

February 3, 2000

Mr. Douglas J. Walters  
Nuclear Energy Institute  
1776 I Street, NW., Suite 400  
Washington, DC 20006-3708

SUBJECT: GENERIC AGING LESSONS LEARNED (GALL) REPORT AND STANDARD  
REVIEW PLAN FOR LICENSE RENEWAL (SRP-LR)

Dear Mr. Walters:

We held a public workshop on December 6, 1999, to discuss the development of the Generic Aging Lessons Learned (GALL) report and the Standard Review Plan for License Renewal (SRP-LR). As described in SECY 99-148, "Credit for Existing Programs for License Renewal," the staff plans on referencing the GALL report in the SRP-LR as a basis for determining the adequacy of existing programs.

The staff intends to treat the GALL report as a topical report with generic applicability to all plants. We have drafted guidance on the treatment of the GALL report, including an example on a license renewal application and the corresponding staff safety evaluation report. (See Enclosure 1) We have also drafted the corresponding SRP-LR section as an example. (See Enclosure 2) We plan on using Enclosure 2 as a "guide" to develop the aging management review sections of the SRP-LR. Please note that Enclosure 2 references a Branch Technical Position (BTP) on aging management review. This BTP is intended to be the staff guidance for program acceptance using the "10 program elements" contained in Section 3.0 of the draft SRP-LR, dated September 1997.

As discussed in the public workshop on December 6, 1999, the staff is releasing early drafts of license renewal implementation guidance documents to invite stakeholders participation. Accordingly, we are providing these enclosures for your information and comment. We also would be willing to meet with industry representatives to discuss any comments you may have. If you have any questions regarding this matter, please contact Sam Lee at (301)415-3109.

Sincerely,

*/RA/*

Christopher I. Grimes, Chief  
License Renewal and Standardization Branch  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

Project No. 690

Enclosures: As stated

cc w/encl: See next page

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The staff intends to treat the GALL report as a topical report with generic applicability to all plants. We have drafted guidance on the treatment of the GALL report, including an example on a license renewal application and the corresponding staff safety evaluation report. (See Enclosure 1) We have also drafted the corresponding SRP-LR section as an example. (See Enclosure 2) We plan on using Enclosure 2 as a "guide" to develop the aging management review sections of the SRP-LR. Please note that Enclosure 2 references a Branch Technical Position (BTP) on aging management review. This BTP is intended to be the staff guidance for program acceptance using the "10 program elements" contained in Section 3.0 of the draft SRP-LR, dated September 1997.

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Document Name: C:\GALL\_SRP.wpd

OFFICE	LA	RLSB	RLSB:SC	RLSB:BC
NAME	EHylton	SLee	PTKuo	CGrimes
DATE	02/02/00	02/02/00	02/02/00	02/03/00

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## TREATMENT OF THE "GALL" REPORT

### APPROACH

The Generic Aging Lessons Learned (GALL) report should be treated in the same manner as an approved topical report. The staff should not repeat its review of the matters described in the GALL report and should find it acceptable when the GALL report is referenced in a license renewal application. However, the staff should ensure that the material presented in the GALL report is applicable to the specific plant involved. The staff should also verify that the applicant has identified specific programs as described and evaluated in the GALL report.

### Information in the License Renewal Application

In Chapter 2 of the application, the applicant would identify structures and components subject to aging management review for license renewal. Scoping is not affected by the presence of the GALL report. (Note: Chapter 1 of the application contains administrative information.)

In Chapter 3 of the application, the applicant would provide the aging management review of the structures and components identified in Chapter 2. The applicant would reference the GALL report as appropriate. The applicant would briefly describe the system, components, materials, and environment, and state that they are bounded by the GALL report. The applicant would also state that the applicable aging effects and industry and plant-specific operating experience have been reviewed, and are bounded by the GALL report. Any outliers would be discussed in the application. Then, the applicant would state that certain aging management programs and the staff evaluation, as described in the GALL report, are applicable to their plant. The applicant would list those components, applicable aging effects, and aging management programs in a table. If the GALL report indicates that some of these aging management programs should be further evaluated, the applicant would provide the plant-specific proposal to augment these programs. For aging management programs and/or staff evaluation in the GALL report that do not apply or are otherwise different for their plant, the applicant would provide a plant-specific aging management review. Also, for components and/or applicable aging effects that are not addressed in the GALL report, the applicant would provide the plant-specific aging management review.

