Public Meeting on Oklo Topical Reports

September 28, 2021

MCA and Performance-based Licensing Topical Reports

Why are they important?

- Articulate the methodologies used by Oklo in developing the licensing basis for its reactor designs
- Offer an alternative licensing approach to the current approaches being considered for Part 53
- Represent a technology-inclusive, risk-informed performance-based licensing methodology, available for use by any advanced reactor developer, to enable broader deployment as directed by NEIMA

MCA and Performance-based Licensing Topical Reports

What do they do?

- Focus on the requirements for assuring adequate protection, rather than regulatory guidance developed for other technologies
- Utilize iterative processes to simplify the design, with preferential use of inherent features and passive systems over complex, active systems
- Clearly demonstrate safety significant functions and features of the design and how to apply the necessary controls to ensure their reliability

MCA and Performance-based Licensing Topical Reports

Current status?

- Oklo submitted both topical reports to the NRC on 7/2/2021
- NRC staff performed completeness review and identified supplemental information to support review of both topical reports
- Oklo/NRC discussion through public meetings on the identified supplemental information and proposed resolution of NRC staff comments

Clarification on follow up email

Table 3-1, “Information Requirements for the ISA Summary,” of NUREG-1520 highlights acceptance criteria for an integrated safety analysis (ISA). Items from Table 3-1 that staff identified as relevant to a maximum credible accident methodology for an advanced reactor include:

- ISA method(s) description in Section 3.4.3.2(5)
- ISA team description in Section 3.4.3.2(5)
- Definition of “unlikely”, “highly unlikely”, and “credible” in Section 3.4.3.2(9)
- Description of accident sequences in Section 3.4.3.2(3c)
- Characterization of high and intermediate consequence accident sequences in Section 3.4.3.2(3c)

