NRC/NEI Meeting on HCVS Phase 2 OIP Template

August 25, 2015

Topics

- Schedule
- Phase 2 FAQ status update
- Phase 1 Missile Protection status update
- Phase 2 OIP Template Major Elements
  - Hatch
  - Nine Mile Point Unit 2
- Projected Consensus Items

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
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 B4 Phase 1-2 OIP Template (~80%) and Draft HAX Hatch Pilot OIP (~70%)~~	July 28 Mtg
08-12-15	~~NRC sends NEI comments on Template B4~~ and Pilot 0H2	Aug 25 Mtg
~~08-19-15~~	~~NEI sends NRC Draft CX Phase 1-2 OIP Template (~95%) and 0H3 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 CX, Pilot 0H3 and Differences Pilot	Sep 14-15 Workshop
09-08-15	NEI Publish Draft 0E1 Phase 1-2 OIP Template for Workshop	Sep 14-15 Workshop
09-25-15	NEI Submit to NRC Revision 1 of Phase 1-2 OIP template for endorsement	Oct 5 NRC Endorsement

Phase 2 FAQ Status Update

FAQ	Title	Status
HCVS-FAQ-10 Revision 0	Severe Accident Multiple Unit Response "Licensees are only required to validate severe accident response actions assuming severe accident conditions for a single unit at a site (simultaneous with ELAP for all units) , but must have the capability to perform severe accident response on each unit at a site."	Submitted for endorsement 08/18/15, Incorporated NRC written comments
HCVS-FAQ-11 Draft C	Plant Response during a Severe Accident "Licensees are not required to address the effects of a severe accident on actions and equipment not related to containment protection per EA-13-109. The effects of EA-13-109 containment venting during a SA, however, must be considered."	Submitted for NRC review 08/18/15, Addressed NRC comments from 7/28 meeting

Phase 2 FAQ Status Update

FAQ	Title	Status
HCVS-FAQ-12 Draft G	Radiological Evaluations on Plant Actions prior to HCVS Initial Use "Licensees should use the information in this FAQ for estimating source term contributions to Reactor Building dose rates for operator actions from the start of core damage until the RPV is breached by core debris or the HCVS vent line is first used under severe accident conditions, which can be assumed to be from T=0 to T=7 hours"	Submitted for NRC review 08/18/15, Addressed NRC comments from 7/28 meeting
HCVS-FAQ-13 Draft B	Severe Accident Venting Actions Validation "Licensees should perform validations for time sensitive actions using the 07-18-2014 version of the FLEX validation plan not Appendix E of NEI 12-06 revision 1."	Submitted for NRC review 08/18/15, Addressed NRC comments from 7/28 meeting

HCVS-WP-04 – Missile Evaluation for HCVS Components 30 Feet Above Grade

Date	Scheduled Activity
~~07-13-15~~	~~Establish general approach for comment resolution~~
~~07-28-15~~	~~Complete comment responses and draft paper~~
~~08-25-15~~	~~NEI submit revised paper for endorsement~~ 08-18-15 submitted as Rev 0 which incorporated NRC comments
09-25-15 ??	Receive NRC Endorsement of Tornado Missile Paper

Phase 2 OIP Structure

- Assumption additions and clarifications
- Statement of choices for conditional actions
- SAWA/SAWM/SADV* Characteristics
- SAWA/SADV* Figures
- Time Sensitive Actions
- Evaluation methods for credited flow paths and electrical circuits
- Data for plant parameters

* “If SAWA/SADV is chosen by a Plant Site then site specific detail to be provided by licensee in OIP”

NRC Comments on OB4

Why is “pressure” removed from here? Page 3: Comment [KN1]

> “The vent operation will be monitored by HCVS valve position, temperature, and effluent radiation levels.”
>
> Response: No Change. The intent of this introductory summary is to list only the required HCVS parameters as identified in 13-02 section 4.2, pressure is not one of them.

Document uses the terms torus pressure, wetwell pressure, containment pressure, drywell pressure, and drywell containment pressure (as here) throughout the document (in various contexts of the discussion). Recommend consistency in the use of the terms to avoid confusion, because it is not clear what exact pressure is being referenced. Page 3: Comment [KN2]

> “Parameters measured should be Drywell Containment pressure, Wetwell level, SAWA flowrate and the HCVS parameters listed above”
>
> Response: We will use “DW Pressure” and “Suppression Pool Level” throughout

NRC Comments on OB4

J Bettle - This assumption applies to the water addition capability under SAWA/SAWM. The power supply scheme for the HCVS shall be in accordance with EA-13-109 and the applicable guidance. Page 5: Comment [KN3]

> "049-7 DC power and distribution can be credited for the duration determined per the EA-12-049 (FLEX) methodology for battery usage, ({Site Specific Time}) (NEI 12-06, section 3.2.1.3 item 8) "
>
> Response: Add "*This assumption applies to the water addition capability under SAWA/SAWM. The power supply scheme for the HCVS shall be in accordance with EA-13-109 and the applicable guidance*" to end of assumption. There was no change to this assumption from the Phase 1 OIP

J Bettle - See previous comment, it appears that any assumption for FLEX that is not "HCVS exclusive" is sufficient. Portable generators and air compressors used for other FLEX functions are assumed to be functional on the FLEX timeline thus the 24 hour requirement for HCVS appears to be largely nullified. Page 5: Comment [KN4]

> "049-9. All activities associated with plant specific EA-12-049 FLEX strategies that are not specific to implementation of the HCVS, including such items as debris removal, communication, notification, SFP level and makeup, security response, opening doors for cooling, and initiating conditions for the event, can be credited as previously evaluated for FLEX. (Refer to assumption 109-02 below for clarity on SAWA)(HCVS-FAQ-11)"
>
> Response: No Change. The capability for defined HCVS elements still has the 24 hour requirement. That is unchanged. In Phase 1 we used the FLEX timeline for non-HCVS actions. The only addition to this assumption was the clarity on how it applied to SAWA

NRC Comments on OB4

J Bettle - What time does this occur if the RCIC fails to start/run very early on. Wouldn't the release of noble gasses and hydrogen start then and pressurize both the wetwell and drywell via the SRVs and then vacuum breakers? Page 5: Comment [KN5]

> "109-01. Site response activities associated with EA-13-109 actions are considered to have no access limitations associated with radiological impacts while RPV level is above 2/3 core height (core damage is not expected)."
>
> Response: Add reference to FAQ-12. This is further addressed in FAQ-12

J Bettle – Still needs to be resolved are the secondary containment environmental conditions, especially radiation levels, prior to 8 hours if RCIC does not operate. Page 5: Comment [KN6]

> "109-02. Portable equipment can supplement the installed equipment after 24 hours provided the portable equipment credited meets the criteria applicable to the HCVS.
>
> > An example is use of FLEX portable air supply equipment that is credited to recharge air lines for HCVS components after 24 hours. The FLEX portable air supply used must be demonstrated to meet the "SA Capable" criteria that are defined in NEI 13-02 Section 4.2.4.2 and Appendix D Section D.1.3.
>
> This assumption does not apply to Phase 2 SAWA/SAWM because SAWA equipment needs to be connected and placed in service within 8 hours from the time of the loss of RPV injection. (HCVS-FAQ-12)"
>
> Response: No Change. This assumption is related to the Appendix C timeline in 13-02 not environmental conditions in secondary containment. The environmental conditions in secondary containment in the first 7-8 hours are addressed in FAQ-12 and assumption 109-01 which does apply for SAWA

NRC Comments on OB4

J Bettle – Again, it depends on the profile of these conditions for less than 8 hours if RCIC does not operate. Page 5: Comment [KN7]

"109-06. HCVS manual actions that require minimal operator steps and can be performed in the postulated thermal and radiological environment at the location of the step(s) (e.g., load stripping, control switch manipulation, valving-in nitrogen bottles) are acceptable to obtain HCVS venting dedicated functionality. (reference HCVS-FAQ-01)

This assumption does not apply to Phase 2 SAWA/SAWM because SAWA equipment needs to be connected and placed in service within 8 hours from the time of the loss of RPV injection and will require more than minimal operator action."