In Chapter 4 of the application, the applicant would provide the time-limited aging analysis (TLAA) evaluation. Similar to aging management review in Chapter 3, the applicant would reference the GALL report as appropriate. For TLAA evaluations that have been evaluated in the GALL report, the applicant would state that certain TLAA evaluations and staff evaluation, as described in the GALL report, are applicable to their plant. If the GALL report indicates that further evaluation should be performed, the applicant would provide that additional information in the application. For TLAA evaluations that have not been evaluated in the GALL report or if the TLAA evaluation in the GALL report does not apply to the plant, the applicant would provide the plant-specific evaluation.

Enclosure 1

A summary description of all aging management programs and TLAA evaluations would be provided in the final safety analysis report (FSAR) supplement.

#### Staff Review Guidance

The staff should not repeat its review of the matters described in the GALL report. The staff should ensure that the material presented in the GALL report is applicable to the specific plant involved. For a particular system, the standard review plan for license renewal (SRP) should contain a summary table listing all the components, aging effects, and aging management programs, indicating whether the program is acceptable without change or should be further evaluated, as described in the GALL report. The staff would verify that the applicant has identified the appropriate programs as described and evaluated in the GALL report. The focus of the staff review would be on augmented programs for license renewal. The staff would also review information that is not addressed in the GALL report or is otherwise different from that in the GALL report. In addition, the staff would review the FSAR supplement based on the SRP.

## EXAMPLE

Containment Spray System (part of the Engineered Safety Features). Note: This example is for illustration only.

This example shows information in the license renewal application and the corresponding staff safety evaluation report.

Example: License Renewal Application

3.3 Engineered Safety Features

The Engineered Safety Features at Plant X evaluated in this application consist of: ....., Containment Spray System,....

....

The Containment Spray System provides borated water to reduce the temperature inside containment in accident conditions, as described in FSAR Section Y. The system consists of stainless steel and carbon steel components, such as piping, valves, pumps, and bolting, orifice, spray heads (see Table 2.Z in this application). The internal environment is borated water and the external environment is containment air. A review of the industry experience shows that stagnant portions of the containment spray stainless steel piping have experience cracking. However, this aging effect has not been observed at Plant X.

....

Based on a review of the system, components, materials, environment, applicable aging effects, and operating experience, the information in the GALL report (Chapter V of Reference 1) regarding the Engineered Safety Features bounds Plant X. However, carbon steel piping and isolation valve in the Containment Spray System are not addressed in the GALL report and are evaluated in Sections 3.3.4.1 and 3.3.4.2 of this application.

3.3.1 Aging Management Programs Evaluated in the GALL Report that Are Relied on for License Renewal

The following aging management programs and the staff evaluation for the Engineered Safety Features, as described in the GALL report, are applicable to Plant X:

GALL Item No.	Aging Effect or Mechanism	Aging Management Program	GALL Recommendation
V.A.1.1 thru 1.3, ....	Pitting and crevice corrosion	Inservice inspection and water chemistry	Further evaluation is recommended (see Section 3.3.2.1 of this application)
V.A.1.4, ....	Corrosion/ boric acid wastage of external surfaces	NRC Generic Letter 88-05 and inservice inspection	No further evaluation is recommended
....			

3.3.2 Further Evaluation of Aging Management as Recommended by the GALL Report

3.3.2.1 Detection of Pitting and Crevice Corrosion

The GALL report indicates that a one-time inspection of representative sample of the system population and most susceptible locations in the Containment Spray System should be conducted to ensure that significant degradation is not occurring and the component intended function will be maintained during the extended periods.... For license renewal, Plant X is proposing ....