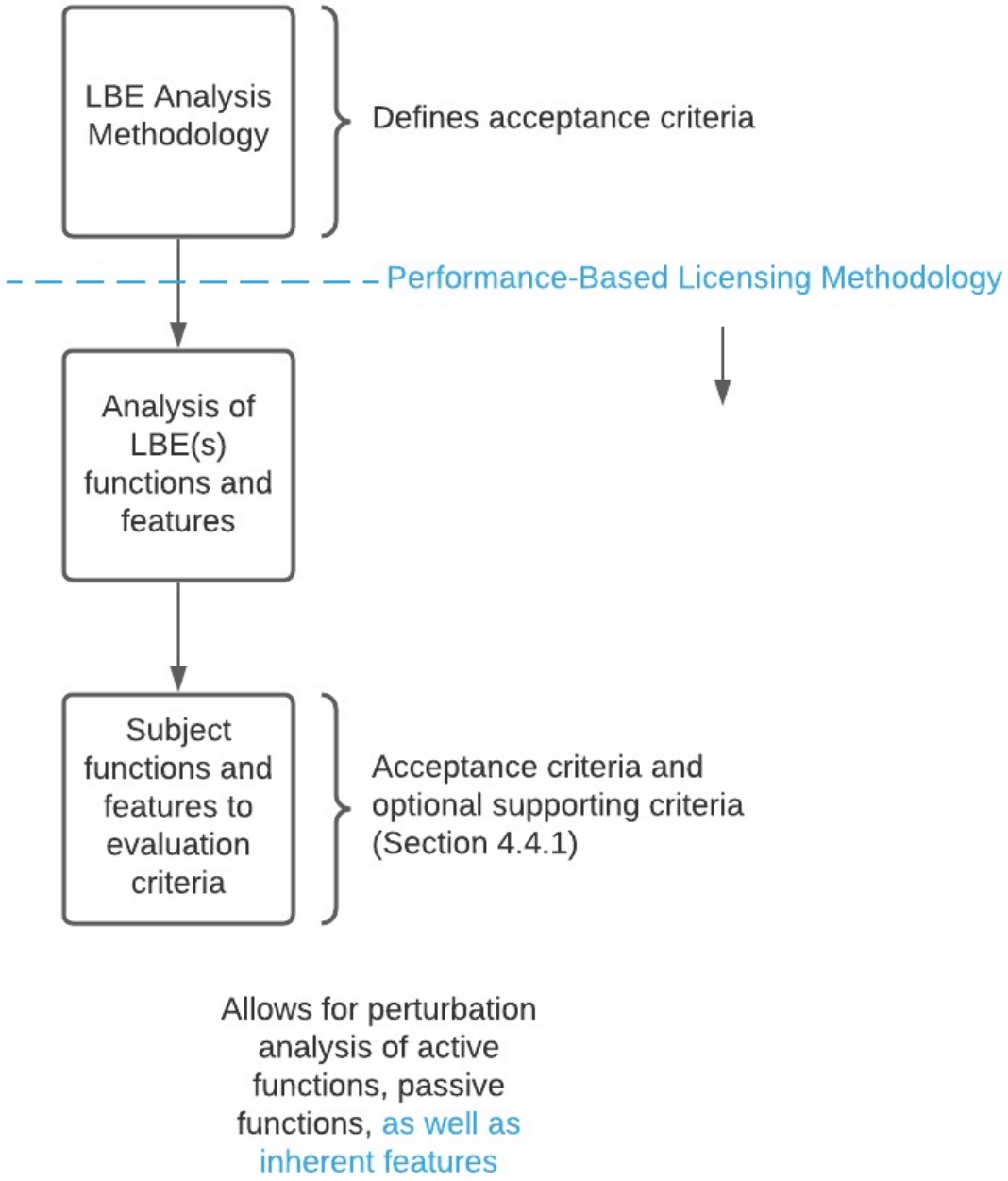
In the items identified above, the information in Section 3.4.3.2(9) contain the specific acceptance criteria referred to in Note 2 from the NRC Form 898. During the public meeting on September 16, 2021, staff emphasized that the acceptance criteria in NUREG-1520 work together as an integrated set of criteria and that some criteria in NUREG-1520 (e.g., 3.4.3.2(3c) and 3.4.3.2(5)) reference NUREG-1513, “Integrated Safety Analysis Guidance Document.” Acceptance