Response: No Change. This assumption is related to the Appendix C timeline in 13-02 not environmental conditions in secondary containment. The environmental conditions in secondary containment in the first 7-8 hours are addressed in FAQ-12 and assumption 109-01 which does apply for SAWA

J Bettle - Although usefulness of HCVS could be limited with no water addition, both are essential without some adequate means of close loop containment heat removal. Page 6: Comment [KN8]

"109-07. HCVS dedicated equipment is defined as vent process elements that are required for the HCVS to function in an ELAP event that progresses to core melt ex-vessel. (reference HCVS-FAQ-02 and White Paper HCVS-WP-01). This assumption does not apply to Phase 2 SAWA/SAWM because SAWA equipment is not dedicated to HCVS but shared to support FLEX functions."

Response: Add reference to FAQ-11. This is further addressed in FAQ-11

NRC Comments on OB4

The following needs to be assured before crediting is taken: ability of the credited equipment to function in the environmental conditions during a severe accident and access to equipment, if operator action is required at the equipment. Page 6: Comment [KN9]

"109-10. Permanent modifications installed or planned per EA-12-049 are assumed implemented and may be credited for use in EA-13-109 Order response. "

Response: No change. Evaluations during HCVS operation is covered elsewhere. This assumption is only setting the conditions the plant modifications that will be installed at the time of compliance to the order versus at the time of submittal of the OIP. There are certain plant modifications for FLEX that may not have been installed by June 30, 2014 or December 31, 2015.

J Bettle – This assumption is accepted on its face value, since staff has not viewed this material and may never formally view this material. Page 6: Comment [KN10]

"109-11. This Overall Integrated Plan is based on Emergency Operating Procedure changes consistent with EPG/SAGs Revision 3 as incorporated per the sites EOP/SAMG procedure change process. This assumption does not apply to Phase 2 SAWM because SAWM requires changes to the EPG/SAGs per approved issue from the BWROG Emergency Procedures Committee.

Response: No Change. This is only setting the conditions the plant procedure revisions that will be used at the time of compliance to the order versus at the time of submittal of the OIP. There are certain changes that may not have been completed by December 31, 2015

NRC Comments on OB4

J Bettle - Assumes that HCVS routing is also sufficiently distant/shielded Page 6: Comment [KN11]

> "109-12. Under the postulated scenarios of order EA-13-109 the Control Room is adequately protected from excessive radiation dose due to its distance and shielding from the reactor (per General Design Criterion (GDC) 19 in 10CFR50 Appendix A) and no further evaluation of its use as the preferred HCVS control location is required. In addition, adequate protective clothing and respiratory protection is available if required to address contamination issues. (reference HCVS-FAQ-01)"
>
> Response: Add. "*Provided that the HCVS routing is a sufficient distant away from the MCR or is shielded to minimize impact to the MCR dose"*

EA-13-109 requires severe accident postulation at any and all units in a site. Order EA-13-049 assumes FLEX success and no core damage / severe accident. Order EA-13-109 does not assume only one unit will enter severe accident condition. A simultaneous core melt at both units at a site may be unlikely, but a staggered core melt cannot be ruled out, given that it is the same BDBEE that is affecting the whole site. The purpose or the significance of the assumption has never been fully explained to the staff. Page 6: Comment [KN12]

> "109-15 The Severe Accident impacts is assumed on one unit only due to the site compliance with NRC Order EA-12-049. However, 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. (HCVS-FAQ-1){Multi-unit, other assumptions from new FAQs being developed.}"
>
> Response: Add reference to FAQ-10. This is further addressed in FAQ-10

NRC Comments on OB4

The specific ID numbers provided for valves, cables, procedures, etc. in this table seem to be coming from the Hatch template. Comment applies to several other places where Hatch specifics may have made their way into the OIP Page 8: Comment [KN13]

”**Table 2-1 HCVS Remote Manual Actions** “

Response: No Change. The green text is an example of acceptable content as derived from the pilot OIP, which was Hatch so it is appropriate to have Hatch information here

This discussion should be in Part 3: Boundary Conditions for SAWA/SAWM. Page 10: Comment [KN14]

”XX Hours {greater than 24 hours}, temporary generators will be installed and connected to {the pigtail to power up battery chargers} using a portable DG to supply power to HCVS critical components/instruments - Time sensitive after ZZ hours. Current battery durations are calculated to last greater than XX hours. DG will be staged beginning at approximately {8-10 hour time frame (Reference FLEX OIP). Within Two (2) hours later the DG will be in service.} Thus the DGs will be available to be placed in service at any point after 24 hours as required to supply power to HCVS critical components/instruments. A DG will be maintained in on-site FLEX storage buildings. DG will be transferred and staged via haul routes and staging areas evaluated for impact from external hazards. Modifications to will be implemented to facilitate the connections and operational actions required to supply power within {XX} hours which is acceptable because the actions can be performed any time after declaration of an ELAP until the repowering is needed at greater than 24 hours for HCVS operation. For Phase 2 applicability, the 8-10 hours will change to 6-7 hours and will be validated by the Phase 2 Verification and Validation thus providing power by 7 ours, since it provides power to the SAWA components.”

Response: No Change. This is where in the document timelines are discussed first. It can be repeated if desired

NRC Comments on OB4

Reference the new white paper and capture the elements in the WP Page 13: Comment [KN15]

"The detailed design {will / addresses} missile protection to a maximum height of 30 feet from ground elevation, from external events as defined by NEI 12-06 for the outside portions of the selected release stack or structure. *[this should be a design element using reasonable protection features for the screened in hazards from NEI 12-06, engineering should use design basis missile hazards methods in the calculations. Examples could be specific details from the sites FSAR.](reference FAQ HCVS-04)"*

Response: Change wording and reference HCVS-WP-04. "The detailed design {will / addresses} missile protection as directed in HCVS-WP-04 related to limited evaluation above 30 feet. *[an evaluation is required for exposed vent piping below 30 feet for the screened in hazards. Examples could be use of specific details from the sites' FSAR.](reference HCVS-FAQ-04; HCVS-WP-04)"*

For the HCVS, this would be correct if the (xx) hours in the previous sentence is at least 24 hours. Page 23: Comment [KN16]

"Venting will require support from DC power as well as instrument air systems as detailed in the response to Order EA-12-049. Existing safety related station batteries will provide sufficient electrical power for HCVS operation for greater than {XX} hours. Before station batteries are depleted, portable FLEX diesel generators, as detailed in the response to Order EA-12-049, will be credited to charge the station batteries and maintain DC bus voltage after {XX} hours. Newly installed accumulator tanks with back-up portable N2 bottles will provide sufficient motive force for all HCVS valve operation and will provide for multiple operations of the {1/2T48-F082} vent valve"

Response: No change. This is in the Beyond Design Basis section without core damage. In the next section is where Severe accident venting is covered and power is not available for HCVS needs until 24 hours

NRC Comments on OB4

Why was “WW level” deleted from here? Page 28: Comment [KN17]

	Primary Location / Component	Notes
1. Establish HCVS capability in accordance with Part 2 of this guidance.	■ POS / ROS	■ Applicable to all SAWA/SAWM and SAWA/SADV strategies
1. Connect SAWA pump / motive component to water source	■ River, Condenser, TB floor	
1. Connect SAWA pump discharge to injection piping	■ Use installed piping	■ SW – RHR emergency fill line
1. Power up {SAWA valves} with {EA-12-049 (FLEX) generator}	■ RHR valves may be operated from the control room	■ Should be done as soon as possible
1. Power up SAWA electric pump(s) with FLEX Generator		
1. Inject to {RPV / DW} using SAWA pump (diesel or electric)		■ Initial SAWA injection rate is {500 gpm – or plant-specific number} {put SAWA flow and basis here}
1. Monitor SAWA indications		■ List indications used/required ○ Pump Flow ○ Valve Position

Response: No change. This is to monitor water addition indications. In action 8 the WW level per SAWM actions are described in section 3.1.A

NRC Comments on OB4

Presumed failure of injection systems or presumed failure to implement an injection system under EA-12-049 in a timely manner due to difficult conditions in a BDBEE? Considering that it is most likely be the same injection path and the same pumps used under EA-12-049, this discussion should be appropriately worded. Page 29: Comment [KN18]

> "It is anticipated that SAWA will be used in Severe Accident Events based on presumed failure of injection systems leading to core damage. This does not preclude the use of the SAWA system to supplement or replace the EA-12-049 injection systems if desired. SAWA will consist of both portable and installed equipment."
>
> Response: Add. "*or presumed failure of an injection system in a timely manner".* This statement is intended to allow plants to replace a current FLEX flow path with a SAWA flow path. That is they are not required to keep 3 flow paths per this order, but if they chose to change the FLEX flow path it must meet the criteria under EA-12-049 compliance.

