Message (Digitally Signed)

From: Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) [derek.j.robinson1@navy.mil]
Sent: 5/3/2021 2:44:47 PM
To: Craig Bias [cbias@remwerks.com]; Hays, David C Jr CIV USARMY CENWK (USA) [David.C.Hays@usace.army.mil]; Praskins, Wayne [Praskins.Wayne@epa.gov]
CC: Liscio, Matthew P CIV USN NAVSEA DET RASO VA (USA) [matthew.liscio@navy.mil]
Subject: RE: HPNS Navy RESARD BUILD Results
Attachments: smime.p7s

This is something that we talked about in the past. The CSM is dependent on the building and wrapped up in our Historical Radiological Assessment.

The CSM is that we have commercial buildings that we are removing contamination where ever we find it and evaluating potential future residential exposure.

I am not aware of any past activities that, by their nature, would have deposited particulate to interior surfaces. Generally, they performed maintenance of ships (including ships from the nuclear weapon testing) and radiological experimentation (NRDL). Radiological particulate from past activities would have been associated with potential spilled radium paint and/or cleaning of ships from the Bikini Atoll. There is very limited likelihood of finding significant contamination inside buildings.

If the worst case scenario shows protectiveness, then it seems like we do not need to go farther to determine the maximum size of a potentially contaminated area. The 43 m2 assumption is a worst case from my perspective. Let's remember that these are large buildings. Future residents would have to build walls to create rooms. It is impossible for four walls to be contaminated...at least two of them would be new (if not all of them). It is also impossible to know what the room size will be in the future, we just need a reasonable assumption.

If the assumption of a 12'x12' room is from the EFH. It seems like a reasonable assumption that we can support.

I also apologize for the long email. Below are the activities listed in the HRA:

- Repair, use, and disposal of radioluminescent commodity items (dials, gauges, and deck markers)
- Gamma radiography for testing of metal and welds
- Calibration laboratory operations for ensuring radiation survey instrument accuracy
- Decontamination of and scientific research on ships contaminated during atomic weapons testing
- Use of various radionuclides for scientific research by the NRDL and its predecessors

Derek

From: Craig Bias <cbias@remwerks.com>
Sent: Friday, April 30, 2021 10:15 AM
To: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>; Praskins, Wayne <Praskins.Wayne@epa.gov>; Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>
Cc: Liscio, Matthew P CIV USN NAVSEA DET RASO VA (USA) <matthew.liscio@navy.mil>
Subject: [Non-DoD Source] RE: HPNS Navy RESARD BUILD Results

Dave, this is a management conversation. I'll just add some information that I am aware of.

TetraTech did 100% surveys of impacted buildings and remediated any contamination found. While the FSS data may not be of sufficient quality for building release, there was oversight of the remediation and there is obvious physical evidence of scabbling, wall removal, etc. This, coupled with the NRC license termination and removal of sources long ago, supports that there are no current rad sources. The question then is whether past sources caused settled dust. In 2015 and 2016 (I think), there was independent (NAVFAC and Battelle) oversight of the resurvey of several survey units in four buildings. The swipe data from all of that work showed there was no detectable dust (as I remember).

In my opinion, if new surveys found any location in excess of an RG, it would be fixed contamination. Given that the surfaces would we cleaned in preparation for those surveys further supports the lack of a potential removable fraction. Perhaps this would allow consensus that any residual contamination is localized and not uniformly present on all building surfaces. As Wayne pointed out, ingestion dose is ultimately proportional to contaminated area size but assuming the whole building is contaminated at the RG and is available for ingestion is not realistic. We could then discuss the size of the contaminated area and whether or not there would be ingestion potential.

From the technical side, we have some more insight into the various models and their behavior, but need to distill down the questions that must be answered to reasonable estimate resident risk.

From: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>
Sent: Friday, April 30, 2021 11:48 AM
To: Craig Bias <cbias@remwerks.com>; Praskins, Wayne <Praskins.Wayne@epa.gov>; Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>
Cc: Liscio, Matthew P CIV USN NAVSEA DET RASO VA (USA) <matthew.liscio@navy.mil>
Subject: RE: HPNS Navy RESARD BUILD Results

I do think a well defined and agreed to CSM is a key component to any resolution. Would you please send me a copy of the document that explains the current CSM or is that the Batelle modeling report? As you know, dust or no dust was/is a significant question/issue and I think? how we got to the potential direct ingestion solution.

Along the CSM lines, I know tetra tech data is problematic, but is there any data that can be used to help establish or at least bound the parameters we are assuming in the models? As an example, do we know the largest total area of contamination actually in a building? Such data could be used to establish an upper bound for source area used in the model. Currently, our assumption is 43 m2, does that match our known site conditions? Other bounds on model inputs could be established with actual site specific data as well.