criteria provided in Sections 3.4.3.2(3c) and 3.4.3.2(5) of NUREG-1520, that reference NUREG-1513, highlight additional considerations for completeness of the hazard identification and assessment and are relevant to uncertainty treatment.

Clarification requested from Oklo

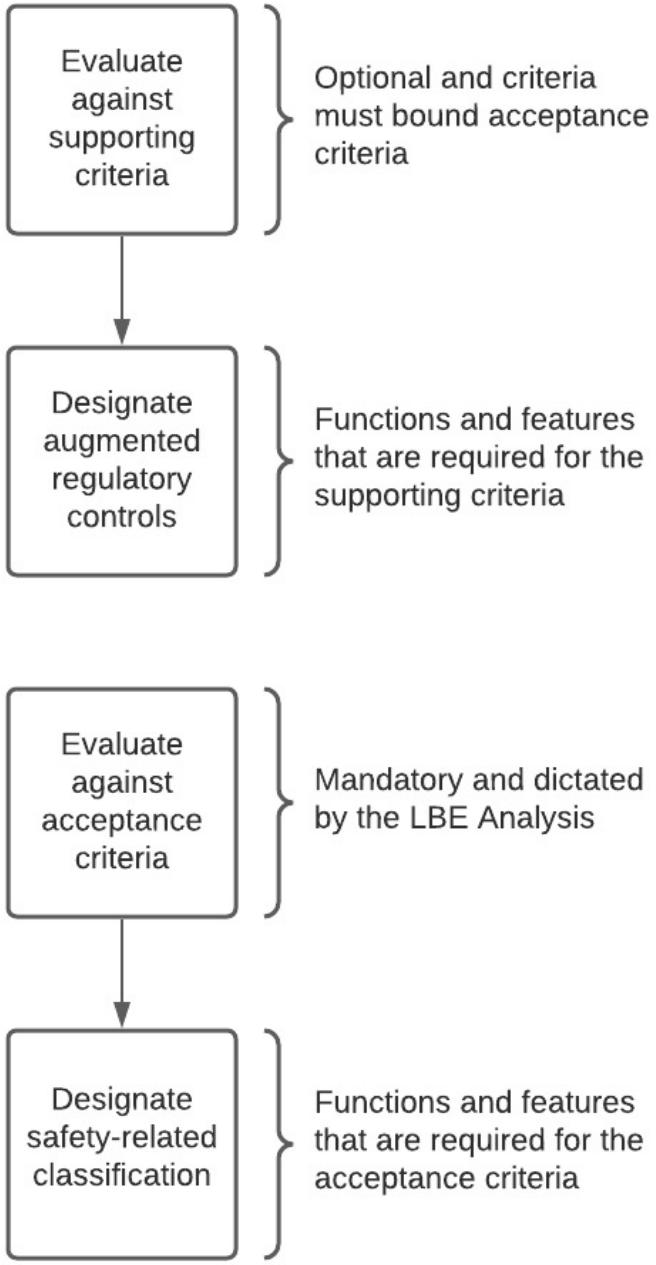
Oklo is seeking to discuss how implementation of this TR is envisioned, as described in future slides. An example will also address many of the NRC staff's questions.

