Fact Sheet on Reactor License Renewal

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Introduction

Based on the Atomic Energy Act, the Nuclear Regulatory Commission (NRC) issues licenses for commercial power reactors to operate for up to 40 years and allows these licenses to be renewed for up to another 20 years. Economic and antitrust considerations, not limitations of nuclear technology, determined the original 40-year term for reactor licenses. However, because of this selected time period, some systems, structures, and components may have been engineered on the basis of an expected 40-year service life.

The decision to seek license renewal rests entirely with nuclear power plant owners and typically is based on the plant's economic situation and on whether it can meet NRC requirements. Each power reactor is licensed based on a given set of requirements, depending primarily on the type of plant. This set of requirements is called the plant's "licensing basis." The license renewal review process provides continued assurance that the current licensing basis will maintain an acceptable level of safety for the period of extended operation.

The NRC has established a license renewal process that can be completed in a reasonable period of time–typically about 30 months--with clear requirements to assure safe plant operation for up to an additional 20 years of plant life.

Nuclear power plants are subject to a systematic and thorough NRC oversight program to ensure nuclear plant equipment continues to meet safety standards. This constant NRC oversight ensures a plant will operate safely throughout its life.

Background

In 1982, based on a widely attended workshop on nuclear power plant aging, the NRC established a comprehensive program for Nuclear Plant Aging Research. Based on the results of that research, a technical review group concluded that many aging phenomena are readily manageable and do not pose technical issues that would preclude life extension for nuclear power plants.

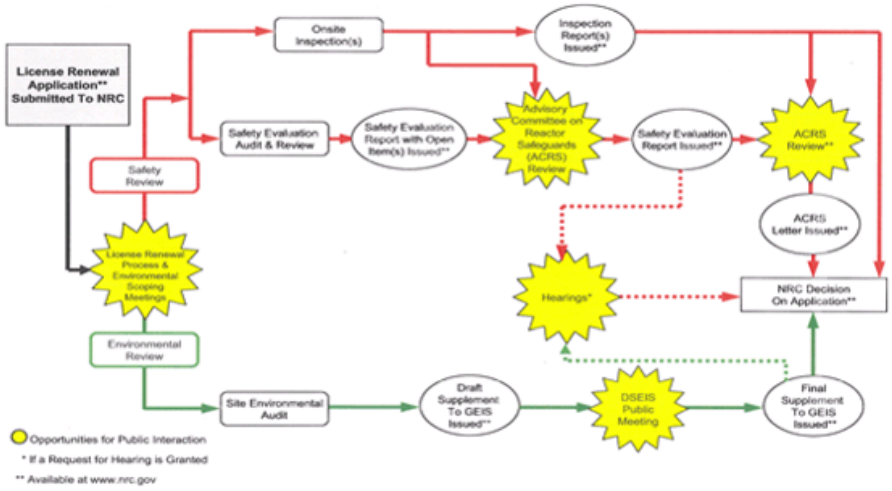
In 1991, the NRC published safety requirements for license renewal as 10 CFR Part 54 (Title 10 of the Code of Federal Regulations, Part 54). The NRC then undertook a demonstration program to apply the rule to pilot plants and develop experience to establish implementation guidance. To establish a scope of review, the rule defined age-related degradation unique to license renewal. However, during the demonstration program, the NRC found that many aging effects are dealt with adequately during the initial license period. In addition, the NRC found that the rule did not allow sufficient credit for existing programs, particularly those under NRC's maintenance rule, which also helps manage plant-aging phenomena.

As a result, in 1995, the NRC amended the license renewal rule. The amended Part 54 established a regulatory process that is more efficient, more stable and more predictable than the previous license renewal rule. In particular, Part 54 was clarified to focus on managing the adverse effects of aging.

