

Industry Implementation Schedule

Thomas Eichenberg

EPRI Fuel Reliability Program

Chair, Regulatory Technical Advisory Committee

Sr. Specialist, Reactor Safety Analysis

Tennessee Valley Authority

Public Webcast: 10 CFR 50.46c Implementation

June 4, 2015



NUCLEAR ENERGY INSTITUTE

nuclear. clean air energy.

Purpose

- Identify Fleet Implementation Schedule
 - Latest Incarnation
 - Minor Revision from May 4 2015 Schedule
 - Living Document
 - Updated as circumstances firm-up
 - Assumptions
 - Based in Part on NEI Draft Rule Comment Package
 - Public Meeting Discussions

Assumptions *(Relative to Draft Rule)*

- With Respect to the Rule:
 - Base Line is Draft Rule from Federal Register Notice
 - Base Line Delta's:
 - Long Term Cooling remains consistent with current rule
 - Existing methodology supplements only address explicit changes relative to the existing rule language
 - “New” methodologies encompass entire new rule language

Assumptions *(Relative to Draft Rule)*

- With Respect to the Rule: *(continued)*
 - Base Line is Draft Rule from Federal Register Notice
 - Base Line Delta's:
 - Breakaway Oxidation testing to become integrated into Vendor manufacturing / quality programs
 - Establish criteria for methodology application
 - Allowance for fuel manufactured prior to vendor program

Assumptions *(Relative to Draft Rule)*

- With Respect to the Rule: *(continued)*
 - Base Line is Draft Rule from Federal Register Notice
 - Base Line Delta's:
 - Resolution of debris related issues (e.g., GSI-191), whether by deterministic or risk-informed approach, addressed per existing owners group programs
 - Handled outside of 50.46c implementation
- No Additional Draft Rule Publication to FRN

Assumptions *(Schedule)*

- June 4 Schedule:
 - Utilization of Licensee Survey Feedback
 - Base Line January 1, 2015
 - FRN Notice of Final Rule April 1, 2016
 - Two Phases
 - Completing Methods and Programs Development
 - Docketing of Licensee Submittals

Assumptions *(Schedule)*

- June 4 Schedule: *(continued)*
 - Hydrogen Pickup Models
 - Utilize vendor specific & Regulatory Guide models
 - Capture Mechanical Design Updates
 - Captures a Place Holder Regarding Long Term Cooling
 - Potential issues to be discussed at June 9, 2015 Public Meeting
 - \$50.90 Staggering for Each Vendor
 - Level of Effort (LOE)
 - Level 1: Post-processing existing analysis
 - Level 2: New, limited confirmation analyses
 - Level 3: Full re-analyses

Assumptions *(Schedule)*

- June 4 Schedule: *(continued)*
 - Large vs Small Break LOE Breakdown where Applicable
 - Place Holders for ESBWR and AP1000 work
 - Not the primary focus of implementation
 - Capture Contract Date
 - Vendor resource development lead time (in progress)

Results

- Significant Times

- FRN Rule Publication: April 1, 2016
- First Vendor Submittal: June 2016
- Final Method Packages in Place: ~Dec. '17-June '18
- Initial LAR Submittal: December 2018
- First LAR SE Issued: April-May 2019
- Last LAR Submittal: May-June 2020
- Full Fleet Compliance: May-June 2022

Open Issues

- Applicability
 - Breakaway Oxidation
- Staff Review on Critical Path
- Compound Compliance
- Core Operating Limits Report Methods

Implementation Language

- Examples
- Durations Defined
 - X = Backstop Duration: Perspective 1 (72 months)
 - Y = Backstop Duration: Perspective 2 (36 months)
 - Z = Negative Consent Trigger (24 months)

Implementation Language *(continued)*

- Example

- (o) Each entity holding a license on the date of effectiveness of this rule shall submit a compliance demonstration via §50.90 for (g)(1)(i),(ii),(iii), and (iv).
- (#1) Paragraph (g)(1)(iii) of this rule only applies to fuel assemblies manufactured under a NRC approved, vendor breakaway oxidation program.
 - More appropriate and/or additional locations to address issue?