Performance-Based Licensing Methodology

Brief review



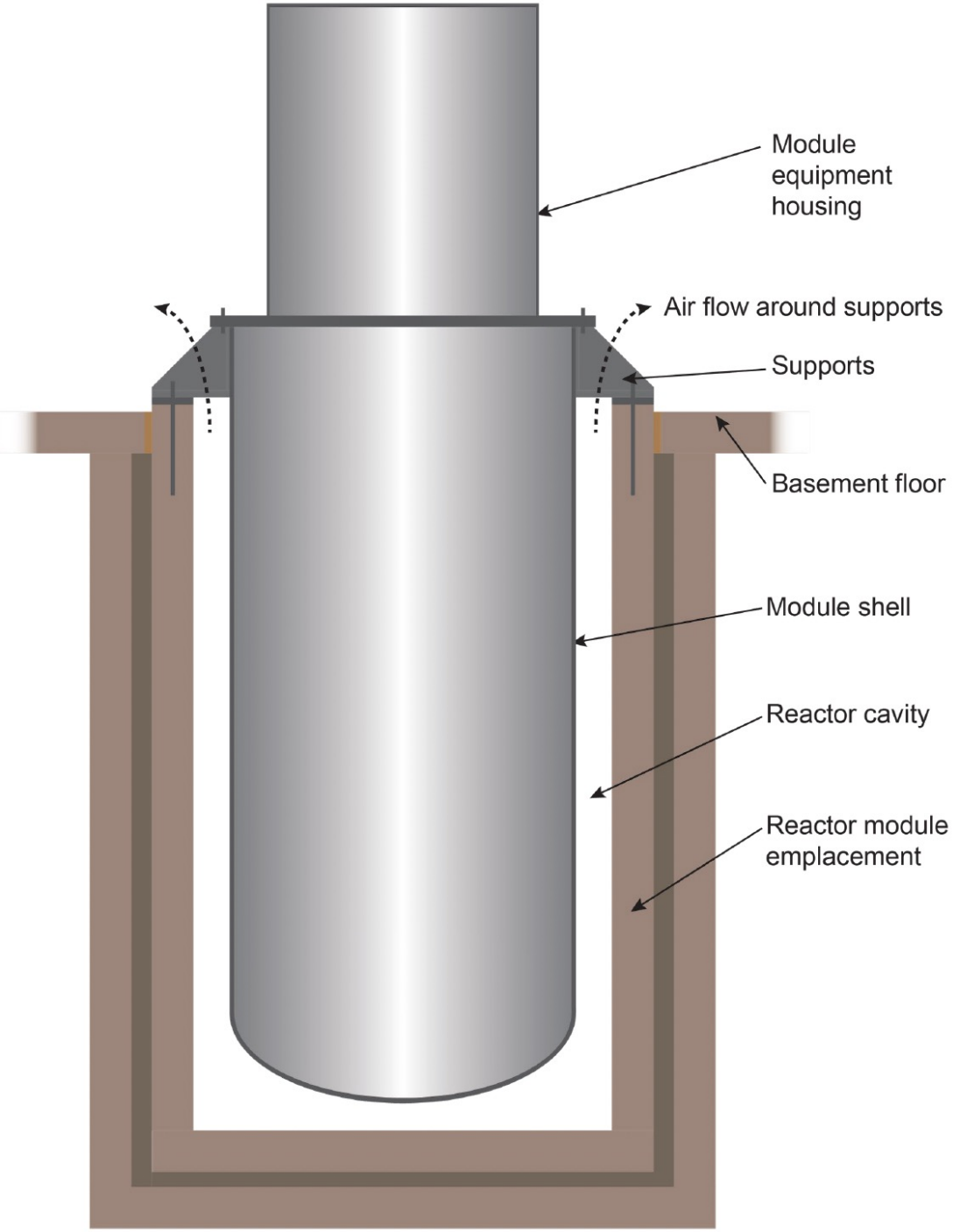
- Oklo saw a need for a way to analyze inherent features
- The Performance-Based Licensing Methodology stands alone from how LBEs are selected
- Technology-inclusive advanced reactor licensing must be flexible in order to be innovative
- This methodology is iterative and failure of a step requires re-analysis or re-design, ensuring safety-by-design