Do not recall any discussions about this. A backflow prevention on the skid might help prevent backflow through the pump but will also hold the fluid in the flex hoses. Consider backflow prevention at the SAWA connection point and means to drain the fluid at the skid. Page 29: Comment [KN19]

> "The SAWA flow path includes methods to minimize exposure of personnel to radioactive liquids / gases and potentially flammable conditions by inclusion of backflow prevention. {The check valve is integral with the pump skid and will close and prevent leakage when the SAWA pump is secured.} {Describe the backflow prevention device here}"
>
> Response: Add detail. Need to include instructions that "ensure the potential impact of piping hold-up volumes when considering location of the backflow prevention device"

NRC Comments on OB4

Licensees should provide (or at least document) the results of the evaluation of drywell temperature instrumentation. Page 32: Comment [KN20]

> "Instrumentation relied upon for SAWM operations is DW pressure and Torus level. All of which are powered by the {FLEX (EA-12-049)} generator which is placed in-service prior to core breach. The DG will provide power throughout the Sustained Operation period (7 days). DW Temperature monitoring is not a requirement for compliance with Phase 2 of the order, but some knowledge of temperature characteristics provides information for the operation staff to evaluate plant conditions under a severe accident and provide confirmation to adjust SAWA flow rates. (C.7.1.4.2, C.8.3.1)"
>
> Response: No Change. Use of temperature indications is part of the procedures and the support guidance. there is no requirement to perform any additional evaluation on temperature

Capture at an appropriate place in the OIP that the licensees will provide the scenario that the plant belongs to regarding WW level indication (C.6.3.1, C.6.3.2, or C.6.3.3) and the modifications that will be made under C.6.5, including the information in C.6.6. Page 33: Comment [KN21]

> "Procedures will be developed that control the torus level in the indicating range, while ensuring the DW pressure indicate the core is being cooled, whether in-vessel or ex-vessel. Procedures will dictate conditions during which SAWM flow rate should be adjusted (up or down) using torus level and DW pressure as controlling parameters to remove the decay heat from the containment. (this is similar to the guidance currently provided in the BWROG SAMGs) (C.7.1.4.3)"
>
> Response: No change. See section above this comment on page 32 that states "[state your plant option from the 3 above]"

NRC Comments on OB4

What is the purpose of this statement? Page 35: Comment [KN22]

"It is anticipated that SAWM will only be used in Severe Accident Events based on presumed failure of injection systems"

Response: Add detail. *"….. of plant injection system per direction by the plant SAMGs. Refer to attachment 2.1.D for SAWM SAMG language additions."*

See comment below. Page 36: Comment [KN23]; See the following comment Page 36: Comment [KN24]; See comment above and previously on the parameter "pressure". Used interchangeably. Page 36: Comment [KN25]; Suppression pool level, torus level or wetwell level? Pick one throughout the document. Page 36: Comment [KN26]

Torus level and DW pressure are read in the control room using indicators powered by the {FLEX DG installed under EA-12-049}. These indications are used to control SAWM flowrate to the {RPV / DW}.

Parameters used for SAWM are:

- Containment Pressure*
- Suppression Pool Level*
- SAWM Flow

Response: We will use "DW Pressure" and "Suppression Pool Level" throughout

Do we need to put in SAWA / SAWM / SADV failures? Page 57: Comment [td27]

"Attachment 4: Failure Evaluation Table"

Response: No Change. We do not envision any addition to this table for SAWA and SAWM is not hardware so this table is not applicable to SAWM

Revision 0C6 Changes to 0B4

- Incorporated NRC Comment Resolutions
- Replaced section 3.1.B SAWA/SADV detail with
  - "If SAWA/SADV is chosen by a Plant Site then site specific detail to be provided by licensee in OIP"
- Included the reference sections from EA-13-109 and NEI 13-02 Revision 1
- Added performance criteria for portable equipment in Attachment 1
- Added MK II Attachment 2.1.C
- Added SAWM Language Attachment 2.1.D

2.1.D: SAWM SAMG Approved Language

The following general cautions, priorities and methods will be evaluated for plant specific applicability and incorporated as appropriate into the plant specific SAMGs using administrative procedures for EPG/SAG change control process and implementation. SAMGs are symptom based guidelines and therefore address a wide variety of possible plant conditions and capabilities while these changes are intended to accommodate those specific conditions assumed in Order EA-13-109. The changes will be made in a way that maintains the use of SAMGs in a symptom based mode while at the same time addressing those conditions that may exist under extended loss of AC power (ELAP) conditions with significant core damage including ex-vessel core debris.

Actual Approved Language that will be incorporated into site SAMG*

Cautions:

- Addressing the possible plant response associated with adding water to hot core debris and the resulting pressurization of the primary containment by rapid steam generation.
- Addressing the plant impact that raising suppression pool water level above the elevation of the suppression chamber vent opening elevation will flood the suppression chamber vent path.

* actual language may vary by acceptable site procedure standards, but intent and structure should follow this guidance.

2.1.D: SAWM SAMG Approved Language

Priorities:

With significant core damage and RPV breach, SAMGs prioritize the preservation of primary containment integrity while limiting radioactivity releases as follows:

- Core debris in the primary containment is stabilized by water addition (SAWA)
- Primary containment pressure is controlled below the Primary Containment Pressure Limit (Wetwell venting)
- Water addition is managed to preserve the Mark I/II suppression chamber vent paths, thereby retaining the benefits of suppression pool scrubbing and minimizing the likelihood of radioactivity and hydrogen release into the secondary containment (SAWM)

Methods:

Identify systems and capabilities to add water to the RPV or drywell, with the following generic guidance:

- Use controlled injection if possible.
- Inject into the RPV if possible.

Maintain injection from external sources of water as low as possible to preserve suppression chamber vent capability.

* actual language may vary by acceptable site procedure standards, but intent and structure should follow this guidance.

Hatch 0H3a Major Change

The flow path will be from the FLEX suction in the Altamaha river through the FLEX pumps with 4 outlets with individual flow indicators. One indicator will be dedicated to the unit in a Severe Accident, and the flow will be monitored that is provided to the RHR service water FLEX header. The monitored water flow rate will pass through the RHRSW piping to the Reactor Building where it will connect with the RHR system by opening MOVs from the MCR that interconnect the systems. The flow will then be directed into the RPV via the LPCI injection valves. Cross flow into other portions of the RHR system will be isolated by ensuring closure of the MOVs from the MCR. DW pressure and Suppression Pool level will be monitored and flow rate will be adjusted by use of the FLEX pump control valve at the Intake Structure. Communication will be established between the MCR and the FLEX pump location.

