

# Reactor License Renewal

GE BWR/4 Technology Course

R-504B – 4.16

# Learning Objectives

1. Recognize the major steps in the process to renew an operating license, including:
  - a. Conducting Time-Limited Aging Analysis (TLAA)
  - b. Developing and implementing Aging Management Programs (AMPS)
  - c. Documenting the analysis and commitments regarding license renewal in the current licensing basis for the plant

# Learning Objectives

2. Identify how the NRC reviews the application for license renewal and inspects the utilities' activities regarding licensing renewal, including inspections conducted following approval of the renewed license.
3. Recognize the major categories of structures and components that must be evaluated for aging effects when applying for license renewal.

# Introduction

- Original License Limit – 40 years
  - Based on economic considerations and not technical concerns
- Application – NRC evaluation of Safety and Environmental issues related to the license renewal
  - Does the licensee understand the impact of aging on critical safety components?
  - Has the licensee taken appropriate actions?

# Background

- 1982 – established NPAR, Nuclear Plant Aging Research.
  - Concluded aging effects are manageable
- 1995 – NRC issued 10CFR Part 54 – safety requirements of license renewal
- GALL (Generic Aging Lessons Learned)/NUREG1801
- SRP (Standard Review Plan)/NUREG1800
- Regulatory Guide RG 1.188
- 1996 – Environmental Protection Requirements 10CFR part 51