Implementation Language *(continued)*

- Example *(continued)*
 - (#2) Each entity holding a license on the date of effectiveness of this rule shall submit a compliance demonstration via §50.90 for fuel assemblies manufactured under an approved breakaway oxidation program. Compliance demonstrations shall be submitted within **X** months of the rule effective date, or within **Y** months from the time evaluation models / supplements and paragraph (g)(1)(iii) testing programs supporting this rule are available for the fuel / cladding design utilized by the licensee, whichever is later.
 - (Takes Staff off critical path from a regulatory perspective)

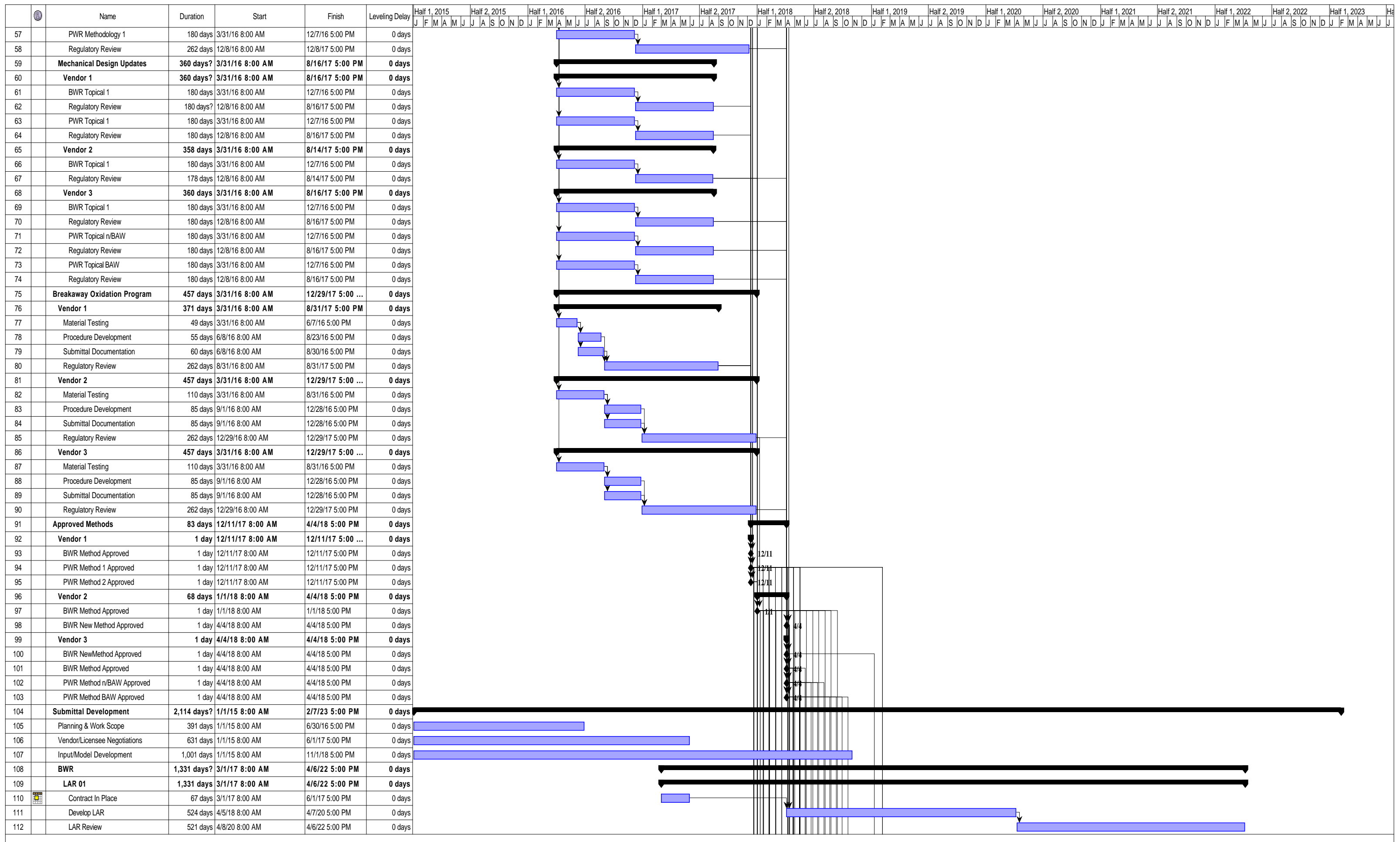
Implementation Language *(continued)*

- Example *(continued)*
 - (#3) Each entity holding a license on the date of effectiveness of this rule is only required to show an initial compliance demonstration by stand alone §50.90 request specific to this rule. Until such time as the licensee submits the initial §50.90 compliance demonstration pursuant to paragraph (o)(#2), and is approved via a completed §50.92 action, the licensee shall continue to comply per the existing §50.46 for purposes of §50.90 requests outside of this rule.
 - (#3)(i) An entity holding a license on the date of effectiveness of this rule may choose to combine initial compliance with a §50.90 request with a scope beyond compliance demonstration, such as a fuel product or vendor transition.
 - Divorce fuel design changes, steam generator replacement effects, and other LAR's from the LOCA rule change compliance process

Implementation Language *(continued)*

- Example *(continued)*

- (#4) For purposes of compliance with this rule, if NRC does not complete the §50.92 action on an initial compliance demonstration §50.90 request within **Z** months of docketing, the application is deemed to be approved via negative consent; licensees are allowed to utilize §50.46c specific method updates to develop thermal limits present in core operating limits reports until such time as the initial application request is fully processed consistent with §50.90 & §50.92.
- Negative consent mechanism to supplement Technical Specification LOCA method requirements for the Core Operating Limits Report (COLR) on an interim basis



