



U.S.NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

Discussion of Evaluation of APM and Potential Consequences of Small Margin

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August 22, 2013

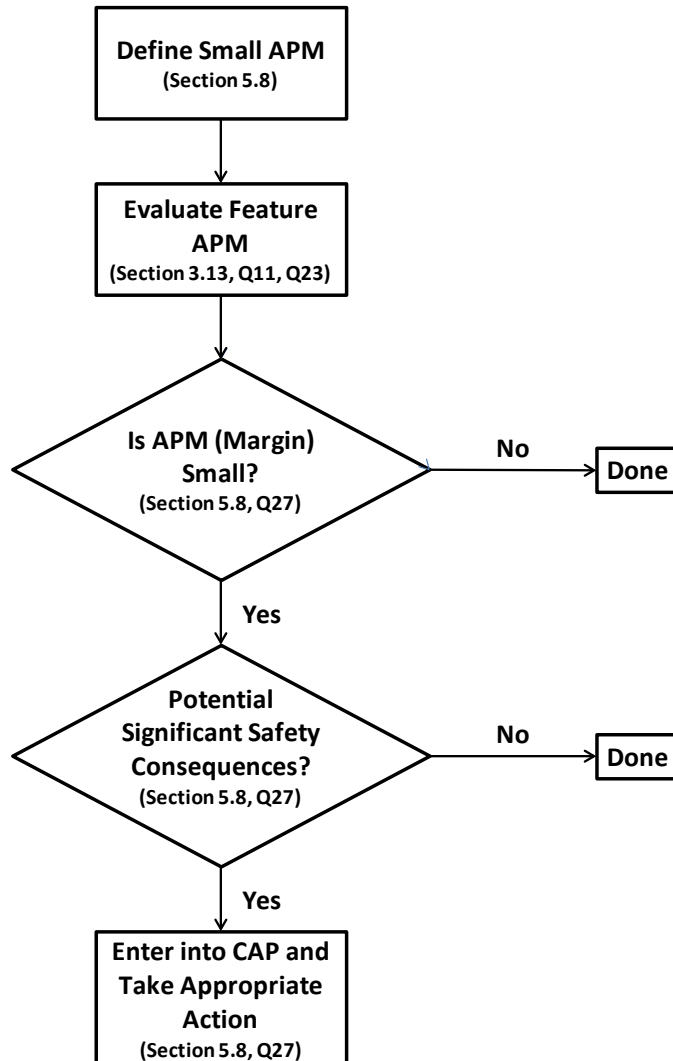
Agenda

1. Background
2. APM Process
3. NEI 12-07 Examples
4. Summary
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Background

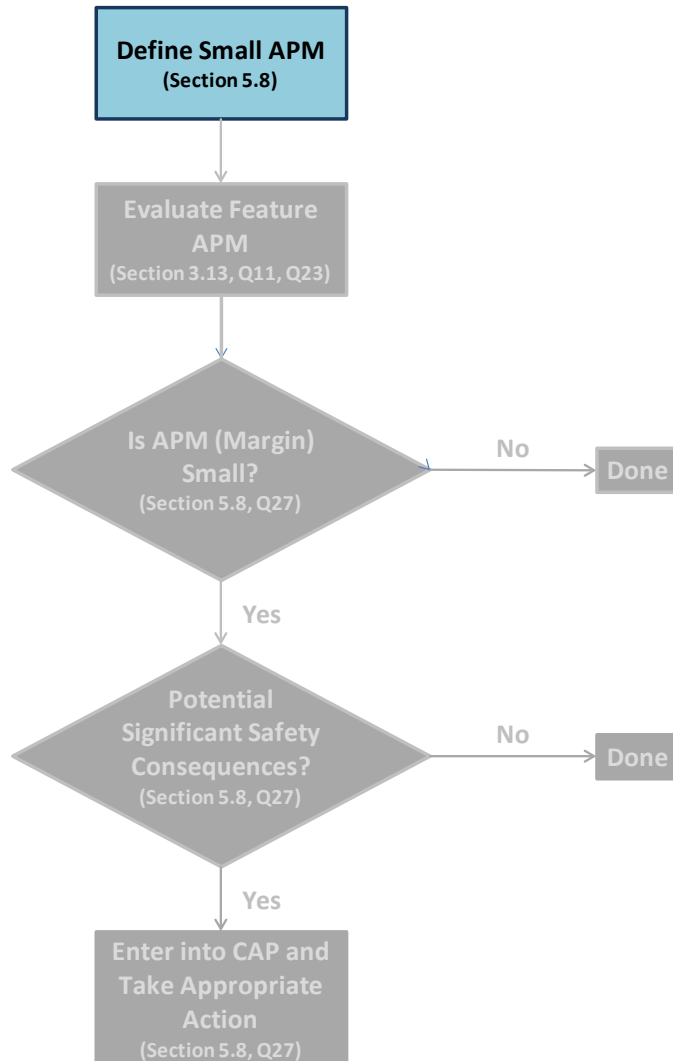
- Near-Term Task Force (NTTF) observed flooding “cliff-edge effect”
- NRC 50.54(f) letter indicated licensee walkdowns should identify and address cliff-edge effects through the corrective action program (CAP)
- As a result of stakeholder interactions, NEI 12-07 replaced cliff-edge effects with:
 - Computation of Available Physical Margin (APM), and
 - Evaluation and disposition of small margins with potentially significant safety consequences through CAP
- Information on APM is also relevant for to R2.1 response
- Therefore, ensuring that licensees evaluate APM and address instances of small APM with potentially significant safety consequences are parts of the response to the NTTF recommendations