I don't disagree that a similar approach can be taken with dusts, just do not know what data we have to defend or bound model assumptions with. Which takes us back to a defensible or maybe at least an agreed to CSM.

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Cc: Liscio, Matthew P CIV USN NAVSEA DET RASO VA (USA) <matthew.liscio@navy.mil>
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We'll get there. I believe it is calculating the intake activity which simplifies to RMVFR*Q(t). Q is the fixed surface activity and is what varies with time due to all the gain and loss processes.

As you ponder the ingestion rate, I still think our CSM is settled dust and therefore we should be calculating indirect ingestion. To do that with the same assumptions as we did with direct, the rate for a 12x12 room and lower walls would be the total area (~43 m^2) divided by the exposure time (~123,500 h) or 3.46E-04/h which is 3.5x higher than the default. Air release fraction needs to be non-zero. We would use the spreadsheet as we did with direct. As an example, even with the air fraction at 1, Cs ingestion dose is 1 mrem and ingestion risk is 8.5E-07.

From: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>
Sent: Friday, April 30, 2021 9:57 AM
To: Craig Bias <cbias@remwerks.com>; Praskins, Wayne <Praskins.Wayne@epa.gov>; Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>
Cc: Liscio, Matthew P CIV USN NAVSEA DET RASO VA (USA) <matthew.liscio@navy.mil>
Subject: RE: HPNS Navy RESARD BUILD Results

Craig, Thank you. FYI: I believe Q is what the spreadsheet column M is basically calculating. Still think simple enough to rearrange equation to provide a better estimate of the actual value RESRADBLd is using in the dose calculation. In that the RESRADBLD dose is the basis for the spreadsheet calculation, I believe being closer to the value that RESRADBLD uses to determine the dose is our most defensible position. Always willing to discuss.

Hope all have a great weekend,
Dave

From: Craig Bias <cbias@remwerks.com>
Sent: Friday, April 30, 2021 9:28 AM
To: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>; Praskins, Wayne <Praskins.Wayne@epa.gov>; Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>
Cc: Liscio, Matthew P CIV USN NAVSEA DET RASO VA (USA) <matthew.liscio@navy.mil>
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Dave, I'm reporting the cumulative equivalent dose (mrem) over the exposure period (about page 11 in output), not the average equivalent dose rate (mrem/yr) reported on the last page.

I disagree that we need to calculate Q, but will let you look into as well. Cheers.

From: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>
Sent: Friday, April 30, 2021 8:40 AM
To: Praskins, Wayne <Praskins.Wayne@epa.gov>; Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>
Cc: Liscio, Matthew P CIV USN NAVSEA DET RASO VA (USA) <matthew.liscio@navy.mil>; Craig Bias <cbias@remwerks.com>
Subject: RE: HPNS Navy RESARD BUILD Results

Wayne, In short; the larger the source, the more activity is available to be ingested. Since we are modeling the source as the entire floor and walls to 2m high, the building dimensions set/equal the source. I still believe with some additional survey work and actual data, the Conceptual Site Model (CSM) could be modified which would change how modeled and likely resolve many issues (obviously just my opinion and realize simplified). In lieu of that, we are taking a conservative approach which results in the issues we are trying to solve. The approach is typical so not criticizing it, just does not always end up with our issues. It should be noted that not all the terms of equation E.2 are discussed in the email. For example the ingestion rate (1/h) term is related to source area as well, the removable fraction, and other terms also impact the result.

I believe the Qns(t) term is what we need to make the DON spreadsheet work well (a better approximation) for ingestion risk. Still looking into external.

Note:
$Q_{ns}(t)$ = total average radionuclide activity over the exposure duration, ED, in the source (pCi) at time t.

Craig, for the summed ingestion dose presented in the spreadsheet column K, is this the sum of doses for each time evaluated as discussed in RESRADBLD user manual J.1.4? Just want to make sure I am comparing apples to apples. Also

note other discussions (e.g. building lifetime etc.) in this section, may be able to use to help with CSM, but defer to you on that?

All, The ingestion rate (1/h) term also requires adjustment. The calculation does not match how RESRADBLD suggests and is difficult to compare to EFH accordingly. I will send another email with more details on this and will relate the value to the EFH as well. Additionally, I am looking into the different assumptions of fraction in compartment (room) (Fi) between DON 0.542 and BPRG 0.67. Hope to have more on that next week.