The rule changes were intended to ensure that important systems, structures and components would continue to perform their intended function during the 20-year period of extended operation. NRC's responsibilities under the National Environmental Policy Act call for a review of the environmental impact of license renewal. In parallel with aging efforts, the NRC pursued a separate rulemaking, 10 CFR Part 51, to focus the scope of review of environmental issues.

TOP

License Renewal Process



The license renewal process proceeds along two tracks -- one for review of safety issues (Part 54) and another for environmental issues (Part 51). An applicant must provide NRC an evaluation that addresses the technical aspects of plant aging and describes the ways those effects will be managed. It must also prepare an evaluation of the potential impact on the environment if the plant operates for another 20 years. The NRC reviews the application and verifies evaluations through inspections.

The NRC will renew a license only if it determines that a currently operating plant will continue to maintain the required level of safety. Over the plant's life, this level of safety is enhanced through maintenance of the plant and its licensing basis. A plant's licensing basis is an evolving set of requirements and commitments. Over time, as technology advances and operating experience provides new information, a plant's licensing basis may be changed—for example, when the NRC issues new requirements and the plant makes modifications. These new and additional requirements become part of the plant's licensing basis.

- **Public Involvement**
  Public participation is an important part of the license renewal process. There are several opportunities for members of the public to question how aging will be managed during the period of extended operation. Information provided by the licensee is made available to the public in a variety of ways. Shortly after the NRC receives a renewal application, a public meeting is normally held near the nuclear power plant to provide the public information about the license renewal process and opportunities for public involvement, and to solicit input on the scope of NRC's environmental review. Additional public meetings are held by the NRC during the review of the renewal application, and NRC evaluations, findings and recommendations are published when completed.

  All public meetings are posted on NRC's website at http://www.nrc.gov/public-involve.html, with key ones being announced in press releases and in the *Federal Register* EXIT. Concerns may be litigated in an adjudicatory hearing if any party that would be adversely affected requests a hearing. In addition, members of the public may petition the Commission for consideration of issues other than the management of the effects of aging during the period of extended operation of the plant.

- **Schedule**
  A nuclear power plant licensee may apply to the NRC to renew its license as early as 20 years before expiration of its current license. There is no limit on how late a licensee may apply for license renewal. However, if the licensee submits a renewal application that is sufficient for the NRC's review at least five years before expiration of its current license and the agency is still reviewing the application at the end of the five years, the plant can continue to operate until the NRC completes its review. If a sufficient application is not submitted at least five years before and the current license expires before the review has been completed, the plant may have to cease operations until the renewal decision is made.

  Upon receipt of a license renewal application, the review is conducted, in general, according to the steps and time frames in the following table. License renewal schedules are dependent on and may need to be extended due to available staff resources, the number of current and projected applications, the complexity of the particular review, applicant timeliness in responding to requests for additional information, and the coordination of the timing for on-site audits and inspections.

Licensing Milestone	Months Elapsed
Receive renewal application	0
Publish notice of opportunity for hearing	1.5
Conduct public meeting on license renewal process and scope of environmental impact statement	2.5
Opportunity for hearing closes	3.5
Pose environmental questions to applicant	5.5

Pose safety questions to applicant	6.0
Issue draft environmental impact statement for comment	11.0
Conduct public meeting on draft environmental impact statement	12.0
Issue safety evaluation report, identifying open items	13.0
Issue final environmental impact statement	18.0
Issue safety evaluation report	18.0
Complete Advisory Committee on Reactor Safety Review	20.0
Make decision on application (without hearing)	22.0
Complete hearing process (if needed)	--
Make decision on application (with hearing)	30.0 (contingent on the hearing process)

TOP

Environmental Reviews

Environmental protection regulations were revised in December 1996 to facilitate the environmental review for license renewal. Certain issues are evaluated generically for all plants, rather than separately in each plant's renewal application. The generic evaluation, NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), assesses the scope and impact of environmental effects that would be associated with license renewal at any nuclear power plant site such as endangered species, impacts of cooling water systems on fish and shellfish, and ground water quality. A plant-specific supplement to the generic environmental impact statement is required for each application for license renewal.