APM Process – Overview



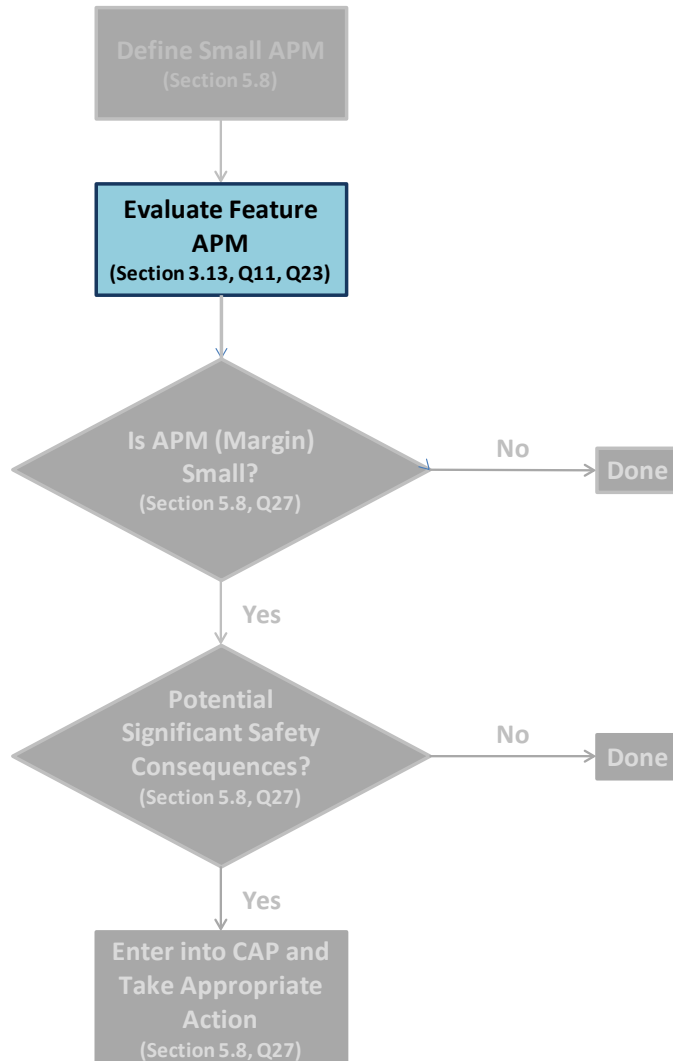
- A specific process has been defined for evaluating and dispositioning APM
- Guidance in NEI 12-07:
 - Section 3.13 (Definition of APM)
 - Section 5.8 (Documentation of APM)
 - Appendix B (Walkdown Record Form Example)
 - Question 11 and 23 (Determination of APM)
 - Question 27 (Evaluation and disposition of APM)
- Audits revealed inconsistencies between sites regarding this process

