Callaway2COLPEm Resource

From: Ramsdell, James V Jr (Van) [van.ramsdell@pnl.gov]
Sent: Monday, March 23, 2009 9:46 PM
To: Harvey, Brad; Steve Hanna
Cc: Sandusky, William F III; Olson, Bruce; Fringer, John; Arora, Surinder; Charles Cox; Marty Bowling; Callaway2COL Resource; Mazaika, Michael
Subject: RE: Callaway - Draft Audit Summary Report for AEOLUS3 Audit on Calvert Cliffs Project

All

Another thought…. For the EIS we are only concerned with the median X/Q. Initial sensitivity tests of the new PAVAN indicate that the median X/Q is not sensitive to the method used to extrapolate winds in the vertical…. And the 95% X/Q is not particularly sensitive to the method.

Van

From: Brad Harvey [mailto:Brad.Harvey@nrc.gov]
Sent: Monday, March 23, 2009 5:37 AM
To: Steve Hanna
Cc: Sandusky, William F III; Ramsdell, James V Jr (Van); Bruce Olson; John Fringer; Surinder Arora; Charles Cox; Marty Bowling; Callaway2COL Resource; Michael Mazaika
Subject: RE: Callaway - Draft Audit Summary Report for AEOLUS3 Audit on Calvert Cliffs Project

Steve:

Regarding your comment that the "decades-old" power law may be non-conservative because it would lead to overestimation of wind speed and hence more dilution at heights above the measurement level; I appreciate your insights into the limitations of our modeling methodology and encourage you to continue to provide us feedback.

I am not convinced that an overestimation of wind speed in our modeling assumptions for RG 1.111 and the XOQDOQ model is necessarily non-conservative, for the following reasons:

1. An overestimation of wind speed reduces the estimate of plume rise, thus reducing plume height and potentially leading to the prediction of higher ground-level concentrations.

2. An overestimation of wind speed may affect the entrainment coefficient E_t defined in Equations (7) and (8) of RG 1.111, potentially increasing the percent of time a "mixed-mode" release would be considered to be ground-level release versus an elevated release.

My experience shows that the assumptions used to determine the entrainment coefficient E_t are crucial in ultimately determining the magnitude of the annual average dispersion factors predicted by the XOQDOQ model.

Regards,

Brad
301-415-4118

From: Michael Mazaika
Sent: Friday, March 20, 2009 5:55 PM

To: Steve Hanna
Cc: Sandusky, William F III; Ramsdell, James V Jr (Van); Bruce Olson; John Fringer; Surinder Arora; Brad Harvey; Charles Cox; Marty Bowling; Callaway2COL Resource
Subject: RE: Callaway - Draft Audit Summary Report for AEOLUS3 Audit on Calvert Cliffs Project

Steve:

See my annotations below. Hope this helps with access and perspective.

Thanks,

Mike

From: Steve Hanna [mailto:steven_hanna@insightbb.com]
Sent: Friday, March 20, 2009 5:01 PM
To: Michael Mazaika
Cc: Sandusky, William F III; Ramsdell, James V Jr (Van); Bruce Olson; John Fringer; Surinder Arora; Brad Harvey; Charles Cox; Marty Bowling
Subject: Re: Callaway - Draft Audit Summary Report for AEOLUS3 Audit on Calvert Cliffs Project

Mike - Thanks for sending the summary report on the AEOLUS3 dispersion model. It is a coincidence that Ted Messier and I used to work in the same environmental company about 20 years ago. He was an entry level meteorologist at the time. **- Interesting. Brad Harvey also worked with these folks while at AREVA and its predecessor companies.**

How do I obtain the Callaway FSAR? I have been looking at only the ER. If it is on EARRTH or the NRC site, please give me a specific web address (otherwise I end up floundering around the EARRTH site for 30 minutes without stumbling across the document). **- This link will get you to the list that includes FSAR Section 2.3; you'll have to scroll down just a bit. In the case of this COLA, Section 2.3 appears as a separate section.**
http://adamswebsearch2.nrc.gov/idmws/ViewDocByAccession.asp?AccessionNumber=ML082520844

Getting access to all of the COLAs is pretty straightforward on the NRC web site. Go to www.nrc.gov. In the yellow box on the right-hand side click on COL Appliocations (received). Scroll down to the box under that heading where each of the 17 current applications are listed. Click on the site you're interested in. Click on "Applicant Documents" (which is an auto-scroll function), then look for the applicable Part of the application Part 2 = FSAR; Part 3 = ER. make sure you're looking at the most recent submittal date (depending on the application, certain parts have been revised separately). In this case, if you follow the trail that leads to the Callaway COLA, click on Part 2, dated 11/14/08. That will take you to the same place as the original long link.