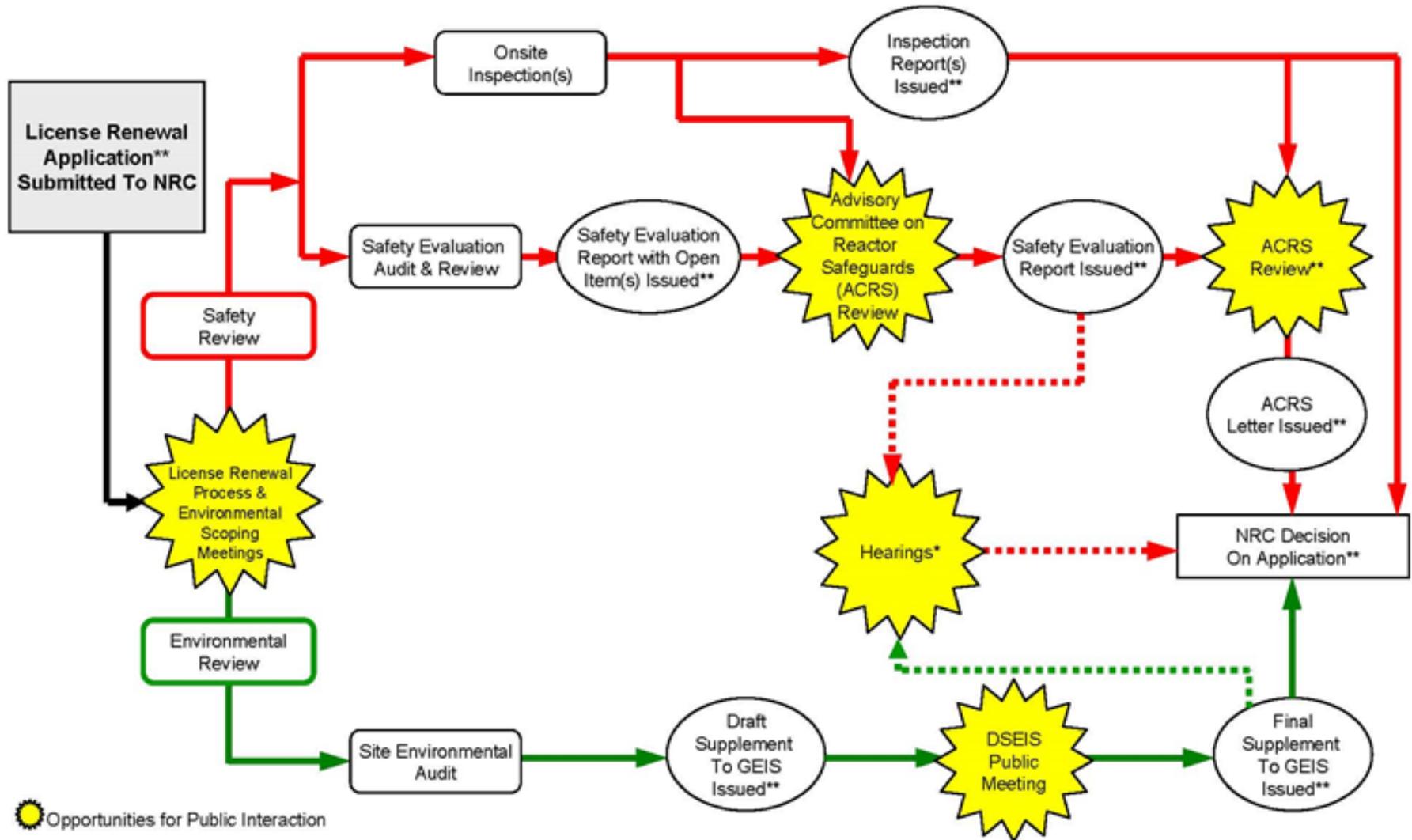
# Principles

- The current regulatory process is adequate to ensure safety with one exception...Age related degradation
- Current Licensing Basis (CLB) applies throughout license extension
  - Voluntary
  - Not a re-review
  - Plants not required to meet latest standard
  - No reduction in requirements

# Principles

- The current process is adequate
- Issues relevant to current operating conditions are carried forward into the new license
- Current Licensing Basis Reconstitution is not required
- Focus of the renewal is the PASSIVE, LONG LIVED, and TIME LIMITED systems
- PRA is not a part of the renewal process

# License Renewal Process



 Opportunities for Public Interaction

\* If a Request for Hearing is Granted

\*\* Available at [www.nrc.gov](http://www.nrc.gov)

# Process

- Application
  - Identifies systems, structures, components (SSCs) affected by license renewal
  - Demonstrates that it can adequately handle the adverse effects of aging
  - Analyze environmental effects
- Two parallel paths...
  - Safety review
  - Environmental review

# Application contents

- Integrated Plant Assessment (IPA)
- Time-Limited Aging Analyses (TLAAs)
- Final Safety Analysis Report (FSAR) Supplement
- Technical Specification Changes
- Standards for Issuance of Renewed License

# Integrated Plant Assessment (IPA)

- Identify and list structures and components subject to an aging management review (AMR):
  - Perform intended function without moving parts or without a change in configuration or properties (passive)
  - Not subject to replacement based on a qualified life or specified period (long-lived)

# Passive systems are subjected to AMR (examples are...)

- Reactor vessel
- Reactor coolant system pressure boundary
- Piping
- Pump casings
- Valve bodies
- Core shroud
- Component supports
- Pressure retaining boundaries
- Heat exchangers
- Ventilation ducts
- Containment
- Containment liner
- Electrical and mechanical penetrations
- Equipment hatches
- Seismic Category I structures
- Electrical cables and connections
- Cable trays
- Electrical cabinets

# Active SSCs are NOT subject to AMR (examples are...)

- Pumps (except casing)
- Valves (except body)
- Motors
- Diesel generators
- Air compressors
- Snubbers
- Control rod drive
- Ventilation dampers
- Pressure transmitters
- Pressure indicators
- Water level indicators
- Switchgears
- Cooling fans
- Transistors
- Batteries
- Breakers
- Relay
- Switches
- Power inverters
- Circuit boards
- Battery chargers
- Power supplies

# Aging Management Program - AMP

1. Scope of program
2. Preventive actions
3. Parameters monitored or inspected
4. Detection of aging effects
5. Monitoring and trending
6. Acceptance criteria
7. Corrective actions
8. Confirmation process
9. Administrative controls
10. Operating experience