Hope this helps. I apologize for the long email.
Dave

From: Praskins, Wayne <Praskins.Wayne@epa.gov>
Sent: Thursday, April 29, 2021 5:28 PM
To: Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>
Cc: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>; Liscio, Matthew P CIV USN NAVSEA DET RASO VA (USA) <matthew.liscio@navy.mil>; Craig Bias <cbias@remwerks.com>
Subject: [Non-DoD Source] RE: HPNS Navy RESARD BUILD Results

I see in Equation E.2 that dose (and risk) via the ingestion pathway is proportional to contaminated area. What is the rationale for assuming a 12' 12' room if larger room/building sizes increase the estimated dose and risk?

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From: Craig Bias <cbias@remwerks.com>
Sent: Thursday, April 29, 2021 10:00 AM
To: Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>; Praskins, Wayne <Praskins.Wayne@epa.gov>
Cc: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>; Liscio, Matthew P CIV SEA 04, NAVSEA DET RASO <matthew.liscio@navy.mil>
Subject: RE: HPNS Navy RESARD BUILD Results

Sorry, I mistyped 17.7 pCi Co below… I meant 9.61E+06… compared to the calculated unit intake activity of 5.43E+05 in Column M.

From: Craig Bias
Sent: Thursday, April 29, 2021 11:44 AM
To: Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>; Praskins, Wayne <Praskins.Wayne@epa.gov>
Cc: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>; Liscio, Matthew P CIV SEA 04, NAVSEA DET RASO <matthew.liscio@navy.mil>
Subject: RE: HPNS Navy RESARD BUILD Results

Here is an input file for Co-60 to check our DCFs.

For clarification on a couple things today regarding Equation E.2 in BUILD manual.

- D(t) is not an instantaneous direction ingestion dose, but rather an integrated dose over the 26 years.
- Q(t) is basically the total source activity and is 100% fixed. That is the input activity concentration (2.25E+05 pCi/m2 for Co-60) times the total contaminated area (~43 m^2) or ~17.7 pCi for Co-60.

- Since the ingestion DCF and SF are dose per unit intake, we need to redefine the quantity in Column M (estimated activity, pCi). That is the calculated unit intake (pCi) and quantitatively is (24 ED Fin Fi) ERI fR Q(t) in Eqn E.2. It is not just Q(t).
- Similarly, since the external DCF and SF are dose per unit time-integrated activity concentration, we need to redefine the quantity in Column W (estimated activity concentration, pCi/m^2). That is the calculated unit time-integrated activity concentration (1/yr/pCi/m^2) if we use the surface DCFs. RESRAD is actually assuming the source term is a volume source that is 0.01 cm thick and uses Eqn F.1 and the volume DCFs. To calculate W, I guess we could divide the external dose by the volume DCFs to get the unit time-integrated activity concentration (1/yr/pCi/g) and then multiply by the soil volume SFs, but it should be a similar result.

Craig

From: Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>
Sent: Thursday, April 29, 2021 11:11 AM
To: Praskins, Wayne <Praskins.Wayne@epa.gov>
Cc: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>; Craig Bias <cbias@remwerks.com>
Subject: RE: HPNS Navy RESARD BUILD Results

Yes, please do. I encourage the information exchange.

I included Craig on this response, so that he knows to expect your call.

Derek

From: Praskins, Wayne <Praskins.Wayne@epa.gov>
Sent: Thursday, April 29, 2021 8:41 AM
To: Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>
Cc: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>
Subject: [Non-DoD Source] RE: HPNS Navy RESARD BUILD Results

Derek –

Thanks for setting up this morning's call. To keep things moving, is it OK for Dave to call Craig Bias if he has additional questions?

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From: Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>
Sent: Tuesday, April 27, 2021 12:49 PM
To: Praskins, Wayne <Praskins.Wayne@epa.gov>
Cc: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>
Subject: RE: HPNS Navy RESARD BUILD Results

Thanks Wayne and Dave! I sent the follow-up meeting request and will let you know.

From: Praskins, Wayne <Praskins.Wayne@epa.gov>
Sent: Tuesday, April 27, 2021 12:05 PM
To: Robinson, Derek J CIV USN NAVFAC SW SAN CA (USA) <derek.j.robinson1@navy.mil>

Cc: Hays, David C Jr CIV USARMY CENWK (USA) <David.C.Hays@usace.army.mil>
Subject: [Non-DoD Source] HPNS Navy RESARD BUILD Results

Derek –

Dave Hays and I had a chance to talk about last week's Navy building RG submittal this morning. Dave has a question or two he would like to ask and should be able to join us this Thursday; I just forwarded your invite.

I don't expect we'll be able to have a detailed discussion on Thursday and would like to schedule a followup call for next week. Dave is in training Monday thru mid-day Thursday; is your group available for a followup call Thursday, 5/6 between noon and 2 PDT? I'm copying Dave on this email.

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