Hatch 0H3a Major Change (continued)

The MOVs will be powered from the FLEX diesel generators connected in the Control Building as described in the EA-12-049 compliance documents. The MOVs will be operated in series (not parallel) to limit the potential for overloading the FLEX DGs. The FLEX DGs are located near the Control Building which is significantly away from the discharge of the HCVS at the Main Meteorological Stack. Refueling of the FLEX DG will be accomplished from the EDG fuel oil tanks as described in the EA-12-049 compliance documents. The Intake structure is a significant distance from the discharge of the HCVS at the Main Meteorological Stack. (see mechanical and electrical sketches in attachments, plant layout sketches in the assumptions section and a list of actions elsewhere in this section)

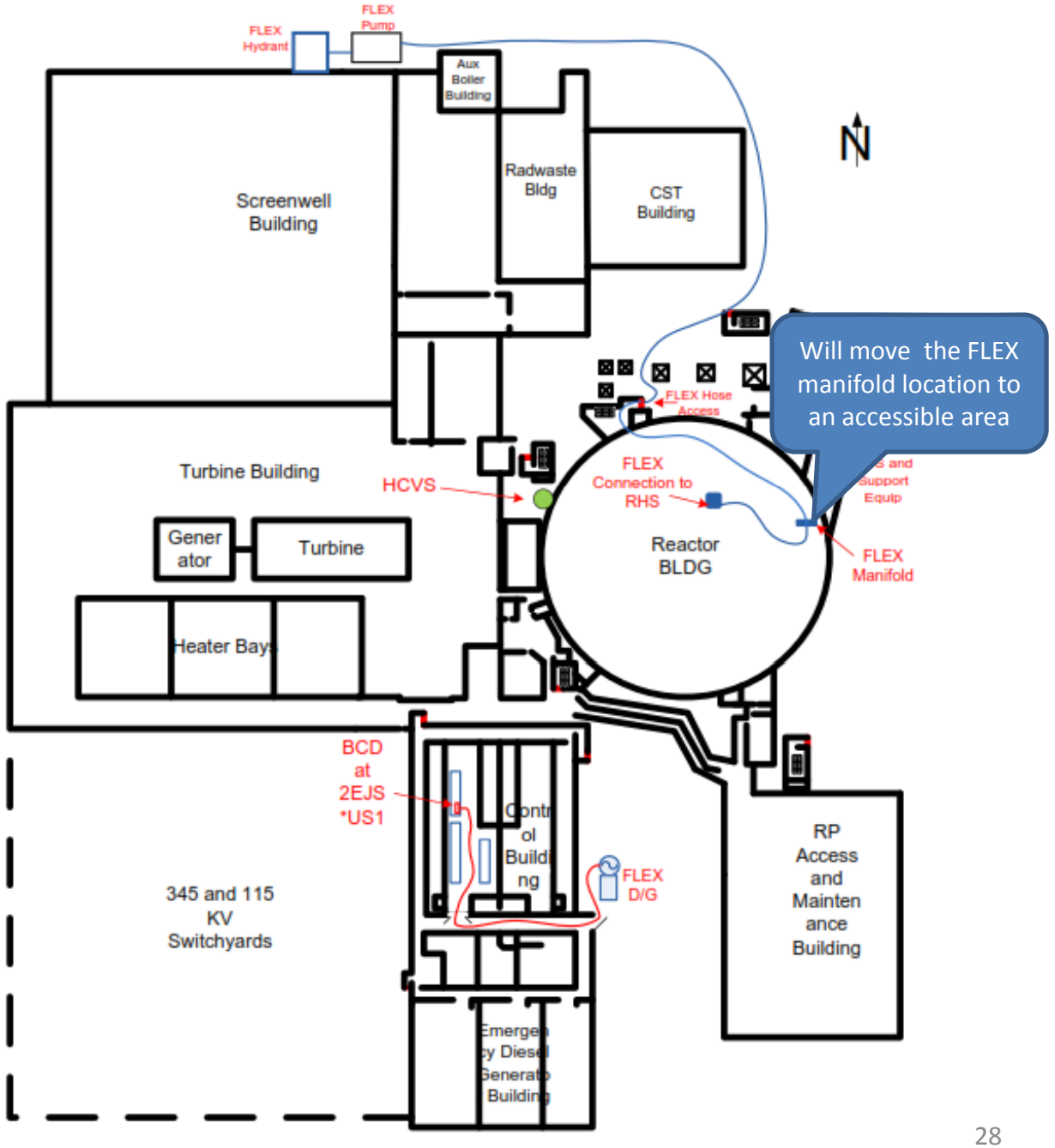
Nine Mile Point Unit 2 (NMP2)

- Nine Mile Point Unit 1 is a BWR/2 with Mark I Containment
- Nine Mile Point Unit 2 is a BWR/5 with Mark II Containment
- A combined OIP submittal will be made, but with separate OIPs for NMP1 and NMP2

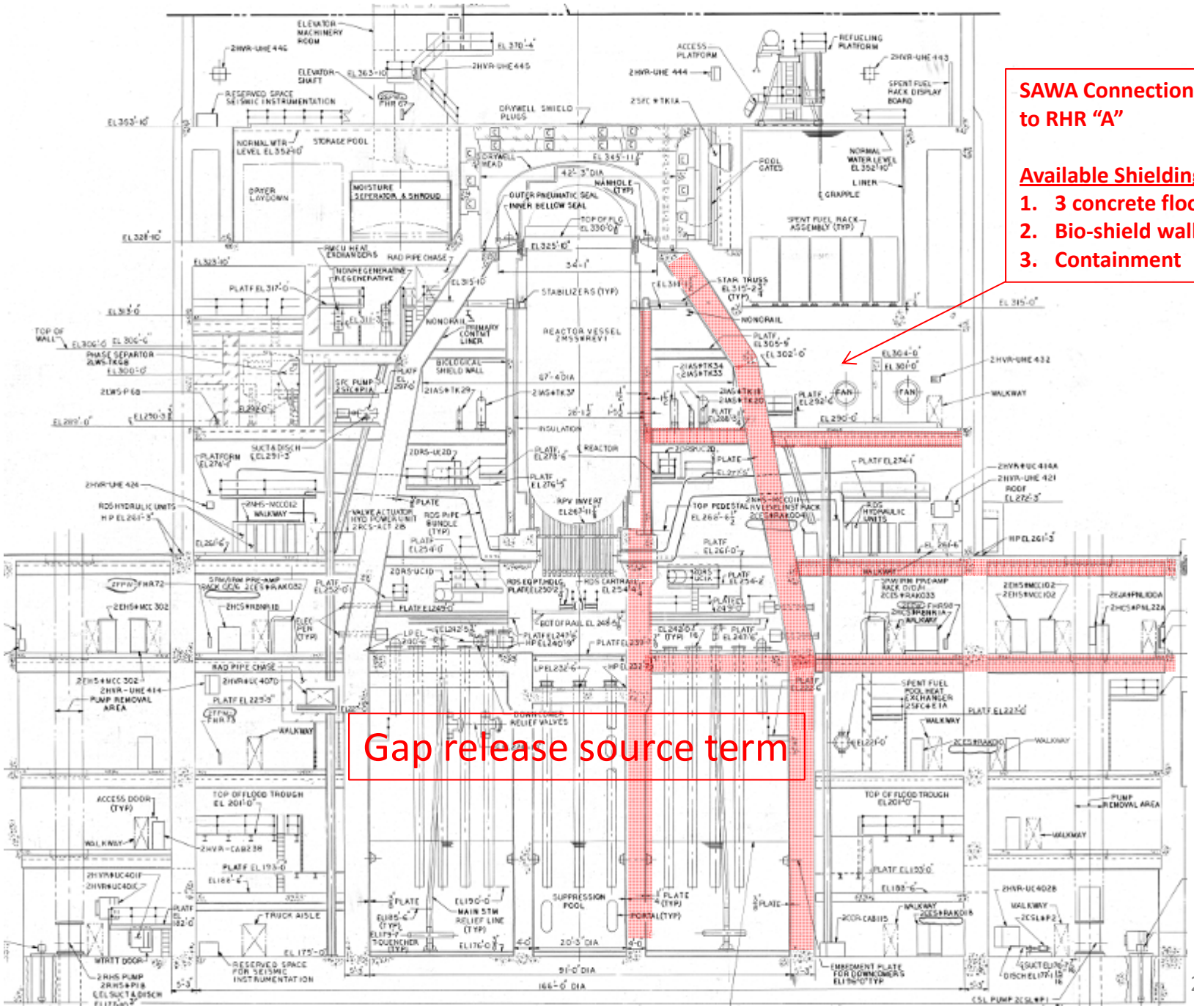
NMP2 – Phase 2 Implementation

- NMP2 will implement Phase 2 in the Spring of 2018.
- NMP2 specific assumptions:
  - NMP2 has determined that the existing license basis as documented in NMP2 SER (NUREG-1047 Supplement 3) allows for the alternate GDC-56 PCIV configuration of two PCIVs outside of containment. A GDC-56 exemption is not required (Phase 1 Assumption)
    - GDC-56 exemption request has been withdrawn
  - No additional plant specific assumptions have been identified for Phase 2