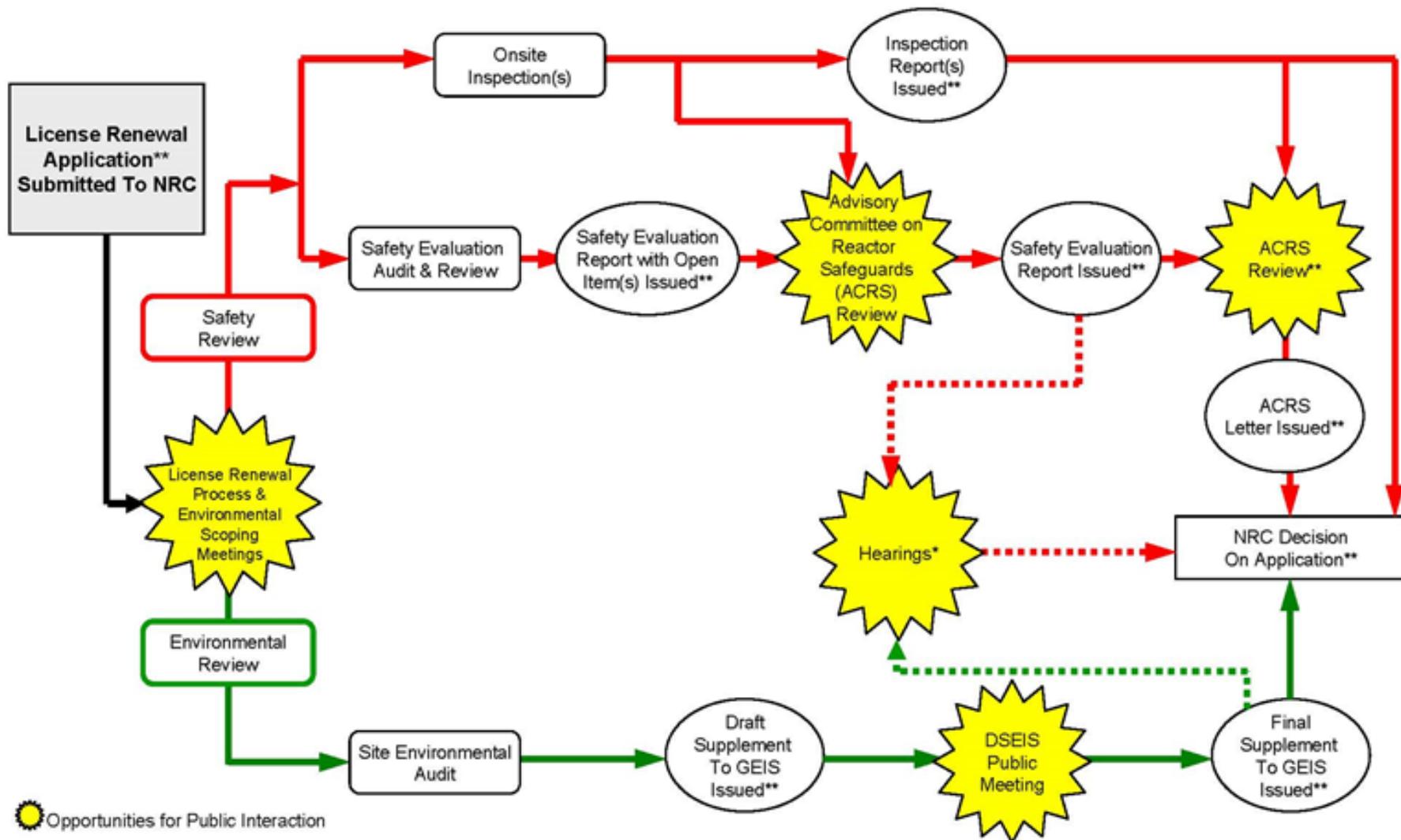
# Time Limited Aging Analysis (TLAA)

- Some SSCs important to safety were assumed per the CLB to perform their design function throughout current term. Assumptions on time were incorporated into design calculations.