	Name	Duration	Start	Finish	Leveling Delay	Half 1, 2015		Half 2, 2015		Half 1, 2016		Half 2, 2016		Half 1, 2017		Half 2, 2017		Half 1, 2018		Half 2, 2018		Half 1, 2019		Half 2, 2019		Half 1, 2020		Half 2, 2020		Half 1, 2021		Half 2, 2021		Half 1, 2022		Half 2, 2022		Half 1, 2023		Ha		
						J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
169	LAR 16	721 days	3/1/17 8:00 AM	12/4/19 5:00 PM	0 days																																					
170	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
171	Develop LAR	174 days	8/6/18 8:00 AM	4/4/19 5:00 PM	154 days																																					
172	LAR Review	174 days	4/5/19 8:00 AM	12/4/19 5:00 PM	0 days																																					
173	LAR 17	735 days	3/1/17 8:00 AM	12/24/19 5:00 ...	0 days																																					
174	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
175	Develop LAR	174 days	8/24/18 8:00 AM	4/24/19 5:00 PM	168 days																																					
176	LAR Review	174 days	4/25/19 8:00 AM	12/24/19 5:00 PM	0 days																																					
177	LAR 18	749 days	3/1/17 8:00 AM	1/13/20 5:00 PM	0 days																																					
178	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
179	Develop LAR	174 days	9/13/18 8:00 AM	5/14/19 5:00 PM	182 days																																					
180	LAR Review	174 days	5/15/19 8:00 AM	1/13/20 5:00 PM	0 days																																					
181	LAR 19	634 days	3/1/17 8:00 AM	8/5/19 5:00 PM	0 days																																					
182	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
183	Develop LAR	174 days	4/5/18 8:00 AM	12/4/18 5:00 PM	0 days																																					
184	LAR Review	174 days	12/5/18 8:00 AM	8/5/19 5:00 PM	0 days																																					
185	LAR 20	648 days	3/1/17 8:00 AM	8/23/19 5:00 PM	0 days																																					
186	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
187	Develop LAR	174 days	4/25/18 8:00 AM	12/24/18 5:00 PM	14 days																																					
188	LAR Review	174 days	12/25/18 8:00 AM	8/23/19 5:00 PM	0 days																																					
189	LAR 21	970 days	3/1/17 8:00 AM	11/17/20 5:00 ...	0 days																																					
190	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
191	Develop LAR	327 days	5/15/18 8:00 AM	8/14/19 5:00 PM	28 days																																					
192	LAR Review	329 days	8/15/19 8:00 AM	11/17/20 5:00 PM	0 days																																					
193	LAR 21	970 days	3/1/17 8:00 AM	11/17/20 5:00 ...	0 days																																					
194	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
195	Develop LAR	327 days	5/15/18 8:00 AM	8/14/19 5:00 PM	28 days																																					
196	LAR Review	329 days	8/15/19 8:00 AM	11/17/20 5:00 PM	0 days																																					
197	LAR 22	982 days	3/1/17 8:00 AM	12/3/20 5:00 PM	0 days																																					
198	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
199	Develop LAR	327 days	6/4/18 8:00 AM	9/3/19 5:00 PM	42 days																																					
200	LAR Review	327 days	9/4/19 8:00 AM	12/3/20 5:00 PM	0 days																																					
201	LAR 23	1,331 days?	3/1/17 8:00 AM	4/6/22 5:00 PM	0 days																																					
202	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
203	Develop LAR	524 days	4/5/18 8:00 AM	4/7/20 5:00 PM	0 days																																					
204	LAR Review	521 days?	4/8/20 8:00 AM	4/6/22 5:00 PM	0 days																																					
205	ESBWR Place Holder	636 days	3/1/17 8:00 AM	8/7/19 5:00 PM	0 days																																					
206	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
207	Develop LAR	75 days	1/10/19 8:00 AM	4/24/19 5:00 PM	200 days																																					
208	LAR Review	75 days	4/25/19 8:00 AM	8/7/19 5:00 PM	0 days																																					
209	PWR	1,550 days	3/1/17 8:00 AM	2/7/23 5:00 PM	0 days																																					
210	LAR 24	1,250 days	3/1/17 8:00 AM	12/14/21 5:00 ...	0 days																																					
211	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
212	Develop Small Break Component	110 days	12/12/17 8:00 AM	5/14/18 5:00 PM	0 days																																					
213	Full LAR Development	522 days	12/12/17 8:00 AM	12/11/19 5:00 PM	0 days																																					
214	LAR Review	524 days	12/12/19 8:00 AM	12/14/21 5:00 PM	0 days																																					
215	LAR 25	1,250 days	3/1/17 8:00 AM	12/14/21 5:00 ...	0 days																																					
216	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
217	Develop LAR	522 days	12/12/17 8:00 AM	12/11/19 5:00 PM	0 days																																					
218	LAR Review	524 days	12/12/19 8:00 AM	12/14/21 5:00 PM	0 days																																					
219	LAR 26	1,264 days	3/1/17 8:00 AM	1/3/22 5:00 PM	0 days																																					
220	Contract In Place	67 days	3/1/17 8:00 AM	6/1/17 5:00 PM	0 days																																					
221	Develop Small Break Component	110 days	1/1/18 8:00 AM	6/1/18 5:00 PM	14 days																																					
222	Full LAR Development	522 days	1/1/18 8:00 AM	12/31/19 5:00 PM	14 days																																					
223	LAR Review	524 days	1/1/20 8:00 AM	1/3/22 5:00 PM	0 days																																					
224	LAR 27	1,264 days	3/1/17 8:00 AM	1/3/22 5:00 PM	0 days																																					

