



# Pilgrim Nuclear Power Station License Renewal Safety Evaluation Report

## **Staff Presentation to the ACRS**

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Office of Nuclear Reactor Regulation

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# Introduction

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- Overview
- Section 2: Scoping and Screening Review
- License Renewal Inspections
- Section 3: Aging Management Review Results
- Section 4: Time-Limited Aging Analyses (TLAAs)

# Overview



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- LRA Submitted by Letter, January 27, 2006
  - GE BWR3 - MARK 1 Containment
  - 2028 MWth, 690 MWe
  - Op License DPR-35 Expires June 8, 2012
  - Located in Plymouth, MA

# Overview



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- SER Issued June 28, 2007
  - SSER to be Issued September, 2007
  - Open Items (4) Have Been Closed
  - Four (4) License Conditions
  - 92 RAIs Issued, 329 Audit Questions
  - ≈82% Consistent With GALL Report, Revision 1

# Review Highlights



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- AMP GALL Audit
    - May 22, 2006
  - Scoping and Screening Methodology Audit
    - June 6 - June 9, 2006
  - AMR GALL Audit
    - June 19, 2006
  - AMP/AMR Status Briefing
    - July 17 - 19, 2006
  - Regional Inspections
    - September 18 - 22, 2006
    - October 2 - 6, 2006
    - December 6 - 7, 2006

# Section 2: Scoping and Screening Review

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## Section 2.1 - Scoping and Screening Methodology

- On-site Audit - June 6 – June 9, 2006
- Pilgrim included all system components in scope if any components were (a)2 – exceptions stated

## Section 2.3

- 4 Additional Components Brought Into Scope

## Section 2.2, 2.4, 2.5

- No Omissions

# Section 2: Scoping and Screening Review



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## Section 2.3 – Mechanical Systems

- Open Item 2.3.3.6: Security Diesel
  - LRA Did not Include System Drawings
  - Referred to Regional Inspector to Determine System Components in Scope
  - Staff Considered the 3/9/2007 Inspector Input Adequate to Close the Open Item

# Section 2: Scoping and Screening Summary

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- The Applicant's Scoping Methodology Meets The Requirements Of 10 CFR Part 54.4
- Scoping And Screening Results, As Amended, Included All SSCs Within The Scope Of License Renewal And Subject To AMR





# License Renewal Inspections

Glenn Meyer

Region I

# Scoping and Screening



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- 54.4(a)(2) - Non-safety SSCs Whose Failure Could Impact Safety SSCs
  - Spatial and Structural Interactions
  - LRA Drawings and Procedures Reviewed
  - Plant Walkdowns Performed

# Scoping and Screening Conclusions

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- Spatial Interaction - Acceptable
- Structural Interaction – Corrected
- Scoping and Screening Acceptable for License Renewal

# Aging Management

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- Reviewed 26 AMP Programs
- Reviewed Programs, Evaluations, and Records
  - Program Procedures
  - Operational Experience Information
  - Prior Pilgrim Issues
- Performed Plant Walk Downs
- Interviewed Cognizant Personnel

# Inspection Conclusions

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- Scoping and Aging Management Programs Support Conclusion That Aging Effects will be Managed
- Drywell Shell Monitoring