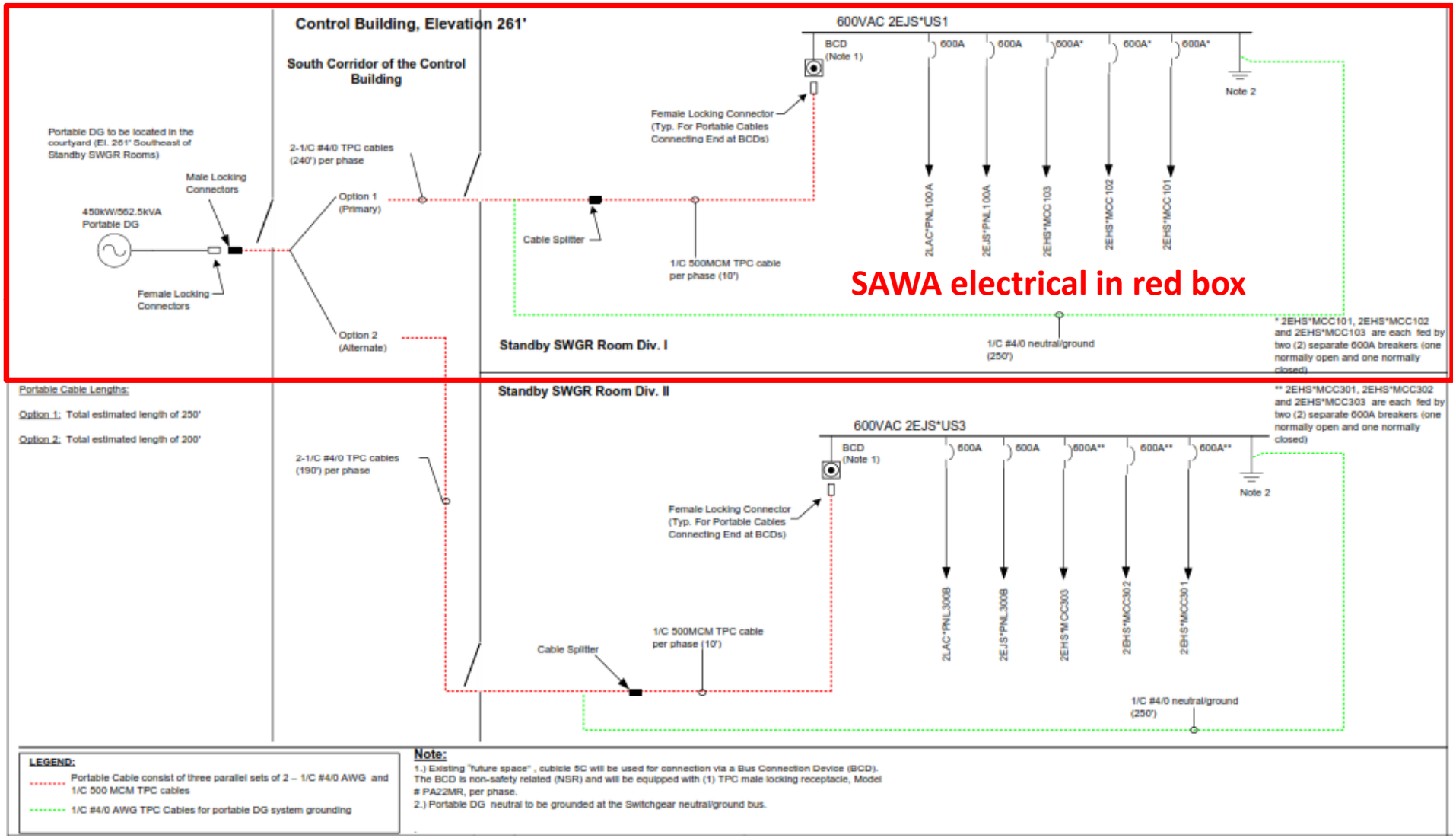
NMP2 Site Layout



NMP2 – Reactor Building Elevation View



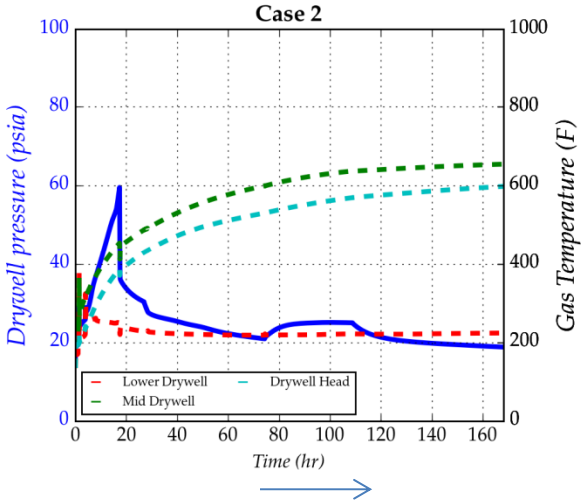
NMP2 – FLEX/SAWA Electrical

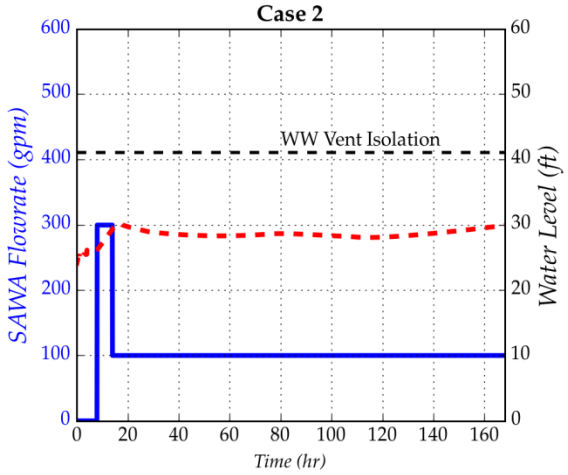


NMP2 – SAWA Flowrate

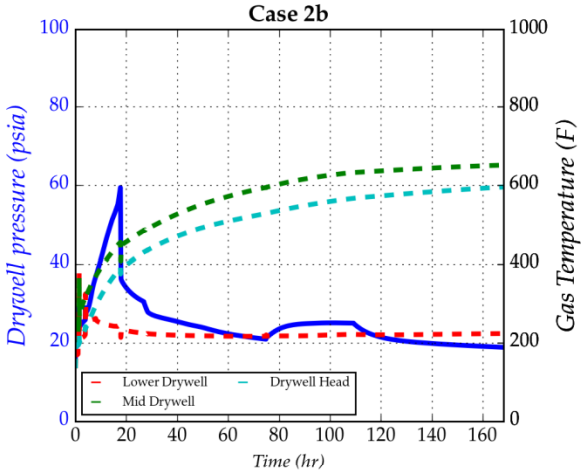
- Site specific evaluation of SAWA flow rate
  - Generic guidance is 500 GPM for 4 hours
  - NMP2 will use 300 GPM for 6 hours
  - Allows use of a single pump and saves deployment time
  - Use MAAP version 5.03 for evaluation
  - Evaluation performed consistent with those used to develop NEI 13-02 Rev 1 Figures C-2 through C-5
  - Sensitivity case for 500 gpm for 4 hours
  - Containment response is very similar for both cases