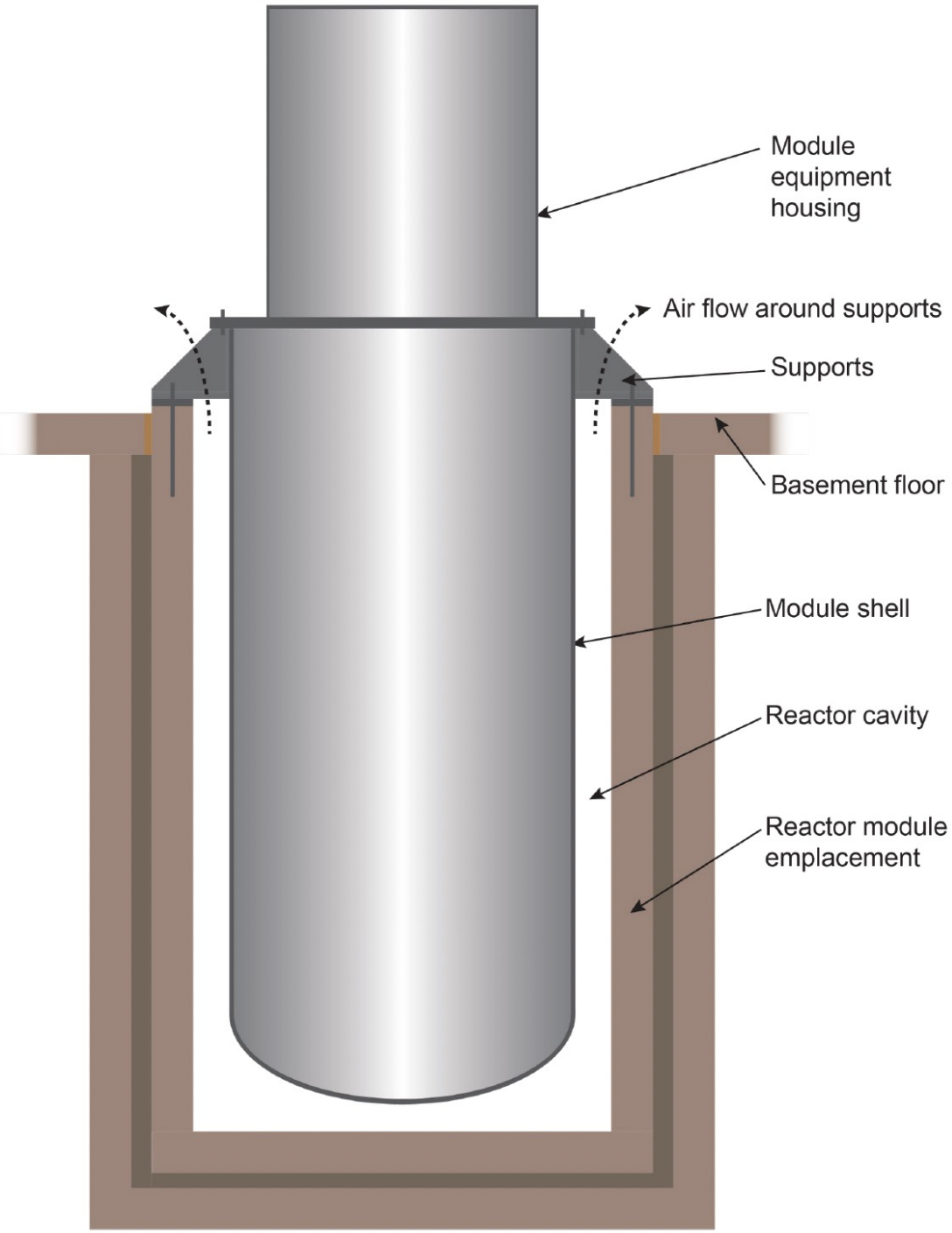
- Evaluation criteria include optional supporting criteria and mandatory acceptance criteria
  - Supporting criteria development is explained by this methodology
  - Acceptance criteria are inherited from the LBE Analysis
- Important functions and features are identified and further analyzed
- The goal is to identify where regulatory controls are required
  - I.e. - design bases, design commitments, and programmatic controls assure those important functions and features

