NRC/NEI Meeting on HCVS Phase 2 OIP Template

July 28, 2015

Topics

- Missile Protection
- Phase 2 Schedule
- Phase 2 FAQ topics
- Phase 2 OIP
  - NRC Comment Responses
  - Major Elements
  - Plant Hatch Pilot Template
  - Projected Consensus Items

Tornado Missile White Paper

- NRC comments on Tornado Missile BWROG White Paper
  - Potential for damage above and below 30 feet and HCVS protection inside and outside of buildings and establishment of impacted zone surrounding the HCVS piping
    - Paper is only the evaluation for portions of the piping 30 feet above the ground elevation that are not missile protected due to building structure, sheet metal is addressed and assumptions on nearby potential missiles is addressed
  - Use of NEI 12-06 guidance/applicability to NEI 13-02, Use of average vs. bounding information and risk evaluation and evaluation of 5 risk parameters (RG-1.174),
    - The evaluation addresses risk insights taken from RG-1.174.
  - Define heavy duty piping and Potential for HCVS pipe damage
    - “Heavy duty” as it applies to pipe is intended to convey the robust nature of such piping
    - Damage probability is assumed high which is very conservative and damage is not likely to cause a loss of pipe function

Tornado Missile White Paper

- NRC comments on Tornado Missile BWROG White Paper (cont'd)
  - Surrounding structures as tornado missile sources
    - Surrounding building contribution to tornado missile sources are considered and included in the 50,000 available missiles
  - Establishment of ground elevation
    - Grade elevation will be defined in the paper as within 300 yards
  - RIS 2006-23 / Use of TORMIS and TORMIS versions / NRC SER (9/26/83)
    - TORMIS used in support of this evaluation is the same version addressed in NRC Safety Evaluation Report dated September 26, 1983
  - Wind loading
    - The paper does not exempt licensees from considering wind load on the HCVS and associated supports
  - FSG contingencies for damaged HCVS piping
    - Paper will recommend sites consider contingencies as a Defense In Depth measure

Tornado Missile White Paper

- Tornado Missile Paper Schedule

Date	Activity
~~07-13-15~~	~~Establish general approach for comment resolution~~
~~07-27-15~~	~~NEI Submit Draft NEI Paper for NRC comment~~
07-28-15	Complete comment responses and Draft NEI Paper
08-11-15	NRC Submit comments on Draft NEI Paper
08-25-15	NEI submit revised paper for endorsement
09-25-15	Receive NRC Endorsement of NEI Tornado Missile Paper

EA-13-109 Phase 2 OIP Template Schedule

Date	Activity
~~07-13-15~~	~~Phase 2 OIP Template Structure Meeting~~
07-28-15	Phase 2 Mk I OIP Pilot Initial Review Meeting
08-25-15	Phase 2 MK I Pilot Detailed Review and Mk II Differences Meeting
09-14/15-15	NEI 13-02 Revision 1 Workshop, Baltimore
09-25-15	NEI Submit to NRC Revision 1 of Phase 1-2 OIP template for endorsement
10-05-15	Receive NRC Endorsement of Revision 1 of Phase 1-2 OIP template and Phase 2 FAQs
12-31-15	Plants submit Phase 2 OIP to NRC

Deliverables

Date	Action	Supporting
~~07-10-15~~	~~NEI sends NRC Draft Presentation for July 13 meeting~~	July 13 Mtg
~~07-13-15~~	~~NEI sends NRC Draft AX Phase 1-2 OIP Template (~50%)~~	July 13 Mtg
~~07-21-15~~	~~NRC sends NEI comments on Template AX~~	July 28 Mtg
~~07-24-15~~	~~NEI sends NRC Draft Presentation for July 28 meeting~~	July 28 Mtg
~~07-27-15~~	~~NEI sends NRC Draft 0B4 Phase 1-2 OIP Template (~80%) and Draft 0H2 Hatch Pilot OIP (~70%)~~	July 28 Mtg
08-12-15	NRC sends NEI comments on Template 0B4 and Pilot 0H2	Aug 25 Mtg
08-19-15	NEI sends NRC Draft 0CX Phase 1-2 OIP Template (~95%) and 0HX Hatch Pilot OIP (~90%)	Aug 25 Mtg
08-21-15	NEI sends NRC Draft Nine Mile 2 Pilot Phase 1-2 OIP Differences Summary and Draft Presentation for August 25 meeting	Aug 25 Mtg
09-02-15	NRC sends NEI comments on Template 0CX, Pilot 0HX and Differences Pilot	Sep 14-15 Workshop
09-08-15	NEI Publish Draft 0DX Phase 1-2 OIP Template for Workshop and Phase 2 FAQs	Sep 14-15 Workshop
09-25-15	NEI Submit to NRC Revision 1 of Phase 1-2 OIP template and Phase 2 FAQs for endorsement	Oct 5 NRC Endorsement