# Time Limited Aging Analysis (TLAA)

- A list of these items must be included in the application
  - Demonstrate that for the period of extended operation
    - Analyses remain valid,
    - Analyses have been projected to the end of the period, or
    - Effects of aging on the intended functions will be managed

# License Renewal Process



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# Safety Review

## Safety Evaluation Audit and Review:

- Review application and supporting documentation
  - **Adequate AMR and AMP?**
  - Generate Safety Evaluation Report – available to public
- Inspection to verify
  - Aging Management Plan (AMP)
  - Information in application

# Safety Review

## Safety Evaluation Audit and Review:

- Applicant may be required to establish new monitoring programs, increase inspections, or improve design criteria
  - Must also show that original assumptions on longevity of SSCs are still valid or that aging will be managed

# Safety Review

## Safety Evaluation Audit and Review:

- Reactor Systems Branch, Plant Systems Branch, and Probabilistic Safety Assessment Branch of DSS and Electrical and Instrumentation and Control Branch and Mechanical and Civil Engineering Branch, Review Application for consistency in Scoping, Screening, and AMR and AMP. (Now done against GALL)

# Generic Aging Lessons Learned (GALL)/NUREG 1801

The purpose of the GALL Report is to provide the technical basis for the Standard Review Plan for License Renewal.

GALL contains the staff's generic evaluation of the existing plant programs and documents the technical basis for determining where existing programs are adequate without modification and where existing programs should be augmented for the extended period of operation.

# Site inspections

- Teams are led by the NRC's regional offices.
- Teams have technical, program, and operational experts from region, headquarters, or consultants.
- Cover scoping, observation of aging effects on plant equipment, aging management programs, implementation.
- Intent is to support findings on program and aging management activities.
- Follow IP 71002

# Regional Inspection

- Support a finding regarding reasonable assurance of the acceptability of an applicant's license renewal program and activities to manage the effects of aging consistent with the current licensing basis (CLB) during the period of extended operation

# Scoping and Screening Inspections

- Verify that the applicant for license renewal has —
  - properly included the systems, structures, and components (SSCs) within the scope of license renewal
  - properly designated those portions of the structures and components in scope that are subject to aging management review
  - identified all passive and long-lived SSCs that require aging management review
- Verify scoping of non-safety-related structures and components whose failure could affect safety-related structures and components from performing their intended functions.

# Scoping and Screening Inspections

- Verify that the applicant for license renewal has
  - properly included the systems, structures, and components (SSCs) within the scope of license renewal.
  - properly designated those portions of the structures and components in scope that are subject to aging management review.
  - identified all passive and long-lived SSCs that require aging management review.

# AMP inspections

- Determine which AMPs are credited to prevent applicable aging effects.
- Verify that AMPs will reasonably manage aging effects
- Review supporting documentation for validity.

# AMP inspections

- Verify that the applicant implemented its methodology for AMPs.
- Verify that the applicant evaluated site-specific and industry information for applicability in determining aging effects:
  - surveillance tests
  - maintenance records
  - history files
  - inservice test and inspection results
  - work orders and corrective actions
- Perform walkdowns of selected in-scope SSCs.

