Enclosure

Regulatory Guide Periodic Review

Regulatory Guide Number:	**1.136**
Title:	**Design Limits, Loading Combinations, Materials, Construction, and Testing of Concrete Containments**
Office/division/branch:	**RES/DE/SGSEB**
Technical Lead:	**Frederick Sock**
Recommended Staff Action:	**Reviewed with issues identified for future consideration**

1. What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?

Regulatory Guide (RG) 1.136, "Design Limits, Loading Combinations, Materials, Construction, And Testing of Concrete Containments" was last issued in March 2007. RG-1.136 endorses with exceptions, the 2001 Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section III, Division 2, hereafter referred to as "the Code". Since the last revision of RG 1.136, the Code has been updated several times, the most recent being the 2015 Edition. The revisions documented in ASME editions from 2004 with 2006 Addenda through 2010 edition had no impact on RG-1.136 since they were mostly editorial/typographical corrections.

The current revision of RG 1.136 does not reflect the changes documented in the 2010 with 2011a Addenda, 2013 and 2015 editions of the Code, which were significant. The changes ranged from the design of the concrete mix (including adding provisions to improve the ability of concrete to resist alkali-silica reactivity and sulfate attack), the design and testing of anchorage components, clarifying the definition of development length for headed bars in tension (by including a new equation and adding a definition for critical section and l_{dt} taken from ACI 318), to the tightening of requirements for provision of radial reinforcement in prestressed concrete containments.

Finally, the 2015 edition of the Code has incorporated the requirement contained in the last revision of RG 1.136, regarding the tangential shear strength provided by orthogonal reinforcement (Regulatory Position C.5), to align the requirements with ACI-349 and ACI-318, but does not differentiate between existing and new plants.

Regulatory Guide 1.136 Revision 3 (March 2007) is the current revision and it is still valid as written for existing and newly licensed nuclear power plants with concrete containments. With the constant advancement in knowledge of concrete behavior and design, the revision of current codes and standards and the revision of other regulatory guides referenced in this regulatory guide (such as RG 1.107), RG 1.136 should be revised to address the changes alluded to herein.

2. What is the impact on internal and external stakeholders of <u>not</u> updating the RG for the known issues, in terms of anticipated numbers of licensing and inspection activities over the next several years?

There is no impact on internal and external stakeholders of not updating Regulatory Guide 1.136. However, the guide should be revised in time to address activities associated with anticipated licensing applications, such as, those for the small modular reactors.

3. What is an estimate of the level of effort needed to address identified issues in terms of full-time equivalent (FTE) and contractor resources?

0.5 FTE is the estimated resource need.

4. Based on the answers to the questions above, what is the staff action for this guide (Reviewed with no issues identified, Reviewed with issues identified for future consideration, Revise, or Withdraw)?

Revise Regulatory Guide 1.136 with the purpose of adopting the latest revision of the ASME B&PV Code with exceptions as warranted.

5. Provide a conceptual plan and timeframe to address the issues identified during the review.

The revision of Regulatory Guide 1.136 should be started in the 2nd Quarter of Fiscal Year 2016 with the purpose of endorsing ASME B&PV Code 2013 Edition. A draft of this revision will be sent to RGGIB in Quarter 4 FY 2016, with a planned release for public comment in Quarter 1 FY 2017

NOTE: This review was conducted in October 2015 and reflects the staff's plans as of that date. These plans are tentative and subject to change.