3.3.3 Aging Management Programs or Evaluations that Are Different from those Described in the GALL Report

3.3.3.1 Aging Management Review of Stress Corrosion Cracking of Stainless Steel Piping and Fittings

The aging management program for stress corrosion cracking of stainless steel piping and fittings up to the isolation valve of the Containment Spray System (Item No. V.A.1.1 of the GALL report) at Plant X is different from that evaluated in the GALL report. Plant X....

3.3.4 Components or Aging Effects that Are Not Addressed in the GALL Report

3.3.4.1 Aging Management Review of Carbon Steel Piping

Plant X....

3.3.4.2 Aging Management Review of Isolation Valve Body

Plant X....

3.3.5 FSAR Supplement

The proposed FSAR Supplement for the Engineered Safety Features is as follows:

Program	Description of Program	Implementation Schedule
Water chemistry program	To mitigate aging effects on internal surfaces that are exposed to borated water as process fluid, chemistry programs are used to control primary water chemistry for impurities (chloride, fluoride, and sulfate) that accelerate corrosion.	Existing program
One-time inspection of Containment Spray System	To verify the effectiveness of the chemistry program and to supplement the limited scope of leakage monitoring program, one-time inspection of internal surfaces of components (using visual inspection) at the most susceptible locations is performed to ensure that degradation is not occurring as a result of corrosion....	Program will be implemented by ....

Implementation of NRC Generic Letter 88-05	The program consists of: (1) visual inspection of external surfaces that are potentially exposed to borated water for leaks, (2) timely discovery of leak path and removal of the boric acid residues, (3) assessment of the damage, and (4) follow up inspection for adequacy.	Existing program
Inservice inspection in accordance with ASME Section XI, as required in 10 CFR 50.55(a)	The program consists of periodic visual inspection of external surfaces for signs of significant degradation and assessment of the damage and corrective actions.	Existing program
....		



Example: Staff Safety Evaluation Report

3.3 Engineered Safety Features

....

3.3.3 Staff Evaluation

In Section 3.3 of the application, the applicant provided an aging management review of the Engineered Safety Features at Plant X. The applicant referenced the GALL report in its aging management review. The staff has previously evaluated the adequacy of aging management for license renewal as documented in the GALL report. Thus, the staff did not repeat its review of the matters described in the GALL report, except to ensure that the material presented is applicable to the specific plant involved and to verify that the applicant has identified the appropriate programs as described and evaluated in the GALL report. The staff further evaluated certain aging management programs as recommended in the GALL report. The staff also reviewed aging management information provided by the applicant that is different from that in the GALL report or not addressed in the GALL report.

3.3.3.1 Aging Management Programs Evaluated in the GALL Report that Are Relied on for License Renewal

The staff has reviewed the application and determined that the applicant has provided the information necessary to adopt the finding of program acceptability as described and evaluated in the GALL report. The applicant has identified those aging effects for the Engineered Safety Features components that are contained in the GALL report as applicable to its plant. The applicant has identified the programs in the GALL report for the aging management of these components, and they are:

GALL Item No.	Aging Effect or Mechanism	Aging Management Program	GALL Recommendation
V.A.1.1 thru 1.3, ....	Pitting and crevice corrosion	Inservice inspection and water chemistry	Further evaluation is recommended (see Section 3.3.3.2.1 of this safety evaluation)
V.A.1.4, ....	Corrosion/ boric acid wastage of external surfaces	NRC Generic Letter 88-05 and inservice inspection	No further evaluation is recommended
....			

The staff has verified that the applicant has identified the appropriate programs as described and evaluated in the GALL report. Thus, it is acceptable for the applicant to reference the information in the GALL report and no further staff evaluation is necessary if so recommended in the GALL report.

### 3.3.3.2 Further Evaluation of Aging Management as Recommended by the GALL Report

....

### 3.3.3.3 Aging Management Programs or Evaluations that Are Different from those Described in the GALL Report

....

### 3.3.3.4 Components or Aging Effects that Are Not Addressed in the GALL Report

....