The NRC performs plant-specific reviews of the environmental impacts of license renewal in accordance with the National Environmental Policy Act (NEPA) and the requirements of 10 CFR Part 51. The public meeting held near the nuclear power plant shortly after receipt of the application is to "scope out" or identify environmental issues specific to the plant for the license renewal action. The result is an NRC recommendation on whether the environmental impacts are so great that they preclude license renewal.

This recommendation is presented in a draft plant-specific supplement to the GEIS that is published for comment and discussed at a separate public meeting. After consideration of comments on the draft, NRC prepares and publishes a final plant-specific supplement to the GEIS.

The NRC issued a standard review plan (NUREG-1555, Supplement No.1) which provides guidance on how the agency reviews the environmental portions of renewal applications. The NRC also issued Supplement 1 to Regulatory Guide 4.2 that identifies the format and content of environmental reports that must accompany license renewal applications.

Safety Reviews

License renewal requirements for power reactors are based on two key principles:

1. The current regulatory process is adequate to ensure that the licensing basis of all operating plants provides and maintains an acceptable level of safety; and
2. Each plant's licensing basis is required to be maintained during the renewal term in the same manner and to the same extent as during the original licensing term.

An applicant must identify all plant systems, structures and components that are safety-related, or whose failure could affect safety-related functions, and that are relied on to demonstrate compliance with the NRC's regulations for fire protection, environmental qualification, pressurized thermal shock, anticipated transients without scram, and station blackout.

For some passive structures and components within the scope of the renewal evaluation, no additional action may be required where an applicant can demonstrate that the existing programs provide adequate aging management throughout the period of extended operation. However, if additional aging management activities are warranted for a structure or component within the scope of the rule, applicants will have the flexibility to determine appropriate actions. These activities could include, for example, adding new monitoring programs or increasing inspections.

License renewal applicants are also required to identify and update time-limited aging analyses. During the design phase for a plant, certain assumptions about the length of time the plant will be operated are incorporated into design calculations for several of the plant's systems, structures, and components.

Under a renewed license, these calculations must be shown to be valid for the period of extended operation, or the affected systems, structures and components must be included in an appropriate aging management program.

The NRC developed guidance for implementation of the license renewal rule with input from interested stakeholders. Plant owners offered both generic process and technical suggestions. A Generic Aging Lessons Learned (GALL) report (NUREG-1801) was prepared and made publicly available. The report documents the basis for determining when existing programs are adequate and when existing programs should be augmented for license renewal. The GALL report is referenced in the standard review plan for license renewal (NUREG-1800) as the basis for identifying those programs that warrant particular attention during NRC's review of a license renewal application.

The NRC also issued Regulatory Guide 1.188, which provides the format and content of the safety aspects of a license renewal application. It endorses a guideline prepared by the Nuclear Energy Institute as an acceptable method of implementing the license renewal rule. The NRC will continue to include changes to the guide and the standard review plan as generic renewal issues are resolved, as well as other changes resulting from lessons learned and process improvements identified during the review of renewal applications.

Inspections

The NRC has established an inspection program for license renewal that verifies the information in the application and NRC's evaluation. The inspections sample the results of the process used by the licensee to identify those structures and components within the scope of license renewal, aging management programs, and design analysis changes.

An additional inspection is performed upon approval of the application and issuance of a new operating license, and typically prior to entering the period of extended operation. This inspection verifies that the license conditions and license renewal commitments are implemented in accordance with 10 CFR Part 54, and that aging management programs are implemented consistent with the descriptions contained in the updated final safety analysis report. Inspection results are documented in a publicly available report.

Hearings

The Commission expects that hearings be conducted on an efficient and reliable schedule, while ensuring fair resolution of contested issues. In addition, there should be timely identification of any open generic policy issues for Commission decision and effective integration of the review of technical issues into the adjudicatory process.

