 will be the list that Bruce runs through RAIDAR. The RADAR model is valuable because it will evaluate the PBT characteristics of chemicals in a holistic way.

No members of the public attended and there were no public comments. The meeting adjourned at about 12 noon. The next meeting (February 11, 2009) will be held at DEQ HQ in Portland.