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RES Response to Comments – 3/9/9

Don Dube Comments
SOARCA SECY and Associated Enclosures
March 2009

Overall Recommendation
Approve the SECY and associated enclosures with comments

General Comments
The SECY on SOARCA results for Peach Bottom and Surry is of high quality. Enclosure 3, the SOARCA public brochure, is excellent in conveying the purpose, methodology, and results of the effort.

- One concern is the recurring discussion that the SOARCA study is the replacement for the Sandia Siting Study, NUREG/CR-2239. Clearly, the analysis is limited to just the 2 reactors (at present), and while the report could shed light on the advancement of the state-of-the-art as well as the magnitude of the reduction in consequences that one might expect for all sites, the report is not a full replacement of the Sandia study. Nor can it be expected, given the extensive nature of the analysis effort, and high per plant cost for plant-specific accident scenarios, plant-specific EOPs, SAMGs, mitigative measures and emergency planning, that more than a handful of the 60+ U.S. sites will ever be fully analyzed.

Response: Deleted the "and replace site-specific" portion of the text in the SECY and Exec Summary and kept "update."

Specific Comments on SECY

1) p. 4, definition of "SPAR" is incorrect. Replace "Probabilistic" by "Plant"

Response: Changed

2) p. 5, about 14 lines down, "…most current PRAs are overly conservative…" Without a full review of all the industry level-2 PRAs, which are generally not available and haven't been so since IPE days over a decade ago, this statement can not be supported. Replace "most" by "some."

Response: Replaced "most current" with "many" and removed the temporal link.

Specific Comments on SECY Executive Summary Enclosure 1

1) p. 1, 2nd paragraph, statement is made:

   "This evaluation of severe accident consequences also would update and replace the site-specific quantification of offsite consequences found in earlier NRC publications such as NUREG/CR-2239, "Technical Guidance for Siting Criteria Development," dated December 1982, and NUREG/CR-2723, "Estimates of the Financial Consequences of Reactor Accidents," dated September 1982."

   As noted above under General Comments, this statement must be qualified.

RESPONSE: Made same change as discussed above.

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2) p. 2, 1st paragraph under "Scenario Selection": Choice of the term "critical core" seems almost like a bad pun, and recommend replacement by alternative term like "essence".

RESPONSE: Changed to "essence"

3) p. 2, last paragraph, statement "...there are no current full scope level 3 PRAs..." Not sure that this can be entirely defended unless one formally surveyed the industry, but regardless, the point is that there are none "generally available" for comparative purposes.

RESPONSE: Added "generally available"

4) p. 3, 3rd paragraph:

> "Conceptually, an event with a larger radiological release could have greater risk if the increase in the radiation release is larger than the decrease in frequency of the event. For example, all other considerations equal, a 10^{-8} per reactor year event must have a radiological release more than 10 times the magnitude of an event with a frequency of 10^{-7} per reactor year in order to pose greater risk. Since we are including events with substantial volatile releases on the order of 1 to 10 percent, it is, practically speaking, not feasible to achieve greater risk by increasing the magnitude of the release by more than a factor of 10."

I understand what is being said, and this is generally true for latent cancer fatalities with linear no threshold, but for early effects the calculated risks clearly are non-linear with regard to source term magnitude, so the statement should be further qualified.

RESPONSE: Added "latent cancer fatality" before risk.

5) p. 7, 1st paragraph: replace "...that moves differently..." by "that responds differently."

RESPONSE: Added after moves "or shelters" differently ..."

6) p. 9, 1st paragraph: again, replace "Probabilistic" by "Plant" in definition of SPAR.

RESPONSE: Changed

7) p. 10, Table 2, ISLOCA:

> "Check valves in high-pressure system fail to open causing low- pressure piping outside containment to rupture, followed by operator error"

Where the heck did this come from? It's not in the draft NUREG, not in any SPAR model, and no such plant design exists! The LPSI discharge piping has 2 (high pressure design class) series check valves. Coincident catastrophic failure of the valves in series is the cause of overpressure of LPSI piping outside containment and the ISLOCA. High pressure system check valves failing to open has nothing to do with it.

RESPONSE: Agree, typo in concurrence version. Changed to "Check-valves in high-pressure piping fail open causing low-pressure piping outside containment to rupture, followed by operator error"

8) p. 16, top paragraph, typo: "Health Physics Society"

RESPONSE: Fixed

Comments on SECY Communication Plan Enclosure 2

1) p. 1, under "Goals":

   "As a result, SOARCA will replace outdated analyses such as NUREG/CR-2239"

   Same comment as above regarding qualification of this statement.

RESPONSE: Changed to "update"

2) p. 9, under "Are accidents at spent fuel pools considered in this study?"

   "The project is focused on evaluating the severe and very unlikely accidents that may occur quickly at operating power reactors"

   Not sure this is really the purpose. Should qualify by "...very unlikely reactor core accidents..."

RESPONSE: Added suggested text

Comments on Public Brochure Enclosure 3

1) p. 20, STSBO:

   "Both of these scenarios are considered "bypass events," in which radioactive materials reach the environment without having a containment failure."

   I know what is meant, but this is a narrow definition of "containment." The containment function is failed. Insert "...having a structural containment failure."

RESPONSE: Added suggested text

2) p. 22, "Historical Perspective" on TMI box:

   "In order to reduce the pressure, operators opened a valve that stuck open."

   This is incorrect. And the link never explicitly states this. The loss of feedwater event caused a mismatch of heat removal, RCS pressure increased, and PORV automatically opened as designed. As noted in the Kemeny Commission report, operators observed that the PORV indicator light showed that the PORV received a signal to reclose and should have reclosed, but had no positive indication that it had actually reclosed.

RESPONSE: Updated text directly from the linked NRC fact sheet on TMI.

3) p. 33, under "Noble gases:"

   "These radionuclides (such as krypton and xenon) are chemically very stable and therefore unlikely to cause human health effects, even though they are readily released after an accident."

   This is not entirely true. Yes they are chemically stable, and yes they don't have the same impact in terms of internal dose as Cs and I, but for many scenarios the gamma shine from Noble gases can be the dominant contributor to offsite dose. Have Jocelyn Mitchell take a second look at this statement.

RESPONSE: Agree, added text "Noble gases—These radionuclides (such as krypton and xenon) are chemically very stable and unlikely to move easily into human exposure situations, even though they are readily released after an accident.

4) p. 38, typo, Occurr

RESPONSE: Fixed

5) p. 35, Historical Perspective: Ci is not previously defined and isn't until p. 47. Have a footnote that says see p. 47.

RESPONSE: Added suggested link to text