The Commission amended its regulations concerning its rules of practice to make the NRC's hearing process more effective and efficient *Federal Register* Vol. 69, page 2182, January 14, 2004). Hearing procedures are tailored to the differing types of licensing and regulatory activities the NRC conducts and will better focus limited resources of involved parties and the NRC.

Status of License Renewal Applications

Some licensees have expressed interest in license renewal and have described their plans to submit license renewal applications. In anticipation of continued interest by licensees in submitting renewal applications in the coming years, and with increasing experience in reviewing license renewal applications, the NRC expects to make the renewal review process more efficient.

The status of pending planned applications as well as additional information on license renewal can be found at: http://www.nrc.gov/reactors/operating/licensing/renewal.html, on the NRC website. See the following table for the status of license renewal applications.

TOP

Status of License Renewal Applications

Applicant	Plant Name & Units	Date Application Received by NRC	Date NRC Issued GEIS Supplement*	Date NRC Issued SER**	Date NRC Issued License
Baltimore Gas & Electric Co.	Calvert Cliffs 1 & 2	April 1998	November 1999	November 1999	March 2000
Duke Energy	Oconee 1, 2, & 3	July 1998	February 2000	February 2000	May 2000
Entergy Nuclear Operations	Arkansas Nuclear One 1	February 2000	April 2001	April 2001	June 2001
Southern Nuclear Operating Co.	Edwin I. Hatch 1 & 2	March 2000	May 2001	October 2001	January 2002
Florida Power & Light Co.	Turkey Point 3 & 4	September 2000	January 2002	February 2002	June 2002
Virginia Electric & Power	Surry 1 & 2 North Anna 1 & 2	May 2001	December 2002	November 2002	March 2003
Duke Energy	McGuire 1&2	June 2001	December	January 2003	December

	Catawba 1 & 2		2002		2003
Exelon	Peach Bottom 2 & 3	July 2001	January 2003	February 2003	May 2003
Florida Power & Light Co.	St. Lucie 1 & 2	November 2001	May 2003	July 2003	October 2003
Omaha Public Power District	Fort Calhoun	January 2002	August 2003	September 2003	November 2003
Carolina Pwr. & Light	Robinson 2	June 2002	December 2003	January 2004	April 2004
Rochester Gas & Elec. Corp.	Ginna	August 2002	January 2004	March 2004	May 2004
SCE&G	Summer	August 2002	February 2004	January 2004	April 2004
Exelon	Dresden 2 & 3 Quad Cities 1 & 2	January 2003	June 2004	July 2004	October 2004
Southern Nuclear Operating Co.	Farley 1 & 2	September 2003	March 2005	March 2005	May 2005
Entergy Nuclear Operations	Arkansas Nuclear One 2	October 2003	April 2005	April 2005	June 2005
Indiana & Michigan Power Co.	D.C. Cook 1 & 2	November 2003	April 2005	May 2005	August 2005
Tennessee Valley Authority	Browns Ferry 1, 2 & 3 ***	January 2004	June 2005	January 2006	May 2006
Dominion Nuclear Connecticut	Millstone 2 & 3	January 2004	July 2005	August 2005	November 2005
Nuclear Management Co.	Point Beach 1 & 2	February 2004	August 2005	October 2005	December 2005
Constellation Energy	Nine Mile Point 1 & 2***	May 2004	May 2006	June 2006	October 2006
Carolina Power & Light	Brunswick 1& 2	October 2004	April 2006	March 2006	June 2006
Nuclear Management Co.	Monticello	March 2005	September 2006	July 2006	November 2006
Nuclear Management Co.	Palisades ***	March 2005	October 2006	September 2006	January 2007
AmerGen Energy Co.	Oyster Creek	July 2005	January 2007	March 2007	April 2009
Entergy Nuclear Operations	Pilgrim	January 2006	July 2007	June 2007	May 2012
Entergy Nuclear Operations	Vermont Yankee ***	January 2006	August 2007	February 2008	June 2011
Entergy Nuclear Operations	FitzPatrick	August 2006	January 2008	January 2008	September 2008
PPL Susquehanna LLC	Susquehanna 1 & 2 ***	September 2006	March 2009	August 2009	November 2009
Wolf Creek Nuclear Operating Corp.	Wolf Creek ***	October 2006	May 2008	July 2008	November 2008
Carolina Power & Light (Progress Energy)	Shearon Harris ***	November 2006	August 2008	August 2008	December 2008
Entergy Nuclear Operations Inc.	Indian Point 2 & 3 ***	April 2007	December 2010	August 2009	