Example

Reactor module emplacement



- An LBE analysis assumes passive air flow around the module shell
- To conduct that passive air flow analysis, certain assumptions are made about its environment (e.g., heat transfer, air flow area)
- The following slides depict an assumption related to air flow

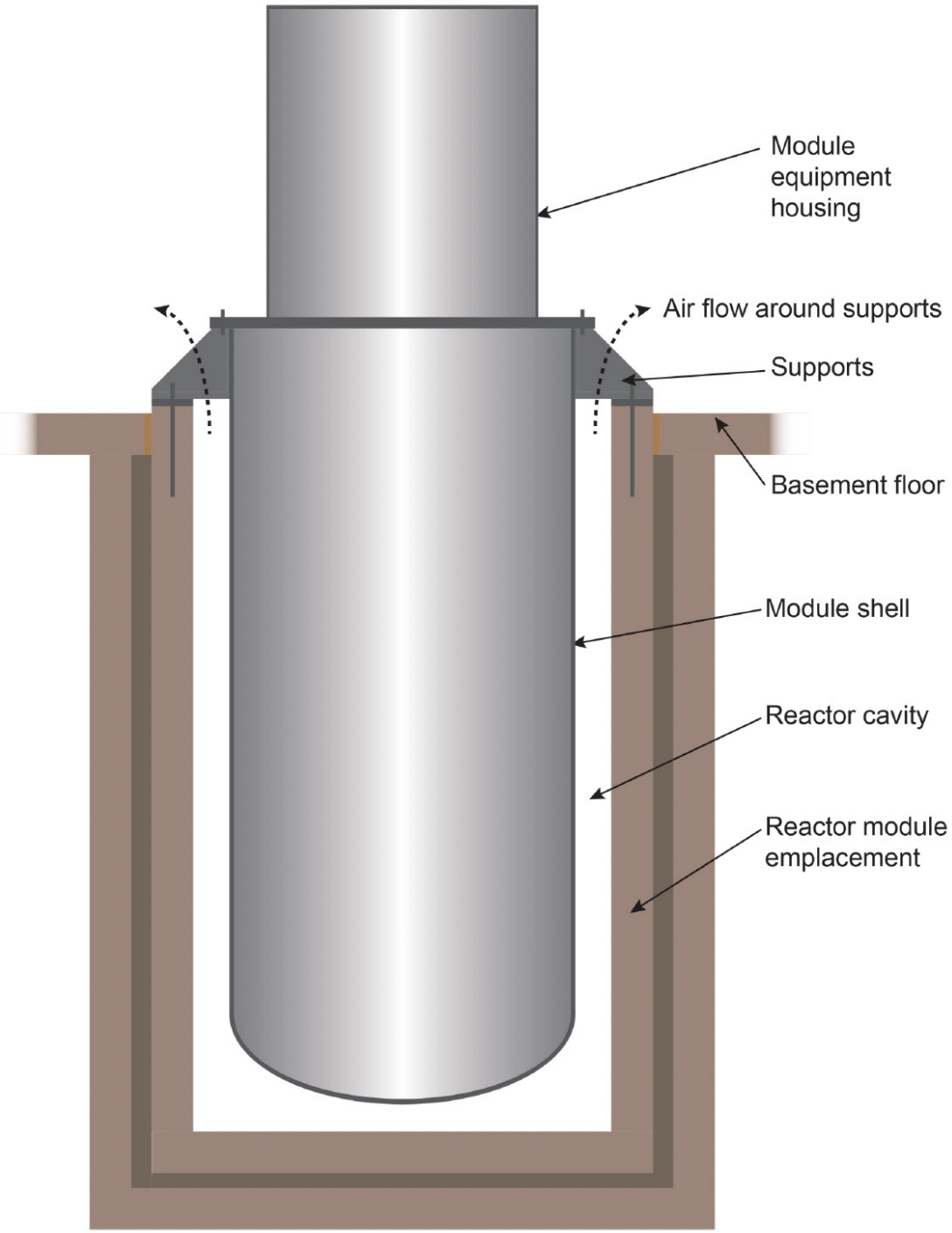


Feature:

- Adequate air flow area

Classification:

- Perturb heat removal rate as a function of air flow area
- Evaluate against supporting criteria
  - If heat removal is sufficiently low, temperatures could exceed those specified by supporting criteria — Therefore, function **is** relied on for supporting criteria
- Evaluate against acceptance criteria
  - Elevated temperatures do not result in acceptance criteria being exceeded — Therefore, function is **not** relied on for acceptance criteria
- Function is designated for augmented (non-SR) regulatory controls



Assign Design Basis and Commitment:

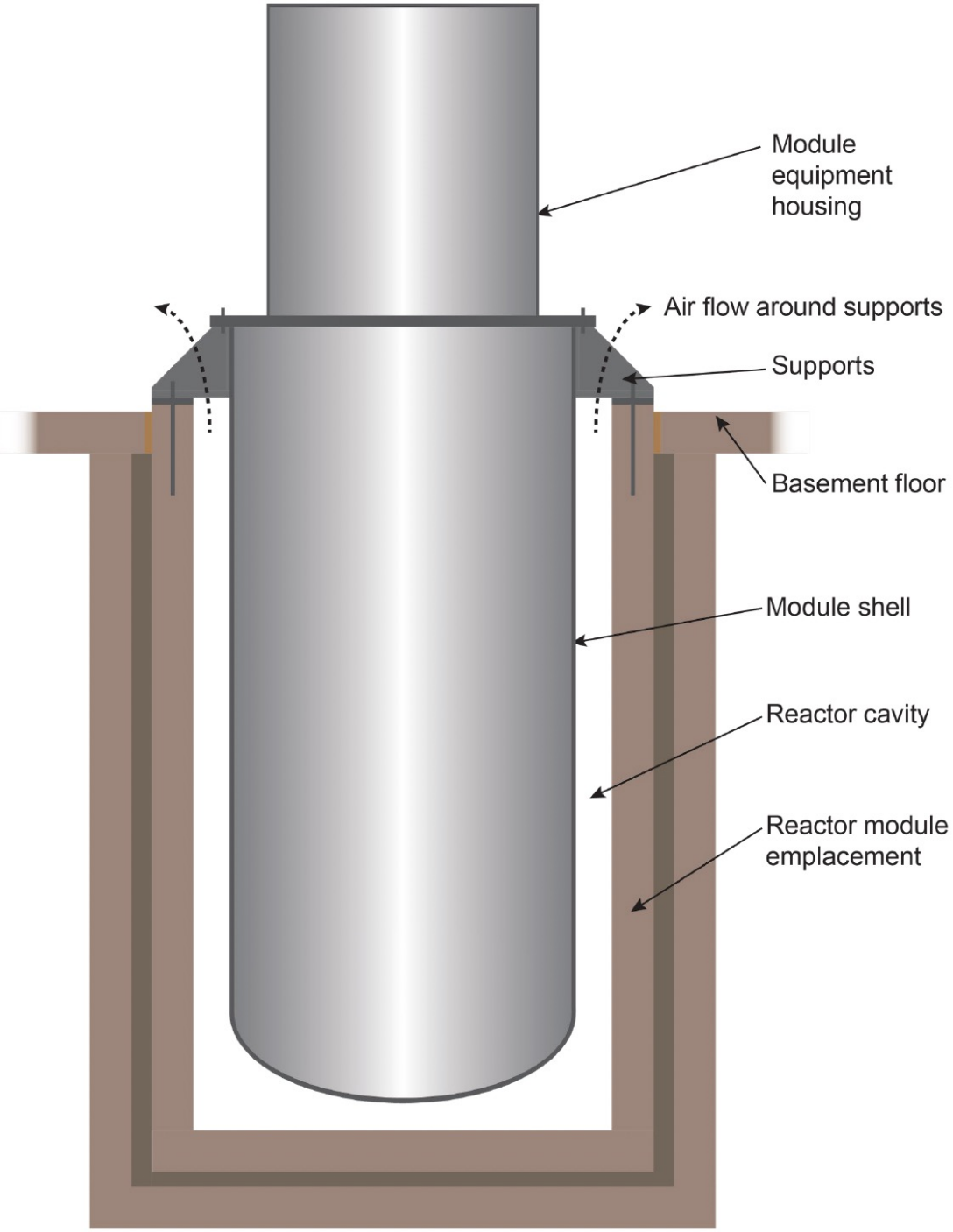
- Non-SR design basis required for augmented controls
- Design commitment made to a specific module installation

Translation:

- Function is translated to a specific system: the Building System

Assign Programmatic Control:

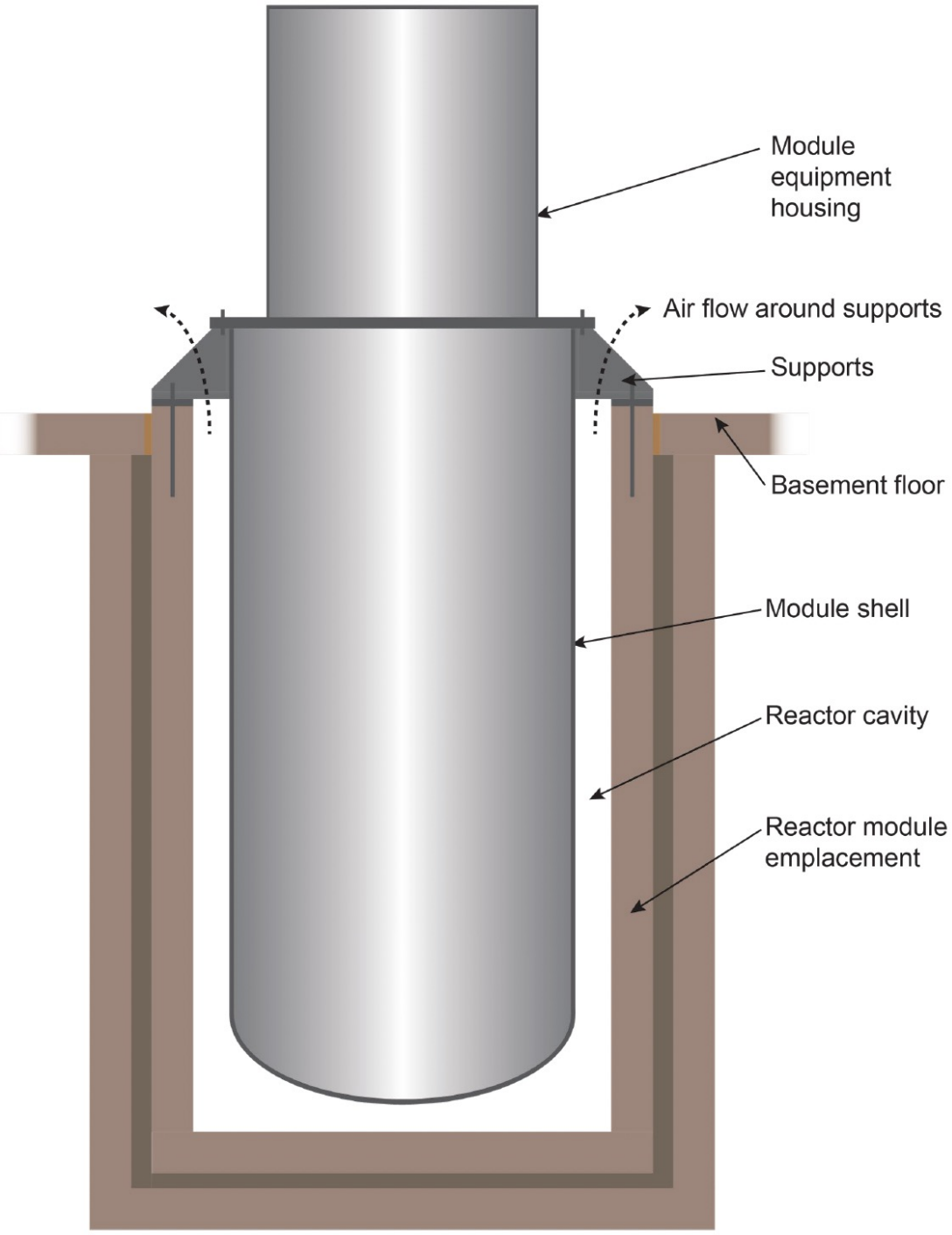
- Pre-operational test verifies construction of the module



Governed by Part III of the QAPD

ITAAC requirement:

- ITAAC.SD.01 requires all pre-operational tests be completed
- All ITAAC must be completed for the NRC Commission to make its 103(g) finding, allowing fuel onsite



All regulatory controls are expected to be clearly outlined for the NRC staff review in an NRC licensing application submission.

DB.BAS.01 The building system provides for the emplacement of the reactor module in a configuration that supports passive cooling of the module shell.

DC.BAS.01.A The critical components of the reactor module, as identified in the appropriate procedure, are installed in the reactor module emplacement as described in the design documents referenced by the procedure.

POT.BAS.01.A (see Chapter 14)

Test identifier	Design basis	Objective
POT.BAS.01.A	DB.BAS.01	Verify the construction of the reactor emplacement against design documents referenced by the test procedure.
POT.BAS.02.A	DB.BAS.02	Verify the critical components and cabling, as identified by the test procedure, are installed in the correct locations, according to design documents referenced by the test procedure.
POT.BAS.02.B	DB.BAS.02	Verify that openings and penetrations through fire barriers are protected according to design documents referenced by the test procedure.
POT.BAS.03.A	DB.BAS.03	Verify the functionality of manual fire pull-stations and individual fire detectors.
POT.BAS.03.B	DB.BAS.03	Verify the fire protection system provides for manual fire fighting capabilities in each fire area.

Closeout