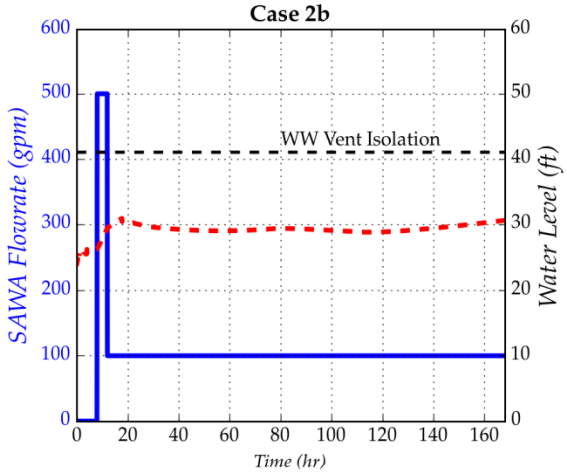
NMP2 – SAWA Flowrate





300 GPM for 6 hours

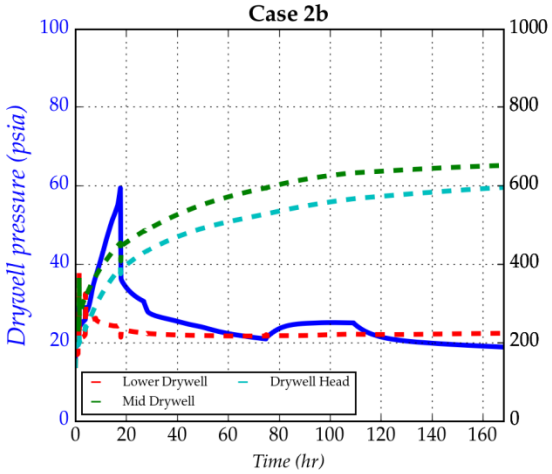


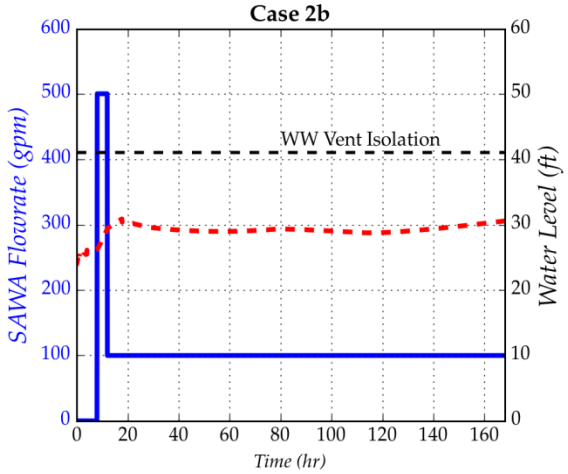


500 GPM for 4 hours

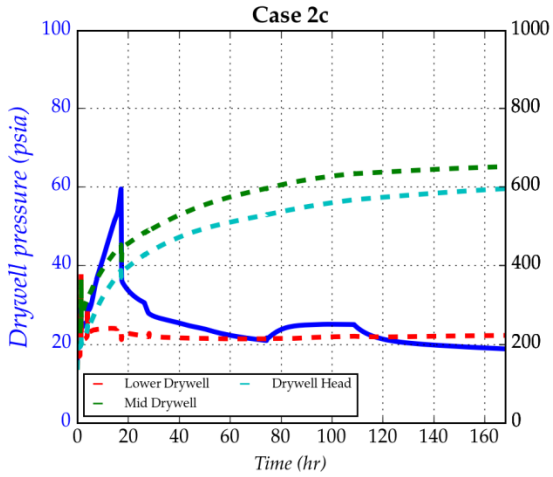
Note Shape of curves extremely similar for duration of 7 days

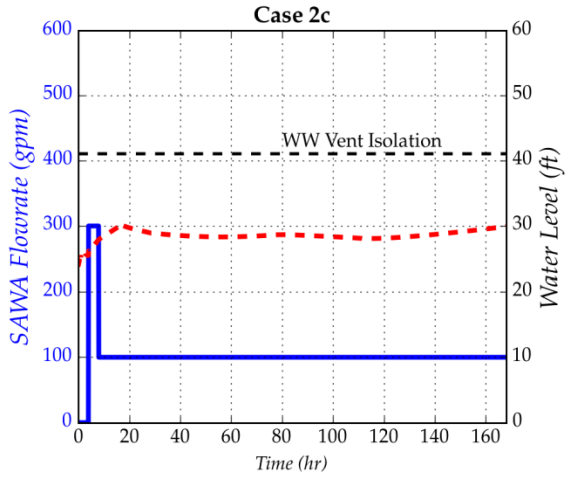
NMP2 – SAWA Flowrate





500 GPM for 4 hours

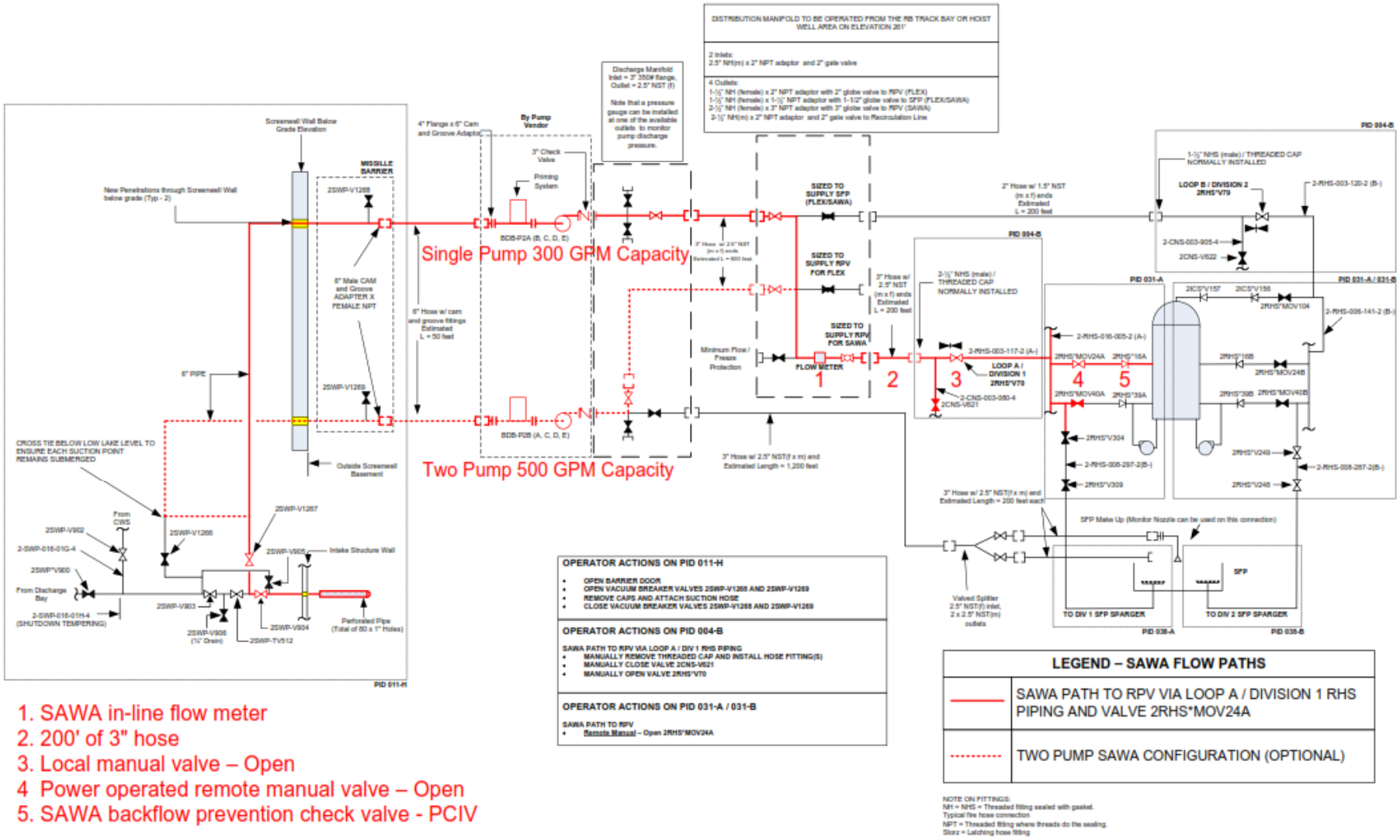




300 GPM for 4 hours

Note Shape of curves extremely similar for duration of 7 days

NMP2 – FLEX/SAWA Mechanical



1. SAWA in-line flow meter
2. 200' of 3" hose
3. Local manual valve – Open
4 Power operated remote manual valve – Open
5. SAWA backflow prevention check valve - PCIV