The AREVA technical persons (Hamawi and Messier?) appear to have provided adequate technical responses to your requests. On the surface, it looks like everything is OK, although I would have to review the complete technical document to be sure. **- We've asked for the documents to be there for the audit, but from a practical standpoint I don't think there will be much time to pour thru the documentation. I suspect time will be limited just as it was during the audit of the model.** But my experience shows that there is often a slip between the technical document and the code that allegedly implements the equations and methodologies. Two models may seem equivalent, but their outputs for the same scenario and inputs can be markedly different. I would hope that you/we could do a side by side check of AEOLUS3 vs the official NRC model for a couple of scenarios (a ground level release and an elevated release). This would not be a spot check but a complete comparison of concentration distributions at several locations. **- This is where we have to keep in mind that the intent is not to validate the code itself, but rather that the results it produces are reasonable. The benchmark will be the X/Q results from the NRC's PAVAN model (compared to the short-term accident**

X/Qs via AEOLUS3) and from the XOQDOQ model (compared to the long-term, routine-release X/Qs via XDCALC). As we agreed in the scope revisions, I will be doing those benchmarking model runs for both the ER and FSAR. Copies of the output files from both AEOLUS3 and XDCALC will be requested via RAI and considered proprietary information. We determined that the input files would be of no use to the Staff since we do not have the proprietary models to run. The output files echo much, if not all, of the input data. Because these sections are so poorly written, it has been my battle from the beginning to: (1) understand what the applicant did to run the AEOLUS3 model in the first place; and (2) make sure that the input parameters and assumptions common to AEOLUS3 and, in the case of this application, PAVAN, are the same when I do the confirmatory model runs - no small task. The same effort for the XDCALC analysis will have to be made so that we end up comparing apples to apples as best we can, given any differences. Upstream of turning the crank is accpetance of the meteorological data which I just received this week.

By the way the decades-old power law coefficients assumed for the wind speed profile (0.25 for classes A-D and 0.5 for classes E-G) are a factor of two larger than those assumed in EPA and other models that still use stability classes. I would think that this would be non-conservative because it would lead to overestimation of wind speed (and hence more dilution) at heights above the measurement height. **- Agreed; but if the respective models both use the same scaling coefficients, then they are at least on relatively equal footing in that regard. Given that, what I was after in my thinking was - has the applicant looked to see whether the actual onsite measurements are reasonably close to the default power law coefficients.**

Steve

At 11:12 AM 3/20/2009, Michael Mazaika wrote:

Steve:

Attached is the draft version of the Summary Report for the Audit of the Calvert Cliffs AEOLUS3 Dispersion Modeling Analysis which is in the process of being finalized for issue to UniStar, the applicant for the Calvert Cliffs Unit 3 COLA. The AEOLUS3 dispersion model was used to estimate short-term, accident-related X/Qs for FSAR Section 2.3.4 and ER Section 2.7.6.2 of the Callaway Unit 2 COLA.

Many of the technical concerns that you raised initially in the orientation training, in subsequent e-mails, and in the Info Needs for the upcoming audit (e.g., MET-3 and MET-13), and similar issues reflected in several of the accident-related Info Needs identified by Van (e.g., ACC-1, AAC-2, ACC-4), were addressed during the audit and will be the subject of additional RAIs as a result of that audit. Some of the audit issues, of course, will be site-specific and are so noted in the summary report. On the other hand, because use of the AEOLUS3 model is common to all current COL applications based on the U.S. EPR design, and because the FSAR and ER dispersion-related discussions appear to have been prepared following a template, many of issues are common.

Therefore, as applicable RAIs are developed for Calvert Cliffs, I will forward them on to you for consideration in your evaluation of the Callaway (and later the Nine Mile Point Unit 3 COLA). Whether or not these issues are raised as RAIs on the environmental review side, they will be brought up on the safety-review side of the U.S. EPR COLAs; so we need to keep that in mind for consistency sake.

Because the AEOLUS3 modeling discussion is so scant in ER Section 2.7.6.2 (i.e., limited to two paragraphs, a total of three sentences, and one table), that section needs a significant overhaul. Again, I would refer you to FSAR Section 2.3.4 and its associated tables of input-related info for a minimum starting point on the level of detail that I would expect (as supplemented by the RAIs to follow). In particular, note that one RAI will

address the need to delete FSAR Section 2.3.4.2.2 and move that material to ER Section 2.7.6 as it addresses the determination of realistic (50%) short-term, accident X/Q values - not a safety-related topic. There is no cross linkage between ER Section 2.7.6.2 and FSAR Section 2.3.4.2.2 from either direction. The only tie is in the introduction to FSAR Section 2.3.4 which reiterates COL Information Items, one of which acknowledges the need to provide 50% X/Q values for assessing environmental effects of accident releases. There are no corresponding site parameters in the U.S. EPR DCD. Another upcoming RAI for that FSAR section will recommend that that COL Information Item be retained in FSAR Section 2.3.4 with a cross-reference to ER Section 2.7.6.2 to close that loop. There is (or at least was) a similar Information Need disconnect in the AP1000 DCD.

One of the most notable issues identified during the audit from a modeling standpoint was an uncertainity, on both Areva's and UniStar's part, as to the orientation of discharge from the (vent) stack for routine releases and whether a rain cap or other flow obstruction is incorporated in the design such that it would hinder momentum rise of exhaust gas. Because the short-term modeling assumed a ground-level release, this is not an issue. But for the XDCALC analysis of long-term routine releases, it potentially is if that model accounts for plume rise.

In any case, I hope you get an opportunity to look over the material before the audit. We can discuss it further next week.

Thanks,

Mike

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