

# PUBLIC SUBMISSION

<b>As of:</b> July 29, 2014
<b>Received:</b> July 24, 2014
<b>Status:</b> Pending_Post
<b>Tracking No.</b> 1jy-8deh-1pt8
<b>Comments Due:</b> August 21, 2014
<b>Submission Type:</b> Web

**Docket:** NRC-2008-0332  
Performance-Based ECCS Cladding Acceptance Criteria

**Comment On:** NRC-2008-0332-0060  
Performance-Based Emergency Core Cooling Systems Cladding Acceptance Criteria

**Document:** NRC-2008-0332-DRAFT-0084  
Comment on FR Doc # 2014-05562

---

## Submitter Information

**Name:** Robert Leyse  
**Address:**  
Box 2850  
Sun Valley, ID, 83353  
**Email:** bobbyse@aol.com

---

## General Comment

There are ongoing manipulations to relocate Appendix K to a regulatory guide. The following three bullets are copied from ML14204A009, July 23, 2014.

- Bert Dunn from AREVA provided a presentation recommending relocating the requirements in Appendix K to a regulatory guide (ADAMS Accession No. ML14175A094).
- There was a significant amount of follow-on discussion on this topic, and the NRC staff noted that this was the first time this recommendation had been presented. Industry noted that this recommendation will likely come to the NRC in the form of a formal written comment, associated with the request for comment on renumbering the regulations.
- In a later discussion on the Appendix K topic, NRC's Office of General Counsel (OGC) noted that there is no legal reason why this information cannot be moved to a regulatory guide, but that both NRC and industry need to be aware of the implications.

In view of the above, the following history is pertinent today.

Thermal Runaway and Baker-Just

It is absurd to license the emergency cooling of tons of zirconium alloy having thousands of square feet of interfacial surface area based on the limited investigations that yielded the Baker-Just equation. Despite this, Appendix K to Part 50--ECCS Evaluation Models, Item 5, specifies that the rate of energy release from the metal/water reaction shall be calculated using the Baker-Just equation and § 50.46 Acceptance Criteria, item (b) (1) specifies the 2200 degrees.

So, how did this fall through the cracks?

The Baker-Just equation was published by the AEC during 1962; long before NRC was established during January 1975. Although it has a very weak foundation, the Baker-Just equation has survived to this day because it is convenient for licensing of nuclear power plants. This equation was first applied to the licensing of nuclear power plants during the era of the AEC when “regulators” were very strongly encouraged to expedite the role of what was then called atomic energy. The AEC, under the direction of the Congressional Joint Committee on Atomic Energy, worked very closely with the industry’s lobbying group then called the Atomic Industrial Forum. The lobbying group for today’s nuclear power industry is named the Nuclear Energy Institute (NEI).

It is unlikely that the nuclear power industry has ever commissioned a study of the roots of the Baker-Just correlation. However, today’s nuclear power industry fiercely defends Baker-Just. This defense is well documented by the NEI in its comment 16 opposing PRM-50-93, “The Baker-Just correlation, using the current range of parameter inputs, has been shown to be conservative and adequate to assess Appendix K ECCS performance. Data published since the Baker-Just correlation was developed has clearly demonstrated the conservatism of the correlation above 1800°F,” refer to ML101040678, Industry Comments on Petition for Rulemaking (PRM-50-93); Multi-Rod (Assembly) Severe Fuel Damage Experiments. Docket ID NRC-2009-0554, April 12, 2010.

The NRC also fiercely defends Baker-Just. In its analysis of PRM-50-76, “The Baker-Just correlation (Reference 4) using the current range of parameter inputs is conservative and adequate to assess Appendix K ECCS performance. Virtually every data set published since the Baker-Just correlation was developed has clearly demonstrated the conservatism of the correlation above 1800°F.” refer to Memo to Matthews/Black-Technical Safety Analysis of PRM-50-76, A Petition for Rulemaking to Amend Appendix K to 10 CFR Part 50 and Regulatory Guide 1.157 - ML041210109, April 29, 2004.