### 3.3.3.5 FSAR Supplement

The staff reviewed the proposed FSAR supplement for the Engineered Safety Features....

### 3.3.4 Conclusions

The staff has reviewed the information in Section 3.3, "Engineered Safety Features," of the license renewal application. The staff evaluation concludes that the applicant has demonstrated that the aging effects associated with the Engineered Safety Features will be adequately managed so that there is reasonable assurance that these systems will perform their intended functions in accordance with the current licensing basis during the period of extended operation. The staff also concludes that the FSAR supplement contains an appropriate summary description of the programs and activities for managing the effects of aging for the Engineered Safety Features.

### 3.3 Aging Management of Engineered Safety Features

#### REVIEW RESPONSIBILITIES

PRIMARY-Branch responsible for materials and chemical engineering

SECONDARY-Branch responsible for mechanical engineering

#### I. AREAS OF REVIEW

This review plan section addresses the aging management review of the Engineered Safety Features for license renewal. For a recent vintage plant, the information related to the Engineered Safety Features is contained in Chapter 6, "Engineered Safety Features," of the plant's Final Safety Analysis Report (FSAR) consistent with the Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (NUREG-0800). Engineered Safety Features consist of systems, such as Emergency Core Cooling System, Containment Heat Removal Systems, Containment Spray, and Control Room Habitability Systems.

The staff has issued a Generic Aging Lessons Learned (GALL) report addressing aging management for license renewal (Reference 1). The GALL report documents generically the staff's basis for determining when existing programs are adequate to manage aging without change and when existing programs should be augmented for license renewal. The GALL report may be referenced in a license renewal application and should be treated in the same manner as an approved topical report.

Because a license renewal applicant may or may not be able to reference the GALL report, the following areas are reviewed:

#### A. Aging Management Programs Evaluated in the GALL Report that Are Relied on for License Renewal

The staff should not repeat its review of the matters described in the GALL report and should find it acceptable when the GALL report is referenced in a license renewal application. However, the staff should ensure that the material presented in the GALL report is applicable to the specific plant involved. The staff should also verify that the applicant has identified specific programs as described and evaluated in the GALL report.

#### B. Further Evaluation of Aging Management as Recommended by the GALL Report

The GALL report provides the basis for identifying those programs that warrant further evaluation during the staff review of a license renewal application. The staff review focus should be on augmented programs for license renewal.

Enclosure 2

C. Aging Management Programs or Evaluations that Are Different from those Described in the GALL Report

The GALL report provides a generic staff evaluation of certain aging management programs. If an applicant does not rely on a particular program for license renewal, or if the applicant indicates that the generic staff evaluation of the elements of a particular program does not apply to its plant, the staff should review the applicant's aging management programs.

D. Components or Aging Effects that Are Not Addressed in the GALL Report

The GALL report provides a generic staff evaluation of certain components and aging effects. If an applicant has identified particular components subject to aging management review for its plant, or if the applicant has identified particular aging effects for a component, that are not addressed in the GALL report, the staff should review the applicant's aging management programs.

E. FSAR Supplement

The FSAR supplement summarizing the programs and activities for managing the effects of aging for the period of extended operation is reviewed.

II. ACCEPTANCE CRITERIA

The acceptance criteria for the areas of review define methods for meeting the requirements of the Commission's regulations in 10 CFR 54.21.

A. Aging Management Programs Evaluated in the GALL Report that Are Relied on for License Renewal

Acceptable methods for managing aging of the Engineered Safety Features are described and evaluated in Chapter V of the GALL report (Reference 1). In referencing the GALL report, an applicant should indicate that the material presented in the GALL report is applicable to the specific plant involved and provide the information necessary to adopt the finding of program acceptability as described and evaluated in the GALL report. An applicant may reference appropriate programs as described and evaluated in the GALL report.

B. Further Evaluation of Aging Management as Recommended by the GALL Report

The GALL report indicates that further evaluation should be performed for:

1. Detection of Pitting and Crevice Corrosion

The management of corrosion of pressure boundary components in the Containment Spray System. A one-time inspection is an acceptable method to verify the effectiveness of the mitigation and monitoring programs.