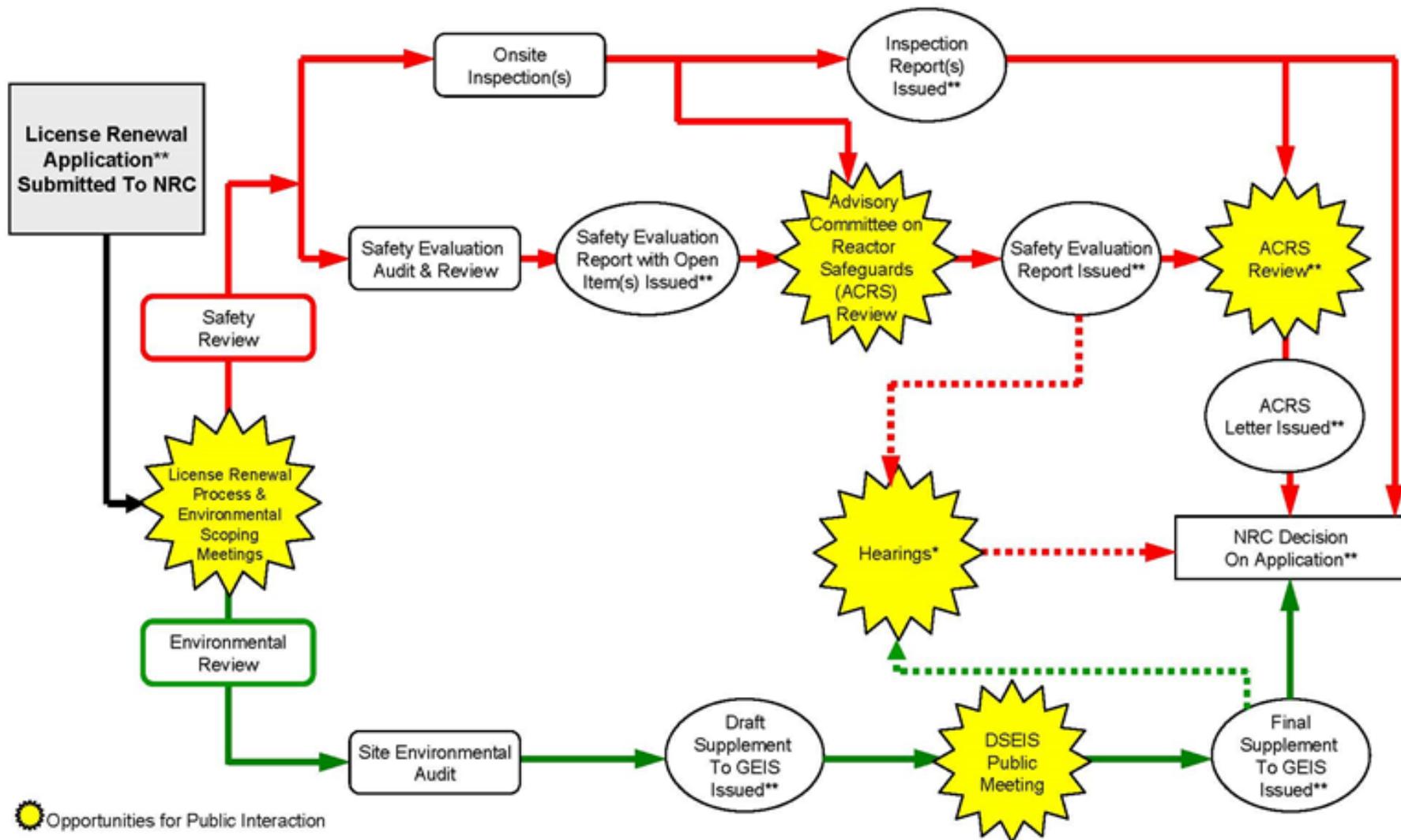
# Post approval Site Inspections IP-71003

- To verify that license conditions added as part of the renewed license, license renewal commitments, selected aging management programs, and license renewal commitments revised after the renewed license was granted, are implemented in accordance with Title 10 of the *Code of Federal Regulations (CFR) Part 54*, “Requirements for the Renewal of Operating Licenses for Nuclear Power Plants.”

# Post approval Site Inspections IP-71003

- To verify that “newly identified” systems, structures, and components (SSCs), pursuant to 10 CFR 54.37(b), and Regulatory Issue Summary RIS-007-16 (UFSAR Guidance), are implemented in accordance with 10 CFR Part 54.
- To verify, on a sample basis, that the description of the aging management programs and related activities covered in §01.01 are, or will be, contained in the updated final safety analysis report (UFSAR) and that the description of the programs is consistent with the programs implemented by the licensee.