Southern Nuclear Operating Co.	Vogtle 1 & 2 ***	June 2007	December 2008	March 2009	June 2009
First Energy Nuclear Operating Co.	Beaver Valley 1& 2 ***	August 2007	May 2009	June 2009	November 2009
AmerGen Energy Company, LLC	Three Mile Island 1	January 2008	June 2009	June 2009	October 2009
Nuclear Management Company, LLC	Prairie Island 1 & 2	April 2008	May 2011	October 2009	June 2011
Dominion Energy Kewaunee	Kewaunee	August 2008	August 2010	November 2010	February 2011
Nebraska Public Power District	Cooper	September 2008	July 2010	November 2010	November 2010
FPL Energy	Duane Arnold	October 2008	October 2010	September 2010	December 2010
Arizona Public Service Co.	Palo Verde 1, 2 & 3	December 2008	January 2011	January 2011	April 2011
Florida Power Corp.	Crystal River 3	December 2008	May 2011	December 2010	N/A
PSEG Nuclear, LLC	Hope Creek	August 2009	March 2011	March 2011	July 2011
PSEG Nuclear, LLC	Salem 1 & 2	August 2009	March 2011	March 2011	June 2011
Pacific Gas & Electric Co.	Diablo Canyon 1 & 2***	November 2009		June 2011	
Energy Northwest	Columbia***	January 2010	April 2012	February 2012	May 2012
FPL Energy Seabrook, LLC	Seabrook***	June 2010	August 2011		
First Energy Nuclear Operating Co.	Davis-Besse 1***	August 2010	February 2014	September 2013	
STP Nuclear Operating Co.	South Texas Project 1 & 2	October 2010	November 2013		
Exelon Generation Company, LLC.	Limerick 1 & 2	June 2011			
Entergy Nuclear Operations	Grand Gulf	November 2011			
Union Electric Company	Callaway	December 2011			
Tennessee Valley Authority	Sequoyah 1 & 2	January 2013			
Exelon Generation Company, LLC.	Byron 1 & 2 Braidwood 1 & 2	May 2013			
DTE Energy Co.	Fermi 2	April 2014			

* Plant-specific supplement to the Generic Environmental Impact Statement

** Safety Evaluation Report

*** Plant-specific review schedule

Completed Applications

Application withdrawn by licensee

May 2014

TOP

Page Last Reviewed/Updated Friday, June 27, 2014

HOME

NEWS RELEASES
EVENT REPORTS
ADAMS
OPEN GOV
DIGITAL GOVERNMENT
STUDENTS & TEACHERS
PHOTOS & VIDEO
FOR DEVELOPERS

ABOUT US

STRATEGIC PLAN
BUDGET & PERFORMANCE
PERF & ACCOUNTABILITY REPT
HISTORY OF THE NRC
CAREER OPPORTUNITIES
NRC ETHICS
AGENCY STATUS
CONTACT US

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INFO DIGEST
FACTSHEETS & BROCHURES
FORMS
ELECTRONIC SUBMITTALS APPLICATION
NRC REPORTS – NUREG
NRC REGULATIONS – 10-CFR
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PLAIN WRITING
ENFORCEMENT ACTIONS
RULEMAKING

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