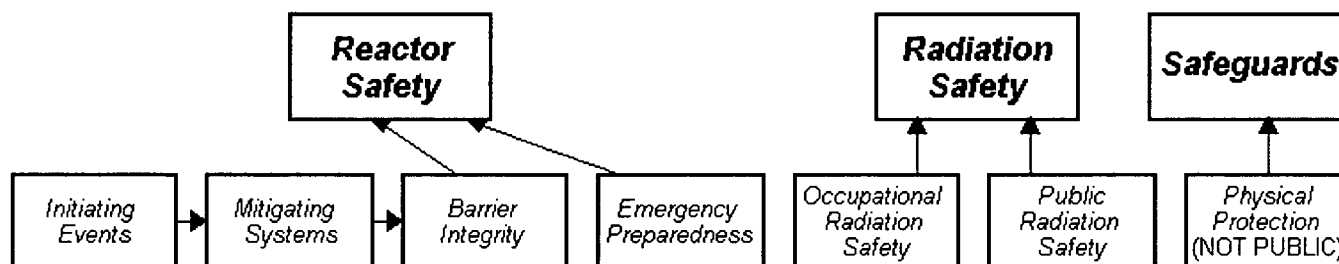
# Current Performance

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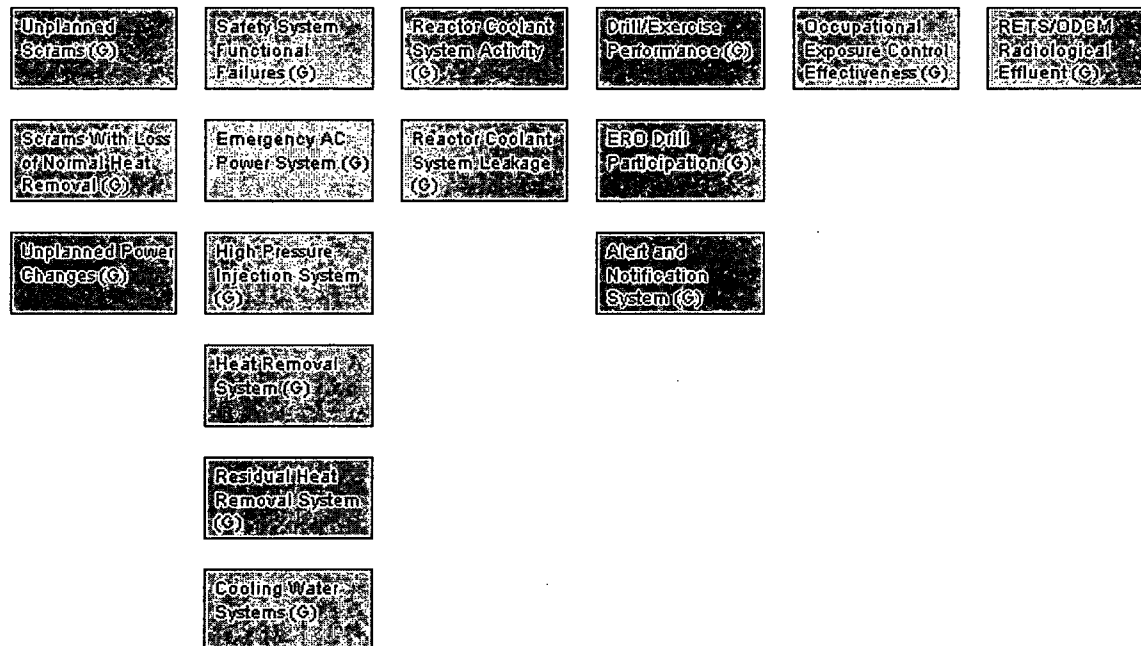


- Licensee Response Column (Column I) of the NRC's Action Matrix – Green PIs and Findings
- No Cross-cutting Issues
- Reactor Oversight Process Baseline Inspections

# Performance Indicators

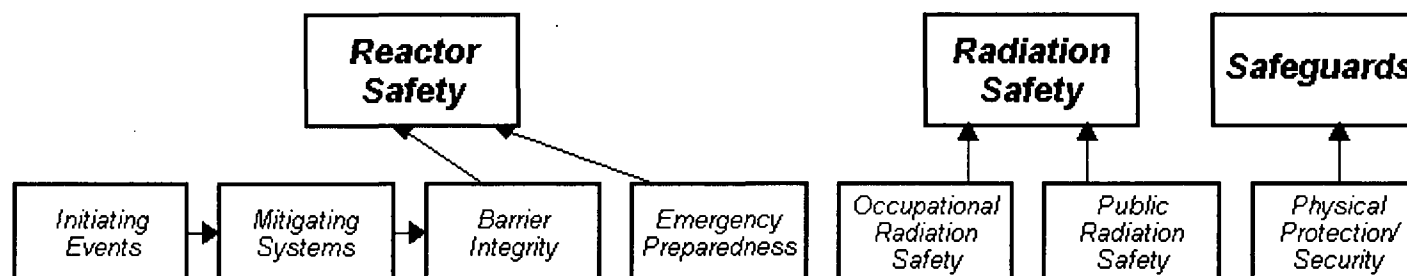


## Performance Indicators





# Inspection Findings



## Most Significant Inspection Findings

2Q/2007	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter
1Q/2007	No findings this quarter	G	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter
4Q/2006	No findings this quarter	G	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter
3Q/2006	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter	No findings this quarter