NMP2 – SAWA Manual Actions

Primary Action	Primary Location/Component	Notes
Establish HCVS capability in accordance with Part 2 of this OIP.	MCR or ROS	
Connect SAWA pump discharge to injection piping	Reactor building 289' elevation/RHR "A"	Perform reactor building portions of deployment first
Connect SAWA pump to water source	Intake/outside screenhouse building	
Power SAWA/HCVS components with EA-12-049 (FLEX) generator	Outside Control Building/Inside Control Building Division I Switchgear Room	
Inject to RPV using SAWA pump	RB Trackbay at valve manifold	Initial SAWA flow rate is 300 gpm
Monitor SAWA indications	RB Trackbay (some valve position in MCR)	Pump flow Valve position indication
Throttle SAWA flow for SAWM	RB Trackbay at valve manifold	Monitor DW pressure and Suppression Pool level

NMP2 – SAWA Action Timeline

Time	Action	Notes
T<1 hour	Connect SAWA hose in reactor building and route hose to RB trackbay • Remove threaded cap and install hose fittings • Close 2CNS-V621 • Open 2RHS*V70	No evaluation required for actions inside reactor building
T=1 – 7 hours	Complete actions started at T<1 hour Establish electrical power for HCVS and SAWA using EA-12-049 generator	Evaluate core gap release impact to reactor building access for SAWA actions
T=8 – 14 hours	Establish and maintain SAWA flow at 300 GPM for six hours	SAWA flow must commence at T=8 but should be done as soon as motive force is available
T>14 hours	Proceed to SAWM actions per Section 3.1.A	SAWA flow may be reduced to 100 GPM six hours following SAWA initiation

NMP2 – SAWA Instruments

Parameters	Instrument	Location	Power Source/Notes
Drywell Pressure	2CMS*PI2A	Indicator in Main Control Room El 306' on 2CEC*PNL601	Division 1 battery via EA-12-049 generator RG 1.97
Suppression Pool Level	2CMS*LI9A	Indicator in Main Control Room El 306' on 2CEC*PNL601	Division 1 battery via EA-12-049 generator RG 1.97
SAWA Flow	FLEX Pump Flow Indicator	At FLEX six-valve manifold deployed to Rx Bldg Track Bay EL 261'	Self-powered off internal battery.
SAWA Pump Instrumentation	Self-contained instrument/control panel	Portable pump deployed to north side of NMP2 Screenwell Bldg EL 261'	275 HP John Deere Diesel Engine driving on-board alternator
RHS Valve Controls	Valve indication /controls	Main Control Room El 306' on 2CEC*PNL601	2EHS*MCC103-17C via 2EJS*US1 via EA-12-049 generator

NMP2 SAWA Modifications

- Electrical Modifications
  - None anticipated
- Mechanical Modifications
  - Increase hose size for SAWA flow rate (300 gpm)
  - Construct valve manifold
  - Hose length/location of valve manifold may need changes based on hydraulic calculation/radiological evaluation
- Instrument Modifications
  - SAWA flow instrument

NMP2 SAWA Procedures

- Connect SAWA pump discharge to RHR piping
  - Remove threaded cap and install hose fittings
  - Close 2CNS-V621
  - Open 2RHS*V70
- Connect SAWA pump to intake using FSG
- Power SAWA/HCVS components with EA-12-049 (FLEX) generator using FSG
- Verify other RHR modes are isolated using Control Room switches
- Open 2RHS*MOV24A to lineup injection to RPV using SAWA pump
- Start SAWA pump to establish SAWA flow
- Adjust SAWA flow at valve manifold and using SAWA flow indication to establish and maintain 300 gpm.

Where an FSG is referenced, it will be the same FSG reference with the same steps used for FLEX

NMP2 SAWM Manual Actions

Primary Action	Primary Location/Component	Notes
Lower SAWA flow to preserve Wetwell vent path	RB Trackbay at valve manifold	• Control to maintain containment parameters to ensure wetwell vent remains functional • 100 gpm minimum capability is maintained for greater than 7 days
Control SAWM flow rate for containment control / decay heat removal	MCR RB Trackbay at valve manifold	• SAWM flow rate will be monitored using the following instruments – SAWA Flow – Suppression Pool Level – Drywell Pressure • SAWM flow rates will be controlled using the manual valve at the six valve manifold
Establish alternate decay heat removal	Various locations	SAWM strategy can preserve the wetwell vent path for >7 days
Secure SAWA flow	RB Trackbay at valve manifold	When alternate decay heat removal is established

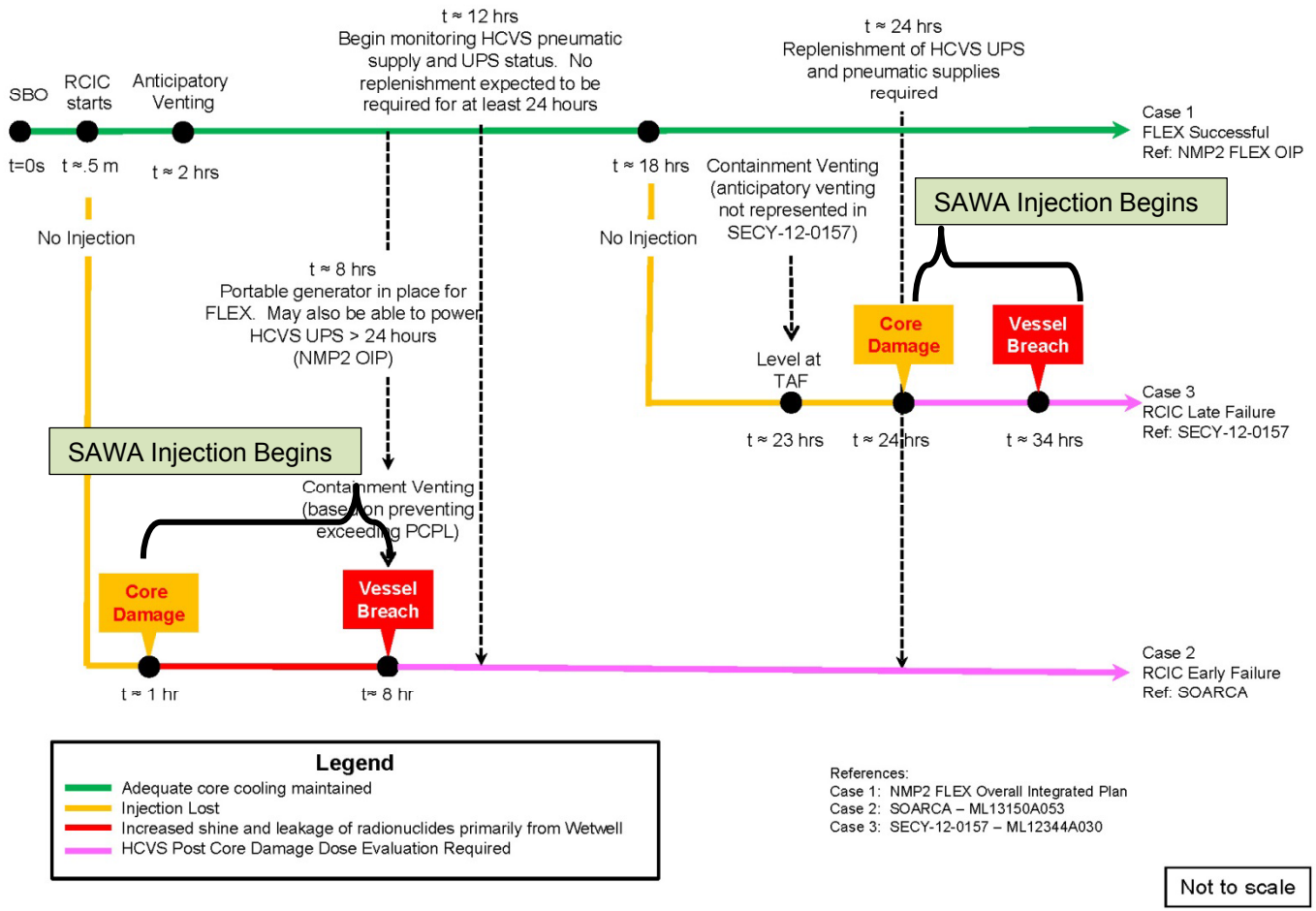
NMP2 – SAWM Action Timeline

Time	Action	Notes
T>14 hours	Initiate actions to maintain the wetwell vent (SAWV) capability by lowering injection flow rate while maintaining the cooling of the core debris	Monitor SAWM critical parameters while ensuring the wetwell vent remains available