2. ....

C. Aging Management Programs or Evaluations that Are Different from those Described in the GALL Report

Acceptance criteria are described in Branch Technical Position 3.0-1.

D. Components or Aging Effects that Are Not Addressed in the GALL Report

Acceptance criteria are described in Branch Technical Position 3.0-1.

E. FSAR Supplement

The summary description of the programs and activities for managing the effects of aging for the period of extended operation in the FSAR supplement should provide appropriate description such that later changes can be controlled by 10 CFR 50.59. The description should contain information associated with the integrated plant assessment regarding the bases for determining that aging effects are managed in the period of extended operation.

III. REVIEW PROCEDURES

For each area of review, the following review procedures are to be followed:

A. Aging Management Programs Evaluated in the GALL Report that Are Relied on for License Renewal

An applicant may reference the GALL report in its license renewal application, as appropriate. The staff should not repeat its review of the matters described in the GALL report. The staff should find it acceptable when the GALL report is referenced in a license renewal application, if the applicant has provided the information necessary to adopt the finding of program acceptability as described and evaluated in the GALL report. The reviewer verifies that the applicant has provided a brief description of the system, components, materials, and environment, and has stated that the particular plant is bounded by the GALL report. The reviewer also verifies that the applicant has stated that the applicable aging effects and industry and plant-specific operating experience had been reviewed by the applicant and are bounded by the GALL report. The reviewer verifies that the applicant has identified those aging effects for the Engineered Safety Features components that are contained in the GALL report as applicable to its plant. The reviewer reviews any outliers identified by the applicant.

The applicant may state that certain aging management programs and the staff evaluation, as described in the GALL report, are applicable to its plant. The reviewer verifies that the applicant has identified the appropriate programs as described and evaluated in the GALL report. Programs evaluated in the GALL report regarding the Engineered Safety Features are tabulated in Table 3.3-1 of this review plan section. No further staff evaluation is necessary if so recommended in the GALL report.

B. Further Evaluation of Aging Management as Recommended by the GALL Report

1. Detection of Pitting and Crevice Corrosion

The reviewer reviews the applicant's augmented program to manage corrosion of pressure boundary components in the Containment Spray System. Aging management programs for the Containment Spray System include the chemistry program and the leakage monitoring program. However, the GALL report recommends further evaluation to verify the effectiveness of the chemistry program and to supplement the limited scope of the leakage monitoring program. An acceptable method is a one-time inspection as recommended in the GALL report. The reviewer reviews the applicant's proposed program. The program should consist of a one-time inspection of internal surfaces of components (using visual inspection) at the most susceptible locations is performed to ensure that degradation is not occurring as a result of corrosion....

2. ....

C. Aging Management Programs or Evaluations that Are Different from those Described in the GALL Report

Review procedures are described in Branch Technical Position RLSB 3.0-1.

D. Components or Aging Effects that Are Not Addressed in the GALL Report

Review procedures are described in Branch Technical Position RLSB 3.0-1.

E. FSAR Supplement

The reviewer verifies that the applicant's FSAR supplement for aging management of the Engineered Safety Features for license renewal is consistent with Table 3.3-2 of this review plan section. The reviewer also verifies that the applicant has provided FSAR supplement for Subsection III.C, "Aging Management Programs or Evaluations that are Different from those Described in the GALL Report," and Subsection III.D, "Components or Aging Effects that are Not Addressed in the GALL Report," of this review plan section using a format similar to that in Table 3.3-2.

#### IV. EVALUATION FINDINGS

The reviewer verifies that sufficient and adequate information has been provided to satisfy the provisions of this review plan section and the staff's evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

The staff evaluation concludes that the applicant has demonstrated that the aging effects associated with the Engineered Safety Features will be adequately managed so that there is reasonable assurance that these systems will perform their intended functions in accordance with the current licensing basis during the period of extended operation. The staff also concludes that the FSAR supplement contains an appropriate summary description of the programs and activities for managing the effects of aging for the Engineered Safety Features.