Miscellaneous findings





# Pilgrim Nuclear Power Station Aging Management Review Time Limited Aging Analysis Open Items

# Fire Protection Program (B.1.13.1)

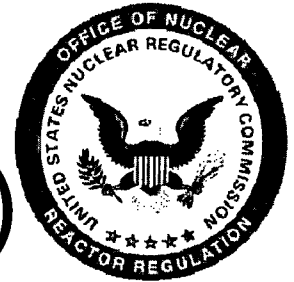
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- Open Item 3.0.3.2.10:
  - Applicant did not Adequately Address how to Manage the Aging Effects of Inaccessible Seals.
  - Applicant Stated (ACRS) and Documented (June 2007) That There are Actually No Inaccessible Seals at PNPS

# Containment Inservice Inspection Program (B.1.16.1)

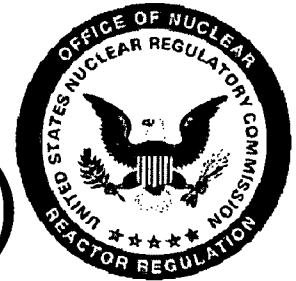
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- Open Item 3.0.3.3.2:
  - Regional Inspection Documented:
    - Inoperative Bellows Rupture Drain Flow Switch
    - Drain Monitoring Inconclusive & Undocumented
    - Water on Torus Room Floor

# Containment Inservice Inspection Program (B.1.16.1)

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- Open Item 3.0.3.3.2:
  - Replace Switches Now and in 15 years
  - Identified Non-Aggressive Groundwater as Source of Water on Torus Room Floor
    - Tested November 2006 and June 2006
  - Provided Documentation of Drain Monitoring
    - Committed to Obtain Drywell UT Data

# Containment Inservice Inspection Program (B.1.16.1)

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- Open Item 3.0.3.3.2:
  - Torus Structure
    - Provided Evaluation of Effect on Torus Basemat
    - Commitments to Evaluate Groundwater/Torus Water
    - Commitment to Inspect Condition of Torus Hold Down Bolts and Grout

# Section 4.2: Reactor Vessel Neutron Embrittlement

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- Six TLAAAs Affected by Neutron Fluence
  - Reactor Vessel Fluence
  - Pressure-Temperature Limits
  - Upper Shelf Energy
  - Adjusted Reference Temperature
  - Circumferential Weld Inspection Relief
  - Axial Weld Failure Probability

# Section 4.2: Reactor Vessel Neutron Embrittlement

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- Open Item 4.2
  - Pilgrim – The First BWR-3 to Use RAMA Methodology to Calculate Neutron Fluence
  - Dosimetry Data was not Available with Which to Benchmark the RAMA Calculated Results
  - Result - Fluence Calculation Not Acceptable Per Reg Guide 1.190

# Section 4.2: Reactor Vessel Neutron Embrittlement

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- Open Item 4.2
  - Applicant's Back Calculation of Limiting Fluence Values Considered Acceptable by the Staff
  - TLAA Identified Which Established the Limiting Fluence Value
    - Axial Welds @ RV Inner Surface -  $3.37 \times 10^{18}$  n/cm<sup>2</sup> (E > 1.0 MeV)



# Section 4.2: Reactor Vessel Neutron Embrittlement

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- Open Item 4.2
  - License Condition 4.2.6: On or before June 8, 2010, the applicant (Entergy) will submit to the NRC correctly benchmarked RV neutron fluence calculations, consistent with RG 1.190, that will confirm that the neutron fluence for the lower intermediate shell axial welds, at the inner surface of the RV, will not reach the limiting value of  $3.37 \times 10^{18}$  n/cm<sup>2</sup> ( $E > 1.0$  MeV) by the end of the period of extended operation (54 EFPY).

# Section 4.2: Reactor Vessel Neutron Embrittlement

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- Open Item 4.2
  - Commitment 47: Submit to the NRC An Action Plan for Benchmarking the Reactor Pressure Vessel Fluence Evaluation.
  - Entergy Plan Submitted August 23, 2007.

# Section 4.3: Metal Fatigue



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- Reactor Water Environment
    - Removed Exception to Fatigue Monitoring Program regarding Environmentally Assisted Fatigue.
    - Combined FMP and EAF – FMP is Now Consistent with GALL.

# Conclusions

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- On the basis of its review of the LRA, with the closing of Open Items 2.3.3.6, 3.0.3.2.10, 3.0.3.3.2 and 4.2, the staff determines that the requirements of 10 CFR 54.29(a) have been met.



# Questions