HLWYM PEmails

From: Patrick Laplante
Sent: Thursday, June 12, 2003 4:22 PM
To: Michael Smith
Subject: Q and A's for Biosphere
Attachments: POSSIB~1.WPD

See file.

Pat

Hearing Identifier: HLW_YM_Public_EX
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Subject: Q and A's for Biosphere
Sent Date: 6/12/2003 4:22:13 PM
Received Date: 2/8/2006 2:23:06 PM
From: Patrick Laplante

Created By: plaplante@cnwra.swri.edu

Recipients:
"Michael Smith" <masmith@cnwra.swri.edu>
Tracking Status: None

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Files	**Size**	**Date & Time**
MESSAGE	24	2/8/2006 2:23:06 PM
POSSIB~1.WPD	17592	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
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Possible Questions and Answers on DCAGW/DCAGS:

1. Why do DCAGW/DCAGS modules have two receptor groups?

A: The "residential" receptor group was included in earlier versions of the TPA code to provide flexibility to test different receptor groups (for example, during the period before regulations specified the receptor group). Following specification of the RMEI by regulation, the "residential" receptor group was no longer needed but it was not removed.

2. What is the basis for the residential receptor group?

A: The residential receptor group was included as an early testing option. Following specification of the receptor group by regulation the emphasis has changed to the RMEI and the residential receptor has become obsolete. Because the group was devised for internal staff testing only no justifications were developed.

3. Is the "farming receptor" equivalent to an RMEI receptor specified in the rule?

A: Initial development of the farming receptor pre-dated the development of the regulations, however, staff believe that the farming receptor group in TPA provides useful insights for assisting the staff review of DOE biosphere calculations.

4. Why is a different model used to calculate groundwater concentrations for the residential vs farming receptor?

A: The residential receptor scenario assumed a smaller pumping well than the farming scenario and included a plume capture model to test the influences of well characteristics and hydrology on the amount of radionuclides captured by the well. The farming scenario was assumed to have greater water useage that would capture the entire plume (although the farming receptor calculation can model less than 100% capture).

5. Does TPA to calculations for groundwater protection?

A: TPA version 4.1j contains an early version of groundwater protection calculations that were based on proposed EPA standards (e.g., 1285 acre-ft pumping rate). These calculations are not described in the TPA 4.0 user manual because the calculations were considered incomplete until the applicable regulations were finalized. Two TPA output files contain averaged and maximum results presented as fractions of the applicable proposed limits. If you have future questions about these calculations just contact the NRC and we can provide additional details.

6. The user manual indicates DCAGW uses a dose code GENTPA that is based on GENII v 1.485. What modifications did you make to the GENII code in developing GENTPA?

A: In developing GENTPA, no modifications were made to the GENII mathematical models and equations selected for use in GENTPA. GENTPA only uses a portion of the GENII software executables necessary to implement the biosphere pathway calculations in TPA. Conversion of

intakes and direct exposures to dose was developed as part of DCAGW instead of relying on those calculations in GENII to allow user access to important input data files that were not accessible in GENII. In general, the GENTPA executes the same calculations as GENII but with enhanced control over and transparency of input data.

7. I've heard GENII v1.485 contains a bug (or bugs). Isn't this a problem for TPA?

A: All software has the potential to contain errors however the "stability" of any code is enhanced with testing and use. The GENII v 1.485 software has been available for use and testing since 1988. NRC and CNWRA staff have tested and have been using the code since about 1994 have not identified nor are aware of any errors in the models being applied to TPA calculations that would impact our confidence in the calculations. There is also a substantial amount of testing and code comparisons documented in technical reports and the scientific literature. A recent error report by the organization that distributes the code (Oak Ridge Radiation Safety Computational Center) notified users of a bug when a very limited selection of options is used (acute, air release, crop production grids used). TPA calculations do not use (nor did we test) these code options so this bug did not impact dose calculations in TPA. Notification of errors by the Oak Ridge Center to the user community provides additional confidence that a system has been and is presently in place to notify NRC of important information related to the GENII code.