# License Renewal Process



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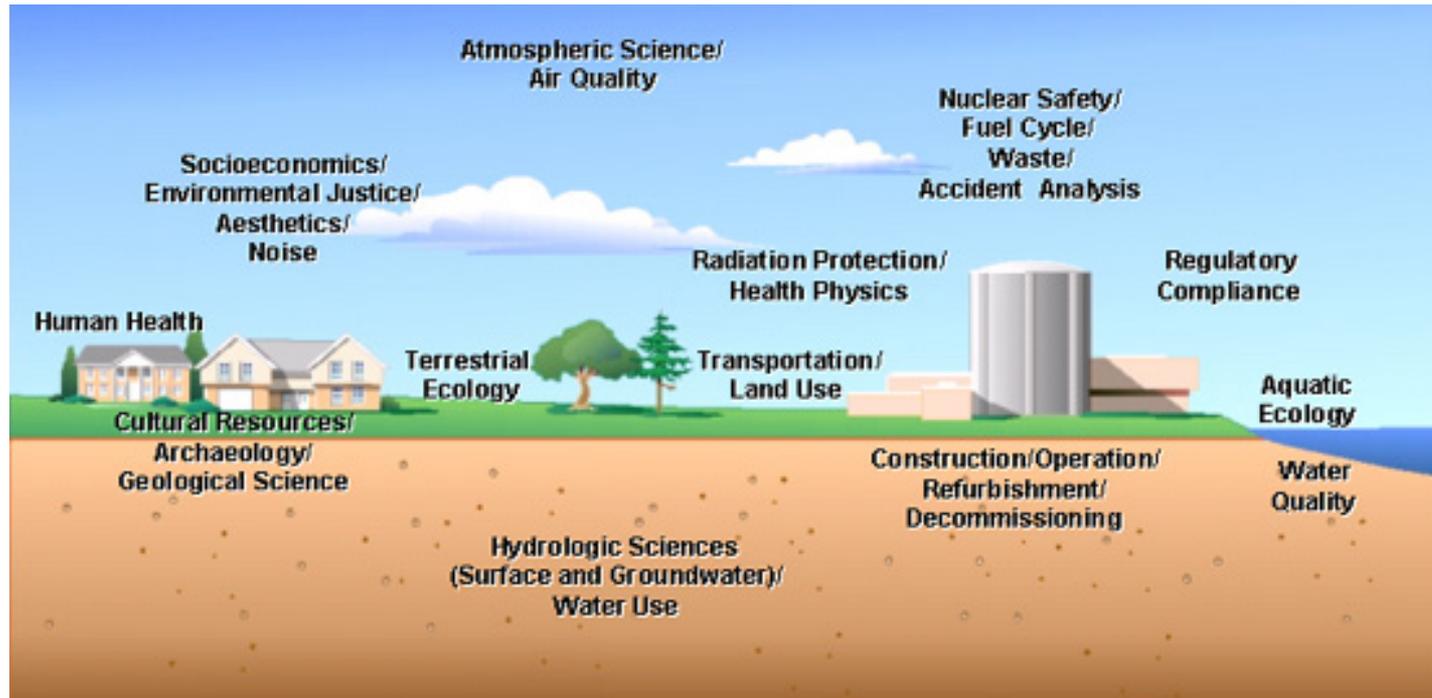
# Inspection Summary

- The applicant implements the scoping and screening methodology in conformance with descriptions contained in the license renewal application and staff's safety evaluation report (SER).
- The applicant correctly and completely identifies the systems, structures, and components (SSCs) satisfying the conditions of 10 CFR 54.4(a).
- The passive, long-lived structures and components (SCs) are subject to an aging management review (AMR) and have aging management programs (AMPs) that are in conformance with descriptions contained in the license renewal application and SER.

# Inspection Summary

- The engineering analysis documentation used to support the application exists, and is credible and auditable.
- Inspections are performed before the approval of a renewed license.
- Inspections should be performed by the NRC's regional offices (including visits to the applicant's site).
- Inspections cover the following aspects:
  - scoping and screening
  - aging management
  - annual LRA update process
  - any open items resulting from inspections or staff review of the LRA