APM Process – Defining Small Margin



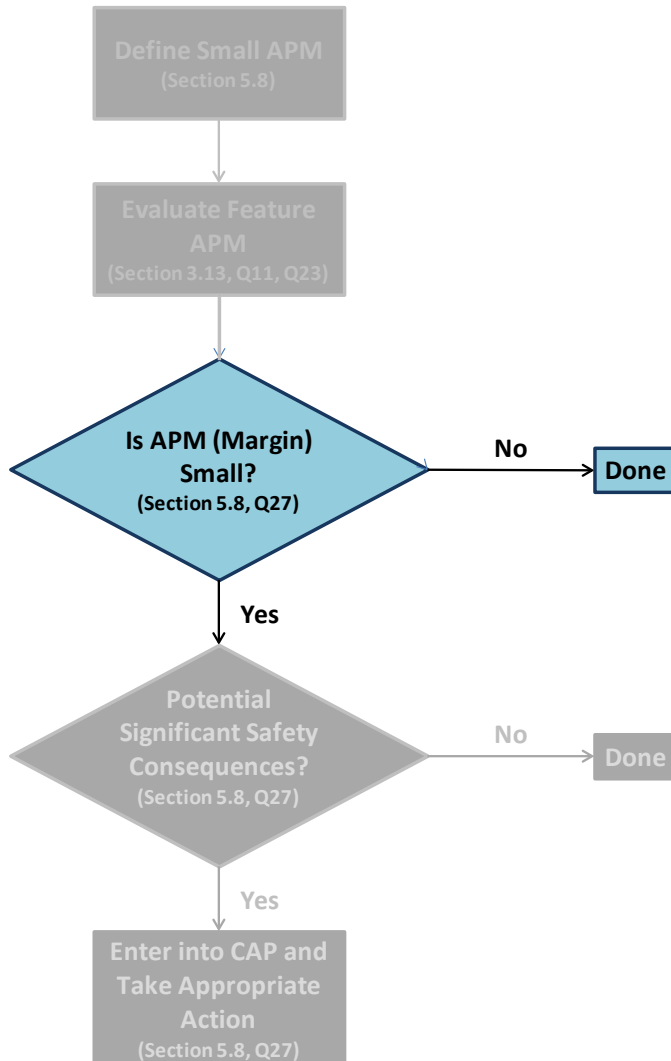
- Licensee defines small margin
- Zero universally considered small

APM Process – Evaluating APM



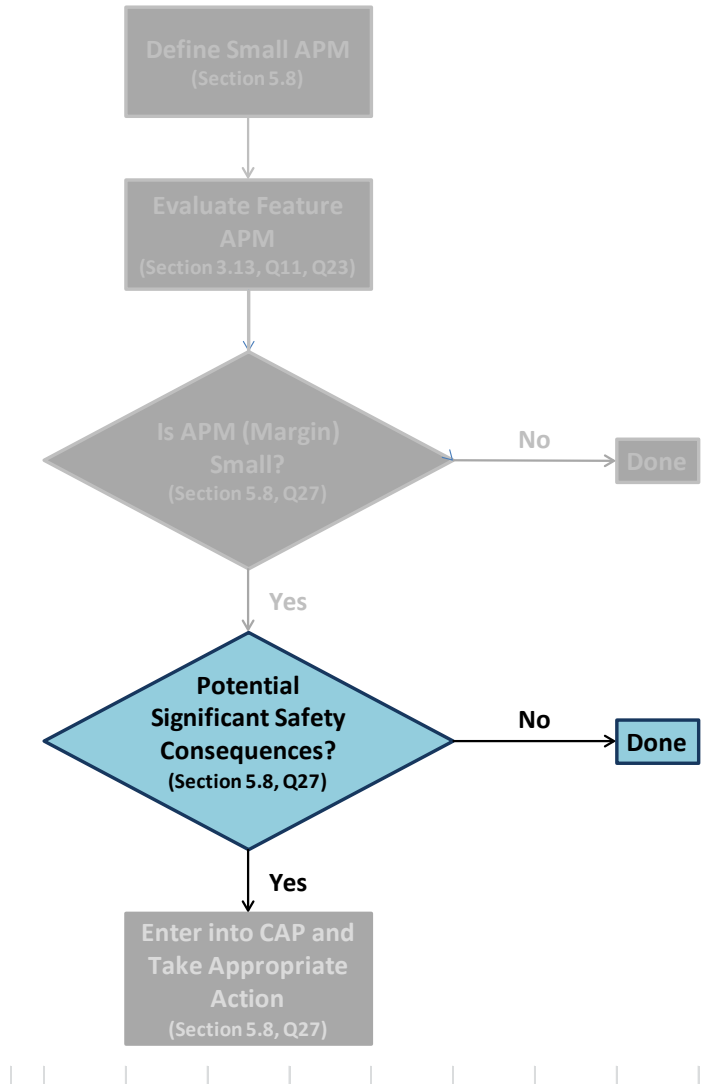
- Evaluate APM at feature
 - Use licensing basis flood heights for computation
 - In addition, other flood characteristics can be used to evaluate APM (e.g., hydrostatic and hydrodynamic pressure)
 - Results in numerical values, including zero
 - Non-numerical values require explanation

APM Process – Is APM Small?



