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 Subject: VY Containment Overpressure Risk Assessment

> MR

Here is a quick-and-dirt explanation of the risk assessment I made to examine the VY containment overpressure credit:

1) I looked at the VY Individual Plant Examination (IPE) and SPAR model to see if/how loss of NPSH to the ECCS pump was treated. Note that we don't have the VY PRA model used to support the EPU, so the IPE/SPAR combination is best available model at this time.

2) Loss of NPSH to the ECCS pumps is only modeled when using the hardened torus vent (which operates after loss of suppression pool cooling). Other possible ways to lose NPSH are not considered, including (a) failure of the operator to control containment pressure when the drywell sprays are operating and (b) failure of primary containment isolation (PCI), which we can presume would cause the containment to depressurize following a LOCA. The VY EPU submittal (Attachment 4, NEDC-33090P, page 4-10) states that the analysis of ECCS pump NPSH assumed containment spray was working after 10 minutes into the LOCA; therefore, only the risk impact due to PCI failure needs to be assessed.

3) The change in core-damage frequency (delta-CDF) is found by multiplying the large LOCA frequency used in the PRA by the probability that PCI fails. Note that the change in large early release frequency (delta-LERF) is equal to delta-CDF in this case since PCI is failed.

4) The PRA for the VY EPU application uses a large LOCA frequency of  $2.4E-5/y$ . In comparison, the VY IPE used  $1.0E-4/y$  and the SPAR model uses  $3.0E-5/y$ .

5) I determined the failure probability of PCI using the VY IPE model. Results are as follows:

5.03E-3	pre-existing leaks
6.63E-4	failure to close drywell equipment or floor drains
4.20E-4	failure to close drywell to reactor building vacuum breakers
3.10E-5	signal failures, including failure of the operator to manually initiate PCI upon automatic failure
2.50E-6	failure to close wetwell purge and vent
1.93E-7	failure to close drywell purge and vent
7.43E-9	failure to close containment exhaust
7.43E-9	failure to close wetwell purge supply
5.97E-3	total

6) So, delta-CDF is  $2.4E-5/y * 5.97E-3 = 1.3E-7/y$

7) Also, delta-LERF = delta-CDF =  $1.3E-7/y$

8) Using the RG 1.174 risk acceptance guidelines, the proposed credit for containment overpressure is small and consistent with the intent of the Commission's Safety Goal Policy Statement (this is the 4th key principle of risk-informed decisionmaking stated in Section 2 of RG 1.174).

9) We should also consider other issues such as defense-in-depth and safety margins in order to reach an integrated decision per RG 1.174.

Marty

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**CC:** Michael Johnson; Michael Tschiltz