8. Why does DCAGW do age-dependent dose calculations?

A: The age-dependent dose capabilities in TPA were included for testing purposes and to help inform staff responses to public questions. Staff do not intend to support the use of this portion of the TPA code for any other use or purpose. Results of these calculations must be tempered by the limitations of the data described in the EPA and ICRP documentation identified in the TPA user manual. The TPA code default data and model selections limit the dose calculations to adult dosimetry consistent with methodology reported in ICRP reports 26 and 30 as reflected in the EPA federal guidance reports 11 and 12 referenced in the TPA user manual.

9. What is the basis for [any part] of the age-dependent dose calculations?

A: These calculations were included to provide capabilities only for staff testing purposes. Staff do not intend to support the use of this portion of the TPA code for any other use or purpose.

10. Why doesn't TPA use the most current ICRP dosimetry models?

A: At present, the federal government has adopted the dosimetry methodology in ICRP reports 26 and 30. NRC application of dose calculations is intended to be consistent with this federal policy.

11. Scenario X is not covered by the biosphere modeling in TPA code. I think this scenario is important to safety and therefore TPA is incomplete.

A: Answer depends on scenario but could include the following:

[one approach] The purpose of this meeting is to inform you of the code capabilities and not to evaluate the technical adequacy of the code. If you or any member of the public has comments on the adequacy of the code or any other part of the HLW program at NRC you can call or write to [provide contact] and your comments will be considered by staff.

[a more technical approach]
a) Scenario X IS covered by TPA (it may not be self evident or described in documentation)

b) Scenario X is not explicitly modeled in TPA but such a scenario is bounded by current modeling

c) Scenario X is not modeled in TPA because it is not expected to increase the risks to the receptor more than the presently modeled scenario

d) Scenario X is not included because it is inconsistent with the regulatory framework

e) We appreciate your input and suggestions, we
1) have not evaluated that scenario but will make a note to consider whether it would be important to include in total system calculations
2) have considered it and did not include for the following reason(s)...[scenario dependent]

12. Is the biosphere modeling in DCAGW and DCAGS realistic or conservative?

A: The pathway models from the GENII code are generally considered to overestimate exposures. The code developer indicates this in documentation on the code and this was demonstrated in an international code comparison study conducted by the IAEA (IAEA Tecdoc #795, 1995)(GENII calculated higher doses than a number of other codes when modeling the same scenario. In the TPA application of the models, where possible, input parameters that reflect site specific conditions are used and an effort was made to avoid the use of excessively conservative parameter value selections. The dosimetry included in TPA uses conservative assumptions and data values. Based on the staff's understanding of the models, data, and parameter selections the results are expected to overestimate actual exposures but not excessively so (i.e., to the point of being completely implausible).

13. Why do I see many different pumping rates in the tpa input file and in the user manual?

Some of the dilution options in DCAGW were coded prior to development of Part 63 and contain a variety of pumping assumptions, some of which are documented in the user manual. For consistency with current regulations users should confirm that the pumping rates used in dilution calculations are set to 3,000 acre-ft/yr. If other dilution volumes or pumping rates are used the responsibility for their use and justification rests with the user.

14. I think Parameter X is unreasonable/invalid etc.

A: NRC and CNWRA staff continue to evaluate the parameter assumptions and data in the TPA

code. The parameter selection documented for the 4.1 code are a snapshot of current staff understanding at the time the documentation was developed. It is expected that as staff continue to test and evaluate TPA and as new technical information becomes available some of the parameter selections may change. NRC recommends that anyone having new information related to modeling parameters communicate that information to NRC for consideration through [provide contact].

15. In DCAGS, why was a separate inhalation model developed and isn't this inconsistent with the inhalation model in DCAGW?

A. A separate inhalation model was developed for DCAGS because the inhalation pathway dominates the dose estimates for the igneous activity scenario and the new model accounts for important processes that are not included in the simple GENII model (i.e., the effects of time dependence and thickness of ash blanket on mass loading). The DCAGS inhalation model was not applied to DCAGW calculations because the inhalation pathway is much less significant to dose estimates when the contamination originates in groundwater, thus the effort to make the coding change was not justified

16. Is there an ash redistribution model in DCAGS?

A. No. The role of DCAGS is to convert annual radionuclide concentrations in soil to dose. The soil concentrations are estimated by the ASHRMOVO module, however, in version 4.1 that model only accounts for primary removal mechanisms (e.g., decay, leaching). Staff continue to evaluate the redistribution issue.