NUCLEAR ENERGY INSTITUTE

4/28/2011
76 FR 23845
(1)

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June 20, 2011

Ms. Cindy K. Bladey
Chief, Rules, Announcements, and Directives Branch
Division of Administrative Services
U.S. Nuclear Regulatory Commission
Washington, DC 20555–0001

Subject: Comments on Draft Regulatory Guide DG-1197, "Inservice Inspection of Prestressed Concrete Containment Structures with Grouted Tendons"

Project Number: 689

Dear Ms. Bladey:

On April 28, 2011, the NRC issued a Federal Register Notice (76FR23845) soliciting public comments on Draft Regulatory Guide DG-1197, "Inservice Inspection of Prestressed Concrete Containment Structures with Grouted Tendons." NEI informed the industry of this notice and requested a copy of industry comments in case generic issues were identified that might need to be addressed. NEI has since determined that the draft regulatory guide has limited applicability because only two plants have grouted tendons. The industry comments are submitted below.

If you have any questions on this matter, please contact me at 202-739-8137; jhr@nei.org.

Sincerely,

James H. Riley

Enclosure

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = M. Baysie (mmb1)
H. Franks (hlg1)
M. Case (mjc)

ENCLOSURE

Comments on DG 1197

1) The primary issues are defined as 1) concrete creep and tendon relaxation and 2) tendon corrosion. Instrumentation described in the DG would be very good at allowing operators to validate design criteria used during construction for deformation related phenomena (shrinkage, creep, relaxation) and allow fairly simple iteration of design basis. However, such instrumentation would NOT address corrosion of individual tendons. Preliminary finite element modeling has shown that loss of individual tendons would have a very small effect on the macroscale internal stress state. Page 4 mentions detection of corrosion is possible if enough instruments are installed. This is probably unlikely, as in practice homogeneous corrosion of tendons rarely occurs.

   The purpose of the methods described in DG-1197 is to assess whether or not the containment retains its ability to perform its design function. The loss of several tendons, randomly distributed, would not likely have any effect whatsoever on this. The primary criterion for such an assessment would be the determination of the general internal stress state and its evolution with time. The methods described in DG-1197 address this adequately. Discussion of corrosion should be removed from this document or clearly linked solely to visual examination as it is misleading in the current context.

2) Page 4, item "c" - the effect of differential thermal expansion or contraction on the internal stress state of the containment would be very minor within operational temperature limits.

3) The term "elastic shortening" is used throughout. Does this refer to curing shrinkage? If so, it is misleading. Please use a more descriptive term.

4) Page 5, item "c". The use of fiber optic Bragg grating strain sensors can be very simply temperature compensated and have been used in geologic applications in recent years. I would strongly advocate their usage for this application.

5) Page 5, last paragraph states "Any significant decrease in the stiffness of the structure because of loss of prestress would result in cracking of the structure under pressure". Stiffness is a function of Young's modulus of the steel and would be constant. This should probably be worded differently. In addition, local cracking suggests a local tensile field had been reached. It is not necessarily indicative of general internal stress state of the structure.

6) Page 6, second paragraph mentions deformation in millimeters. Giving a strain value would be much more useful because it is normalized by gauge length.

7) Page 6, last paragraph - concrete having a pulse velocity <4000 m/s being indicative of poor quality is a somewhat dubious statement and should be removed. If there is a question of quality of the concrete it should be mechanically tested. Pulse velocity alone is not sufficient to characterize mechanical properties.

8) Page 7, Figure 1, Linearity of the bound lines assumes Young's modulus of the concrete is constant with time, hence the estimate may be somewhat conservative. The NRC may consider

allowing utilities exceptions if they can demonstrate that a change in Young's modulus in the plant concrete over time merits a re-computation of bound lines.

9) Page 8, last item a. 1-3: Suggest adding some language as to placement of surveillance tendons, e.g., at 120 deg spacings for vertical tendons.

10) Page 10, 3.1.1 b - Recommend changing the language of these three items to denote "parallel to tendons". Using "along" suggests the tendons themselves are instrumented.

11) Page 10, 3.1.2. a. (3) and Page 12, 3.1.2. c. - Strain values would be more useful here. Calculation would be based on lower bound of Young's Modulus and Poisson's ratio for concrete within spec.

12) Page 14, 5.1. a. - Consider removing "tendon" and replacing with "post tensioning direction".