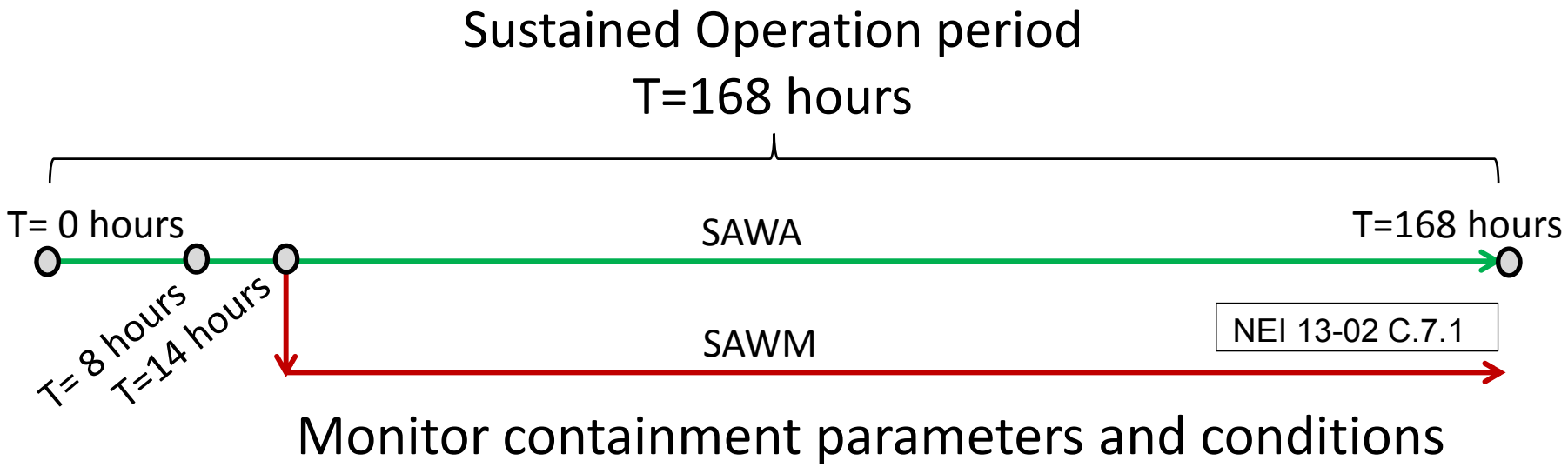
NMP2 – SAWM Portable Equipment

List portable equipment	BDBEE Venting	Severe Accident Venting	Performance Criteria	Maintenance / PM requirements
FLEX DG (and associated equipment)	X	X	TBD	Per Response to EA-12-049
SAWA Pump (and associated equipment)	X	X	TBD	Per Response to EA-13-109

NMP2 Sequence of Events Timeline - HCVS

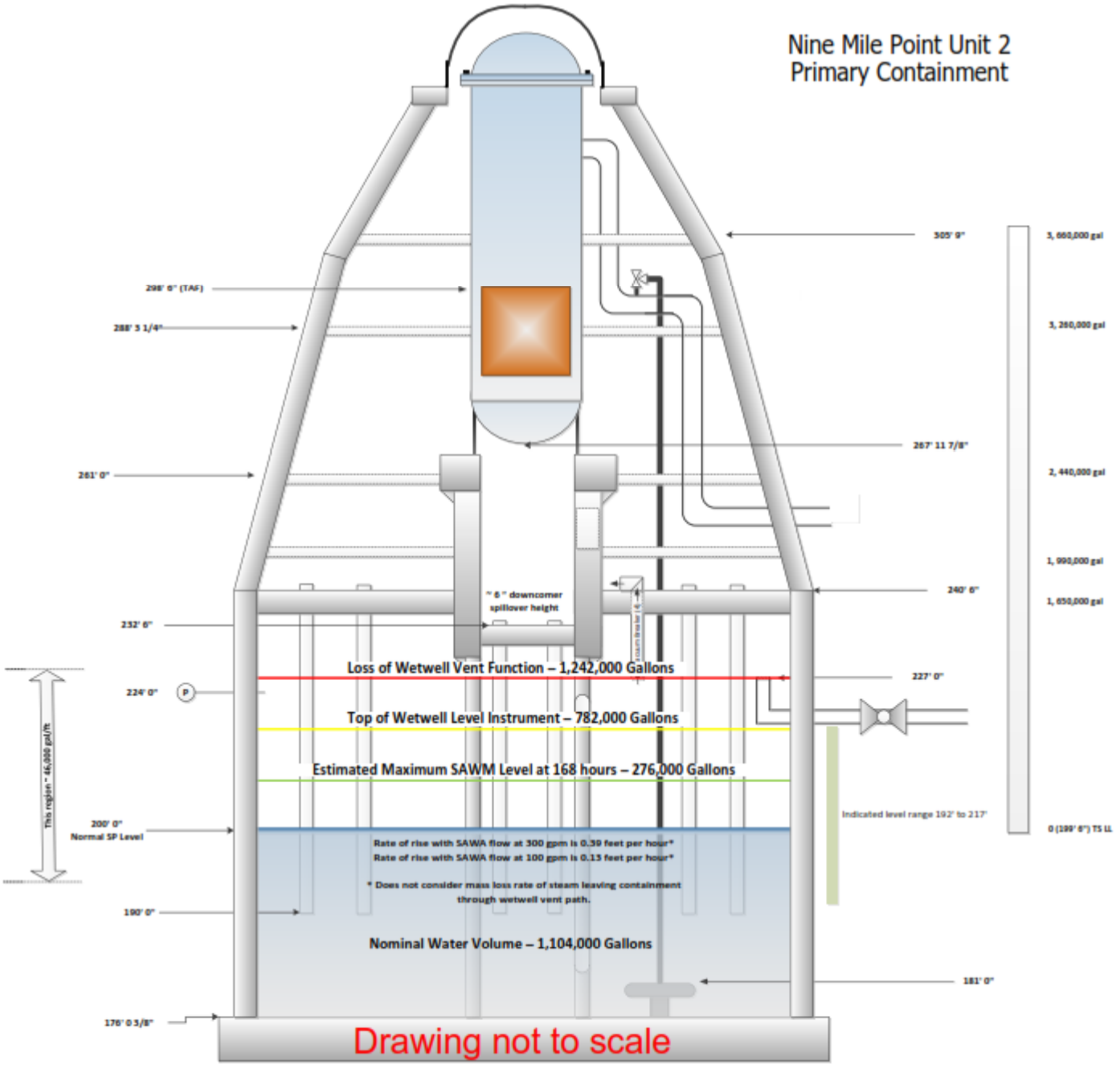


NMP2 Sequence of Events Timeline – SAWA/SAWM



Time	Action
T=0 hours	Start of ELAP
T=8 hours	Initiate SAWA flow at 300 gpm as soon as possible but no later than 8 hours
T=14 hours	Throttle SAWA flow to 100 gpm 6 hours after initiation of SAWA flow
T=168 hours	End of Sustained Operation

NMP2 – Containment Datum



Consensus Items

- Operator actions to use external water source connections
- Design Basis Hazard levels