- Compare APM to small margin definition
 - No: No further action needed
 - Yes: Further action needed
- Leads to identification of smallest controlling margin associated with composite flood protection features
 - Ex: flood barriers consisting of seals, walls, and doors

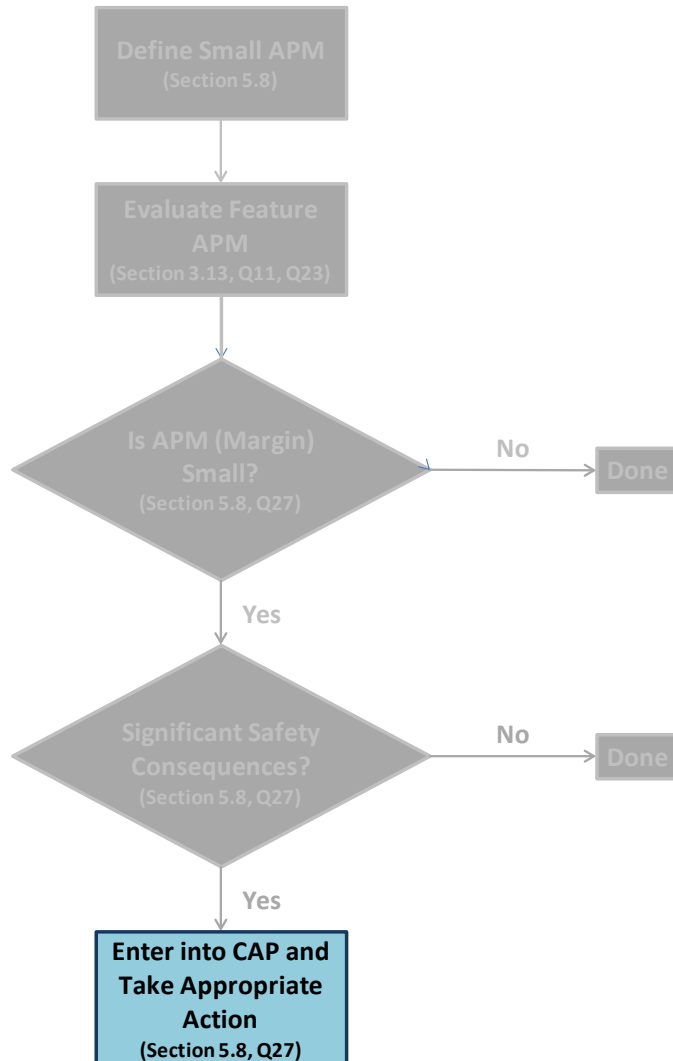
APM Process – Safety Consequences?



- Are there potentially significant safety consequences if margin is exceeded?
 - No: No further action needed
 - Yes: Further action needed

- Documentation of observations about APM and SSCs effected by small margin

APM Process – Entrance into CAP



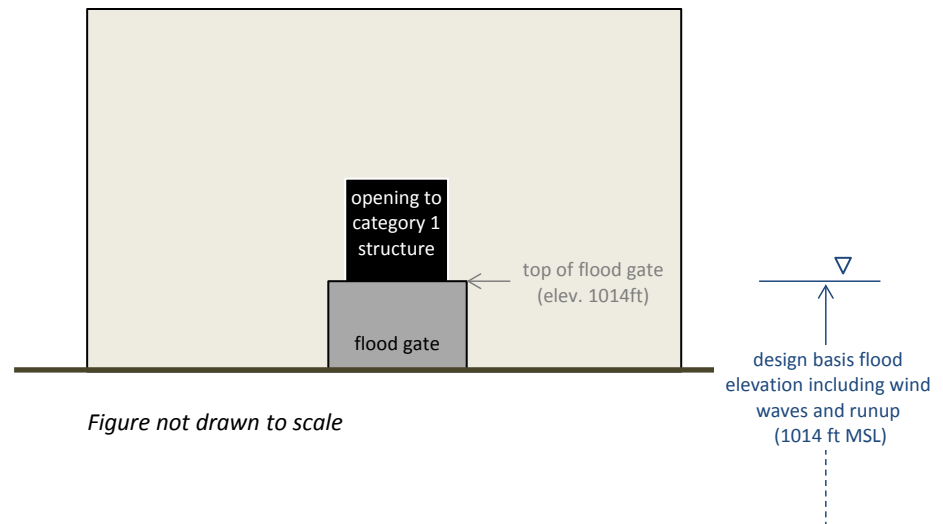
- Instances of small margin and potentially significant safety consequences entered into CAP for further disposition and appropriate actions

