Message

From: Walker, Stuart [Walker.Stuart@epa.gov]
Sent: 2/7/2020 8:58:48 PM
To: Clements, Julie A CIV (USA) [Julie.A.Clements@usace.army.mil]; Praskins, Wayne [Praskins.Wayne@epa.gov]
CC: Hays, David C Jr CIV USARMY CENWK (USA) [David.C.Hays@usace.army.mil]; Rankins, Jonathan E CIV USARMY CEMVS (USA) [Jonathan.E.Rankins@usace.army.mil]
Subject: RE: EPA call today

I'm looking it over now.

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-----Original Message-----
From: Clements, Julie A CIV (USA) <Julie.A.Clements@usace.army.mil>
Sent: Friday, February 07, 2020 3:36 PM
To: Praskins, Wayne <Praskins.Wayne@epa.gov>; Walker, Stuart <Walker.Stuart@epa.gov>
Cc: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>; Rankins, Jonathan E CIV USARMY CEMVS (USA) <Jonathan.E.Rankins@usace.army.mil>
Subject: FW: EPA call today

Wayne and Stuart,

Dave has prepared some bullets for you that explain why the two models are producing different results. Jon has added information to Dave's bullets and has also prepared the attached file.

We are wondering if you would like some time to review this information before we discuss it. Would it be beneficial to move our conference call to Monday (10 Feb) to allow you both time to go through all of it?

Just let us know!

Julie

Given: All models are approximations, usefulness is the question.

1. BPRG 3D external model is all surfaces (6 sources), fixed, external only, and area corrects to source size from an infinite plane. RESRAD-BLD can be set up this way. Results differ for some isotopes however, specifically in risk (some isotopes the DCF and SF are different). BPRG 3D model closest to RESRAD-BLD but does not fit most likely real life scenario at Hunters point.

2. BPRG Dust model only models the floor and horizontal surfaces so better representation of likely real life scenario at Hunters point. RESRAD-BLD model can be set up to model same horizontal source but external results will differ because the BPRG model assumes an infinite plane while RESRAD build corrects for source area.

3. The BPRG Dust model does not consider air exposures (resuspension, submersion). RESRAD-BLd does consider resuspension and submersion but limited to removable fraction and resuspension fraction assumption. Note: Total source ingestion and air should not exceed the mass available as removed fraction in RESRAD-BLD.

4. Ingestion of source is the significant pathway differences between the models. RESRAD-BLD assumes and integrates the removable fraction (minus the air fraction) based on source lifetime modified by area ingested as ingested. The BPRG dust model assumes the activity of the source modified by area ingested as ingested. This represents a rough modeled activity difference factor approximate (pending air fraction) to 1 divided by the assumed removable fraction in RESRAD-BLD. For HP this suggests a factor of 5 higher activity ingested in the BPRG calculation than in RESRAD-BLD.

5. Ingestion rates for BPRG versus RESRAD-BLD rates are 2 to 7 times higher. Differences in how ingestion rates are calculated are still being reviewed but coupled with activity differences is a significant factor.

Please see the attached file which shows a side-by-side comparison of the ingestion cancer risk (residential) equations for the RESRAD-BUILD Model and the BPRG Dust Calculator. The summary shows the different approaches used by each model. This difference is highlighted by the ingestion factors (see

yellow highlight) for each equation (i.e., RESRAD-BUILD surface ingestion rate [SER] and BPRG age-adjusted dust ingestion rate [IFDres-adj])

* RESRAD-BUILD SERs for adult & child = 0.0001 m2/hr & 0.0002 m2/hr
* BPRG IFDres-adj = 528,220 cm2 (converts to 52.8 m2 for comparison with RESRAD-BUILD units)

As an FYI, the numerical input values shown in the attachment are those used in the HPNS models.

Since child and adult are evaluated separately by Battelle, I would apply the EDs of 20 yrs and 6 yrs for the adult and child, respectively. This seems consistent with Battelle's adult total risk for the ingestion pathway (7.74E-07) being greater than the child total risk (6.26E-07) for the ingestion pathway... Ingestion Rates:
Adult: 0.0001 m2/hr x 8760 hrs/yr x 20 yrs = 17.52 m2
Child: 0.0002 m2/hr x 8760 hrs/yr x 6 yrs = 10.51

Ratios (BPRG Ing Rate/RESRAD-BUILD Ing Rate):
Adult: 52.8 m2/17.52 m2 = 3.02
Child: 52.8 m2/10.51 m2 = 5.02

6. RESRAD-BLD Slope Factors for ingestion are 1.3 to 3.6 times higher than those used in the BPRG.

7. RESRAD-BLD calculates and integrates source removal over time of removable duration (source lifetime). BPRG does not assume source removal but does include a dissipation rate and decay factors. RESRAD-BLD calculates the dose and risk from the removed fraction, BPRG does not.

8. For calculations both models default to the most conservative DCF or SF based on uptake fraction. This results in approximations that may conflict with real life scenario (e.g. different uptake factors thus slope factors for same chemical form of contaminant). Not significant differences but goes to show all models are approximations.