#### V. IMPLEMENTATION

Except in those cases in which the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the method described herein will be used by the staff in its evaluation of conformance with Commission regulations.

#### VI. REFERENCES

1. NUREG-??, "Generic Aging Lessons Learned (GALL) Report," ....

TABLE 3.3-1: Aging Management Programs Evaluated in the GALL Report  
for Engineered Safety Features

GALL Item No.	Aging Effect or Mechanism	Aging Management Program	GALL Recommendation
V.A.1.1 thru 1.3, ....	Pitting and crevice corrosion	Inservice inspection and water chemistry	Further evaluation is recommended (see III.B.1 of this review plan section)
V.A.1.4, ....	Corrosion/ boric acid wastage of external surfaces	NRC Generic Letter 88-05 and inservice inspection	No further evaluation is recommended
....			



TABLE 3.3-2: FSAR Supplement for Aging Management of Engineered Safety Features

Program	Description of Program	Implementation Schedule
Water chemistry program	To mitigate aging effects on internal surfaces that are exposed to borated water as process fluid, chemistry programs are used to control primary water chemistry for impurities (chloride, fluoride, and sulfate) that accelerate corrosion.	Existing program
One-time inspection of Containment Spray System	To verify the effectiveness of the chemistry program and to supplement the limited scope of leakage monitoring program, one-time inspection of internal surfaces of components (using visual inspection) at the most susceptible locations is performed to ensure that degradation is not occurring as a result of corrosion....	Program will be implemented by ....
Implementation of NRC Generic Letter 88-05	The program consists of: (1) visual inspection of external surfaces that are potentially exposed to borated water for leaks, (2) timely discovery of leak path and removal of the boric acid residues, (3) assessment of the damage, and (4) follow up inspection for adequacy.	Existing program
Inservice inspection in accordance with ASME Section XI, as required in 10 CFR 50.55(a)	The program consists of periodic visual inspection of external surfaces for signs of significant degradation and assessment of the damage and corrective actions.	Existing program
....		

NUCLEAR ENERGY INSTITUTE  
(License Renewal Steering Committee)

Project No. 690

cc:

Mr. Dennis Harrison  
U.S. Department of Energy  
NE-42  
Washington, D.C. 20585

Mr. Robert Gill  
Duke Energy Corporation  
Mail Stop EC-12R  
P.O. Box 1006  
Charlotte, NC 28201-1006

Mr. Ricard P. Sedano, Commissioner  
State Liaison Officer  
Department of Public Service  
112 State Street  
Drawer 20  
Montpelier, Vermont 05620-2601

Mr. Charles R. Pierce  
Southern Nuclear Operating Co.  
40 Inverness Center Parkway  
BIN B064  
Birmingham, AL 35242

Mr. Douglas J. Walters  
Nuclear Energy Institute  
1776 I Street, N.W.  
Washington, DC 20006  
DJW@NEI.ORG

Carl J. Yoder  
Baltimore Gas and Electric Company  
Calvert Cliffs Nuclear Power Plant  
1650 Calvert Cliffs Parkway  
NEF 1st Floor  
Lusby, Maryland 20657

National Whistleblower Center  
3233 P Street, N.W.  
Washington, DC 20007

Chattooga River Watershed Coalition  
P. O. Box 2006  
Clayton, GA 30525

Mr. Garry Young  
Entergy Operations, Inc.  
Arkansas Nuclear One  
1448 SR 333 GSB-2E  
Russellville, Arkansas 72802

Mr. David Lochbaum  
Union of Concerned Scientists  
1616 P. St., NW  
Suite 310  
Washington, DC 20036-1495

Mr. James P. Riccio  
Public Citizen's Critical Mass Energy  
Project  
211 Pennsylvania Avenue, SE  
Washington, DC 20003

Mr. Paul Gunter  
Director of the Reactor Watchdog Project  
Nuclear Information & Resource Service  
1424 16<sup>th</sup> Street, NW, Suite 404  
Washington, DC 20036