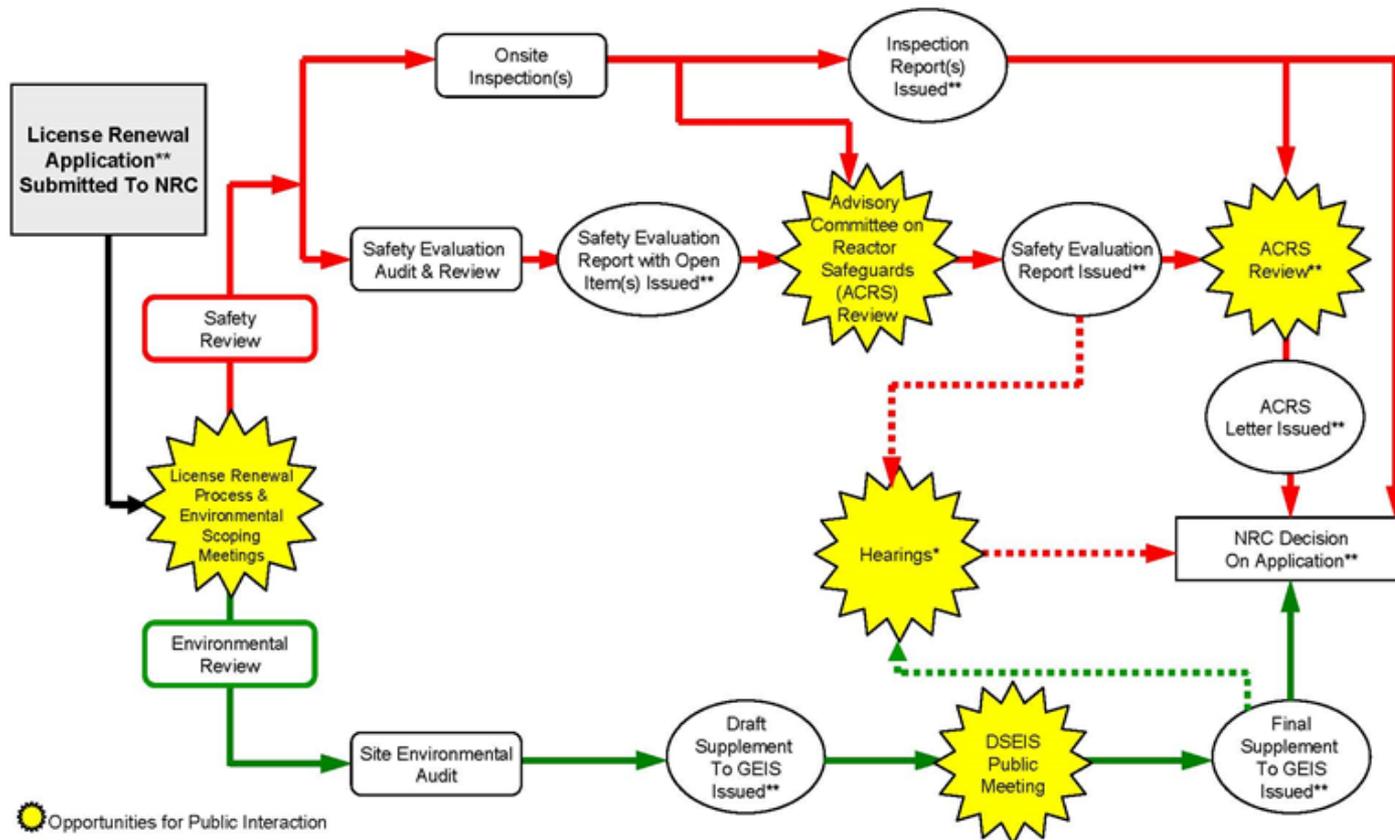
# Environmental Review



For the review, the Environmental PM or EPM establishes a team made up of the NRC staff, supplemented by experts in various fields from labs like Pacific Northwest National Laboratory.

# Generic Environmental Impact Statement - GEIS

## License Renewal Process



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# EPU impact

“All license renewal applications with an approved EPU will be required to perform an operating experience review and its impact on Aging Management Programs for structures, and components before entering the period of extended operation.”

# Decision

- Safety Review completion including issuance of the following documents:
  - Safety Evaluation Report
  - Regional Inspection Report
  - ACRS Recommendation Letter
  - Regional Administrator's Letter

# Decision

- Environmental Review completion including issuance of the Supplement to the Generic Environmental Impact Statement, and
- Atomic Safety and Licensing Board (ASLB) Hearing completion, if required
- Renewed License may not exceed 20 years

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