NEI 12-07: APM evaluation Example #1

Section 3.13 of NEI 12-07 includes the following text:

The top of the lowest flood barrier is a flood gate in the auxiliary building (a Category 1 structure). The top of the flood gate is at an elevation of 1014 ft. If the river rises above this elevation, water will enter the building. The current licensing basis states that the maximum predicted flood level is elevation 1014 ft. Therefore the APM = 0 ft.

Additional illustration:



$$APM = 1014\text{ft} - 1014\text{ft} = 0\text{ft}$$

NEI 12-07:APM evaluation Example #2

Section 3.13 of NEI 12-07 includes the following text:

Cables from the switchyard enter the structure at site grade where the site grade is at elevation 400 ft. These cable penetrations are protected with seals guaranteed for a 40- foot static head. Therefore this structure is protected to elevation 440 ft (400 ft + 40 ft). Other flood protection features on the structure, such as door seals and sandbags, provide flood protection to elevation 445 ft. The current licensing basis states that the maximum predicted flood level at the site is elevation 430 ft. Therefore, the APM = 10 ft.

Additional illustration:

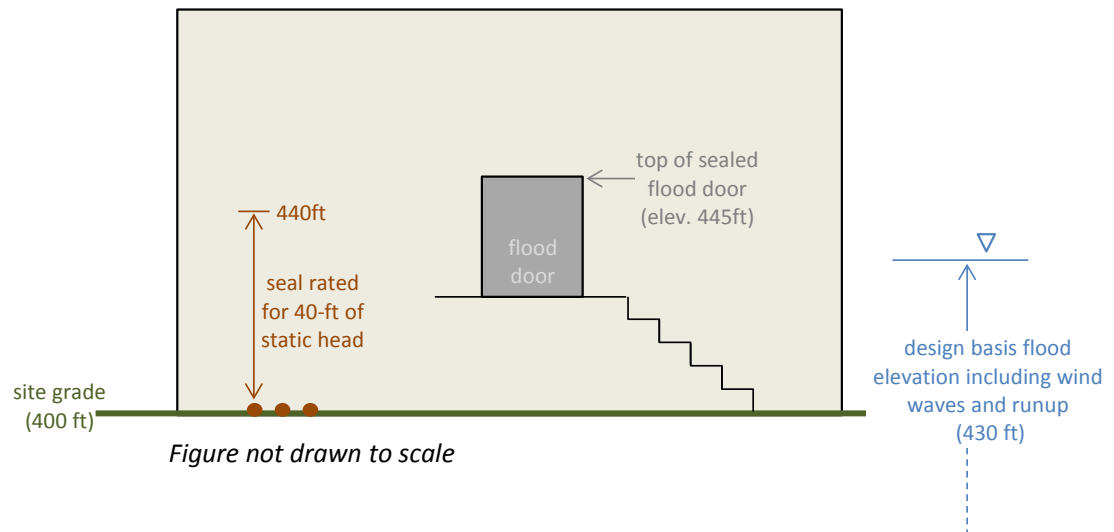


Figure not drawn to scale

$$APM = \min[440\text{ft}, 445\text{ft}] - 430\text{ft} = 10\text{ft}$$

Summary

- Ensuring that licensees evaluate APM and address instances of small APM with potentially significant safety consequences are parts of the response to the NTTF recommendations
- The staff assessment of licensee walkdowns considers whether the flooding walkdowns were performed IAW NEI 12-07 (including evaluation and disposition of APM) and ultimately if 50.54(f) responses are complete and address NTTF Recommendation 2.3
- Audits performed during June and July 2013 revealed inconsistencies from site-to-site with respect to:
 - Whether a threshold for small margin was defined
 - Evaluation of APM
 - Consideration of potentially significant safety consequences
 - Entry of small APM with potentially significant consequences into CAP

Next Steps

- In light of audit experience, it is not clear to staff whether all licensees calculated, evaluated, and dispositioned APM at their sites consistent with the guidance provided in NEI 12-07.
- To address this lack of clarity, and to support staff assessments, NRC staff would like to hold a dialogue during this public meeting to discuss the issue and proposed resolutions (e.g., issuance of an RAI).
- After considering stakeholder feedback, the NRC staff will determine the appropriate path forward.