Corey,

Here is our response to the questions from ES -

Section J.3.2 "Modeling Backfilled Basements Using RESRAD" did not specify but assumed the backfilled basement floor was in the vadose zone with radioactivity leaching to groundwater. While the current version of RESRAD ONSITE does not have a conceptual model that handles cementitious material source terms (RESRAD OFFSITE has more complex source term models), it does have the capability to model a contaminated zone below the water table. However, this relatively new conceptual model and feature in RESRAD ONSITE has not yet been applied by an NRC licensee to our knowledge nor has it been specifically evaluated in guidance. More importantly, the conceptual model for saturated zone flow (using either the mass balance or non-dispersion model) is inconsistent with flow to a well in a confined basement substructure. Therefore, the licensee would have to provide support for the use of RESRAD ONSITE to represent a well within a confined cementitious substructure below the water table to ensure that doses are not under-estimated (e.g., evaluate whether other conceptual and mathematical models that consider transport of radioactivity from the cement walls and floor into saturated groundwater where a well could be placed would not lead to higher doses compared to those predicted by RESRAD).

Jack

Jack D. Parrott
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US Nuclear Regulatory Commission
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From: CAMERON, COREY A <ccameron@oppd.com>
Sent: Thursday, January 21, 2021 1:02 PM
To: Parrott, Jack <Jack.Parrott@nrc.gov>
Cc: BARKER, ANDREA K <abarker@oppd.com>
Subject: [External_Sender] FW: Question for NRC

Good Afternoon Jack,

Below is the e-mail that we discussed on the FSS call today. Please share this with the appropriate NRC staff members and let us know if we can support you further with the discussion.

Respectfully,

Corey Cameron
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From: Robert F. Yetter <RFYETTER@energysolutions.com>
Sent: Thursday, January 21, 2021 11:49 AM
To: BARKER, ANDREA K <abarker@oppd.com>; CAMERON, COREY A <ccameron@oppd.com>
Subject: Question for NRC

Below are the two questions we have for the NRC. Per the conference call this morning, could you please forward to the NRC.

FCS is in the process of developing the conceptual model for the assessment of the groundwater pathway in backfilled basements using RESRAD ONSITE. Draft NUREG-1757, Vol 2, Rev 2, Section J.3.2, contains the following guidance related to the backfilled basement conceptual model:

From Section J.3.2:
The concrete walls and floor can be assumed to not affect flow of radioactivity and the radioactivity on the floor can be modeled as a layer of contaminated soil at the depth of the floor. To simplify the simulation, the contamination on the walls may also be assumed to be on the floor.

We agree that this is a reasonable approach particularly since the majority of the contamination is on the floor. A couple of questions:

1. If we apply this conceptual model would NRC like to see additional justification or is reference to this guidance sufficient?

2. Is this approach envisioned to apply to floors/walls in the saturated zone as well as unsaturated zone?

Regards,

Robert F. Yetter

Director, Radiological Site Closure

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