Phase 2 FAQ Topics

- HCVS-FAQ-10: Severe accident Multi-unit capability
  - ELAP/LUHS can occur at more than one unit at a multi-unit site
  - The Severe Accident impacts are assumed on one unit only due to the site compliance with NRC Order EA-12-049. Assuming FLEX may not prevent core damage at one unit on a site
  - Each BWR MK I and II, under the assumptions of NRC Order EA-13-109 ensure the capability to protect containment exists for each unit via full SAWA capability for each unit
- HCVS-FAQ-11: Plant SA response to core ex-vessel
  - EA-13-109 requires capability to protect containment from overpressure during a Severe Accident (SA)
  - The order response must show the unit(s) are capable of operating HCVS and SAWA during a SA and protecting other actions from the venting operation (pipe routing, etc.)
  - Protection of other plant actions from the SA are not required

Phase 2 FAQ Topics

- HCVS-FAQ-12: Potential limitations on Operator actions based on gap release and core relocation
  - Radiological evaluations supporting actions in the Reactor Building should build on HCVS-WP-02 and NEI 13-02 Revision 1 guidance
  - Structural shielding, such as the bio shield wall and containment remain intact after event
  - Operating source term bounds the shutdown source term while the core remains inside the RPV
  - Core source term (non-gaseous) shielded until RPV breach by permanent Containment shielding
- HCVS-FAQ-13: Validation of first 24 hour time sensitive actions
  - Utilize 2014 NEI Version of FLEX V & V Process for Type A validation

NRC Comments

- KN-1: Combined OIP versus 6 month update
  - Revised wording to make combined recommended option
- KN-2: Definition of POS
  - POS is for sites that have an alternate operating location beyond the MCR
- BJ-3: 545F SADV
  - Change from an alternative to an alternate strategy
- BJ-4: Clarity on SAWA and FLEX working
  - Added cross reference to 109 assumption on manual operation of SAWA
- BJ-5: Clarity of no superheat in Suppression Pool
  - Added conditions around assumption
- BJ-6: Cross Flow Between Units
  - Statement is specific phase 1 for Hatch. Hatch us planning to repower the mixing chamber fan
- BJ-7: Control is in EOP/SOP
  - In the Severe Accident section the SAMG will be referenced.

NRC Comments

- BJ-8/KN-9: SADV and 24 Hour Power
  - SADV operation would require 24 hour power similar to SAWV as described in section 2
- KN-10: Assumption HCVS can be placed in Service
  - Clarify that this is time wise bounded by the actions to place anticipatory venting in service similar to Phase 1 statement
- BJ-11: DW Vacuum Breakers
  - See next slide
- KN-12: Requirement section on <72 hours of SAWM
  - Section will be included
- KN-13: DW Temperature Discussion
  - DW Temperature will be discussed
- BJ-14: Characteristics of plant
  - There will be an attachment with the plant characteristics included

NRC Comment Gap Release Retained in SP

Basis

- RCIC failure at T=0 establishes the limiting action times in the Reactor Building from a radiological perspective
  - Core damage starts at T=1 hour
  - DW pressure remains above the SP pressure until RPV breach
  - RPV breach occurs at T=8 hours
- Noble gas from gap release migrates to the wetwell air space by the SRV/ERV relief path. Conservatively accounting for transport through vacuum breakers 20% of noble gas source term is in the Drywell airspace while 80% is in Torus/Suppression Chamber airspace.
- Early in-vessel release aerosols migrate to the wetwell by the SRV/ERV relief path and are scrubbed and retained by the Suppression Pool
- Core source term shielding (bio shield) is not displaced and will provide post event shielding
- HCVS vent line source term does not exist until first vent usage under severe accident conditions
- Radiological evaluations should only consider dose rates from noble gas from initial gap release through continued core degradation until RPV breach occurs

NRC Comments

- KN-15: Selection of SAWM criteria
  - Each site will have to state which SAWM criteria (C6.3.1, 2, 3) applies
  - Will add information from C.6.6 on figure
- KN-16: Additional reference for tooling
  - Agreed to add reference
- KN-17: When to implement alternate decay heat removal
  - Will revise to include statement to define where in the 72 hr. to 7 day window sites will expect to be, i.e. 130 hrs.
- BJ-18: Blank step in table
  - Revise table
- BJ-19/KN-20: Clarification on FLEX not working
  - Agreed

Revision 0B4 Changes

- Addressed NRC Comments received July 23rd
- Revised layout of section 3
  - *3.1: Severe Accident Water Addition (SAWA)*
  - *3.1.A: Severe Accident Water Management (SAWM)*
  - *3.1.B: Severe Accident DW Vent (545 deg F)*
- Added clarity to the timelines and figures
- Provided clarity throughout on
  - SAWA is the hardware to pump water into the RPV or DW at a flow rate at nominally 500 to 100 gpm.
  - SAWM is not hardware it uses existing hardware installed in the plant or part of SAWA.
    - Credit generic analysis for establishing SAWM flow rates based on plant monitored parameters

Hatch Pilot

- Review Template Revision 0H2

Consensus Items

- Generic procedure statement for SAWM for regulatory closure
- Design Basis Hazard levels versus reevaluated levels