Contrary to the exceptionally firm (and suspiciously) consistency between the NEI and NRC evaluations of Baker-Just, the pertinent data sets published since the Baker-Just correlation was developed have clearly demonstrated the non-conservatism of the Baker-Just correlation above 1800°F. The NRC has never admitted that investigations that involve heating of single specimens of zirconium alloys in steam do not yield applicable data for the temperature or range of temperatures at which thermal runaway is initiated. Certainly, the NRC evaluators who produced ML041210109, April 29, 2004, should have been aware of the many references that are cited in PRM-50-93.

And, the Letter from NRC to Robert H. Leyse, ML100950085, (attached) documents in detail how Baker-Just fell through the cracks. NRC did not even have the key references in its files until Leyse persisted in demanding the key references.

So, the above referenced letter reveals:

- that Robert H. Leyse pursued the roots of Baker-Just,
- that those roots were not available in NRC files when it evaluated PRM-50-76,
- that those roots were not transferred to NRC when it was created in 1974,
- that NRC finally acquired and placed those roots in ADAMS during April 2010,
- that NRC promptly informed Leyse when those roots became available in ADAMS.

---

## Attachments

ML100950085 McGinty

April 16, 2010

Robert Leyse  
P. O. Box 2850  
Sun Valley, ID 8335

Dear Mr. Leyse:

Between February 7, 2010, and February 23, 2010, you sent a series of e-mails to the Chairman of the U.S. Nuclear Regulatory Commission (NRC) and to other NRC employees, including General Counsel Stephen Burns and staff from the Public Document Room. You requested that the NRC make the following documents publicly available:

Bostrum, W.A., WAPD-104, "The High Temperature Oxidation of Zircaloy in Water," March 1954.

Lemmon, Jr., A.W. BMI-1154, "Studies Relating to the Reaction Between Zirconium and Water at High Temperatures," 1957.

In your February 17, 2010, e-mail to the General Counsel, you alleged that these two documents were not made publicly available by the NRC staff in contradiction to the listing of these two documents in a table describing the availability of documents in a draft *Federal Register* Notice (FRN) of denial of a petition for rulemaking. The draft FRN was provided to the Commission in SECY-05-113, "Denial of a Petition for Rulemaking to Revise Appendix K to Title 10 of the *Code of Federal Regulations* Part 50 and Associated Guidance Documents (PRM-50-76)," June 29, 2005.

Although these reports were listed in the draft FRN of denial, they were not referenced or listed in the final denial of the petition for rulemaking (see 70 FR 52893; September 6, 2005). The NRC staff decided to remove the references to these two documents in the final FRN because (1) they did not constitute a significant part of the basis for denying the petition and (2) the reports were not then available in the NRC's files. You should also be aware that WAPD-104 was prepared in 1954 for the Atomic Energy Commission's office for naval reactors. When the NRC was created in 1974, records related to naval reactors were assigned to the Energy Research and Development Administration (which is now the U.S. Department of Energy).

Nevertheless, the NRC has been able to obtain copies of the above reports. They are now publicly available in the NRC's Agencywide Documents Access Management System (ADAMS) at the following ADAMS Accession numbers:

WAPD-104—ADAMS Accession No. ML100900446  
BMI-1154—ADAMS Accession No. ML100570218

R. Leyse

- 2 -

Your February e-mails also requested copies of seven reports prepared by Pennsylvania State University (Penn State) under contract to the NRC. The enclosure to this letter provides a detailed status of each of these reports. Five of these reports are predecisional draft versions that the NRC is now reviewing. Penn State will correct these draft reports as necessary before the NRC publicly releases the reports. The other two reports are monthly progress reports which contain proprietary labor rate information; as such, the NRC will not make these reports public. Any technical information in these monthly reports will be included in one of the other topical reports and made public when those reports are released.

Please address any future questions regarding the status of the Penn State reports to Chris L. Hoxie, Code Development Branch Chief, at (301) 251-7562.

Sincerely,

**/RA/ by TQuay for**

Timothy J. McGinty, Director  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Enclosure:  
As stated