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Cc: Sylvia Kawabata/R10/USEPA/US@EPA

Subject: Generating sediment PRGs with the food web model

Date: 06/28/2006 11:26 AM

Attachments: PRG example.xls

Hi All,

This is a follow-up to the discussion of the food web model and its uses that took place in the morning at yesterday's Centralia TCT meeting. I thought a worked example, with explanation, of how the food web model in "variable" (i.e., probabilistic) mode could generate a range of PRGs would be helpful. I also included a discussion of how this range could be compared to a (hypothetical) acceptable tissue concentration. The key idea here is not for the model to pick a PRG for you but rather just to show you the chance of making the criterion for any PRG you might want to select.

The attached Excel spreadsheet (PRG example.xls) is the food web model that agrees with the Arnot & Gobas template being used by Windward. With few exceptions, the distributions used are either uniform or triangular and data to define these distributions came from the Windward model report. For this example, four different values were assigned as the sediment PRG (0.1, 1.0, 2.5, 10.0 ng/g) . The results for the smallmouth bass are shown on the "PRG chart". The curves (which go from 5% to 95%) are "S"-shaped and tilted as a result of variability in the input parameters of the model. The hypothetical tissue criterion is 5 ng/g.

When the surface water concentration is set to zero (although, as we discussed it will probably be set at whatever is defined as "background"), with a PRG of 0.1 ng/g there would be about a 90% chance of achieving the tissue criterion in smallmouth bass, while at a PRG of 10 ng/g there would be about a 10% chance. At a PRG of 1.0, the chance of acceptability is about a 50:50 (median) and, at a PRG of 2.5, about a 30% chance. Note that when the surface water concentration is not zero (PRG 1.0 w/water), the sediment PRG must be much lower to compensate for this other exposure pathway. This also means that at some level of surface water contamination, no sediment PRG will yield acceptable results.

If you have any questions, please feel free to contact me.

Bruce

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