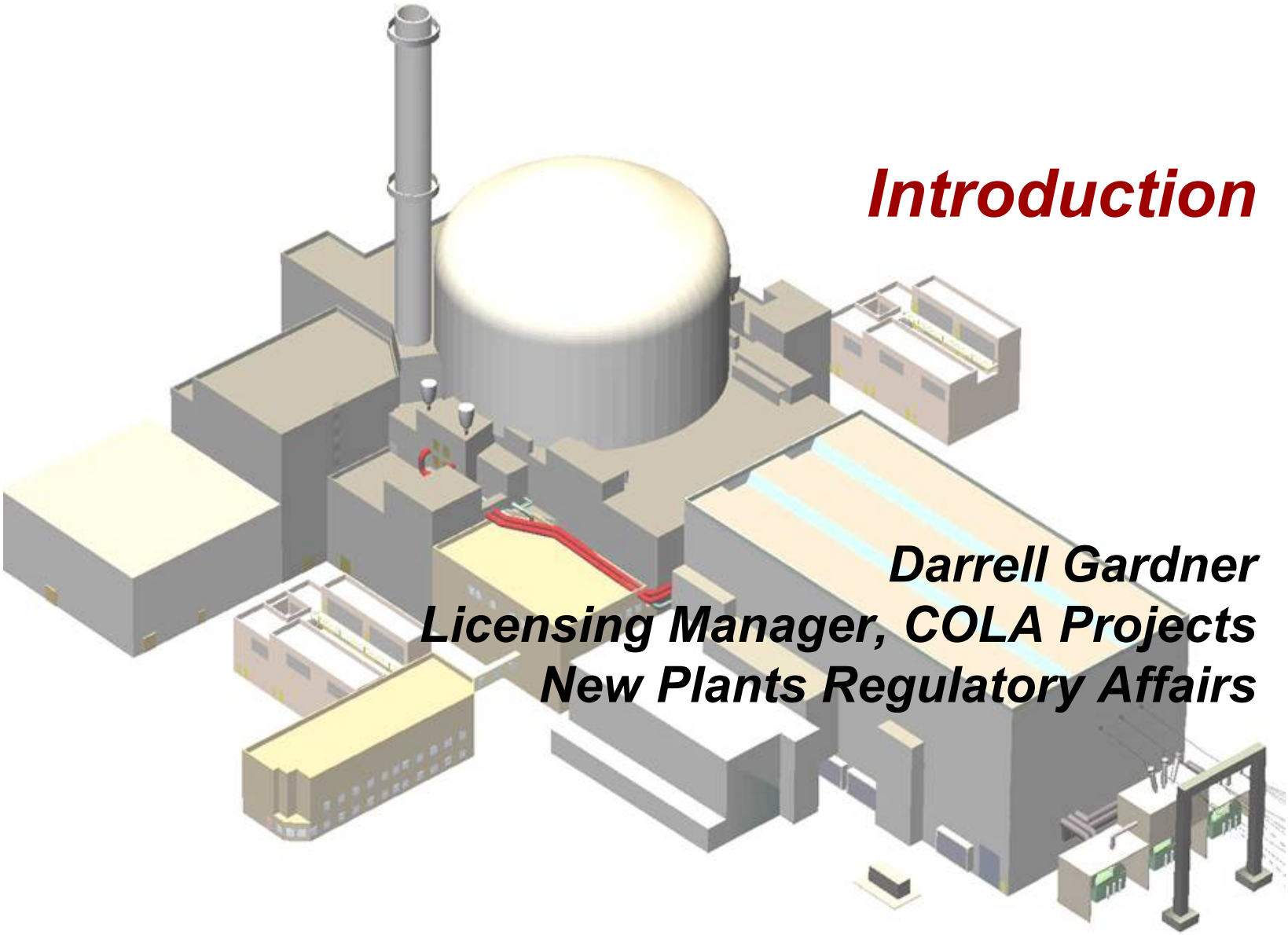
AREVA

PURE ENERGY

U.S. EPR™ Inservice Testing Program

U.S. EPR Design Center Working Group
Meeting with NRC
March 4 , 2009

AREVA



Introduction

Darrell Gardner
Licensing Manager, COLA Projects
New Plants Regulatory Affairs

Agenda

- Introductions (Darrell Gardner)
- Meeting Objectives (Darrell Gardner)
- IST Program Overview (Darrell Gardner)
- IST Review Status (Darrell Gardner)
- COL Information Items (Darrell Gardner)
- Description of the IST Program (Terry Daugherty)
- Conclusions (Darrell Gardner)

Meeting Objectives

- Provide an overview of the development of the Inservice Testing (IST) Program for the U.S. EPR FSAR.
- Understanding between NRC and DCWG regarding the scope and content of the IST Program description within the design certification application and COL applications.
- Discuss those elements of the IST Program description that NRC has questioned in RAIs and reviews of previous design certifications and COLAs.
- Respond to NRC questions regarding the IST Program description.

IST Program Overview

- **The U.S. EPR IST Program was developed utilizing NRC regulations, regulatory guidance, and industry standards:**
  - **RG 1.206 and SRP 3.9.6 Revision 3.**
  - **10 CFR 50.55a.**
  - **ASME OM Code, 2004 edition.**
  - **NUREG-1482, Revision 1on IST guidelines.**
  - **ASME Boiler and Pressure Vessel Code, Section III and Section XI**
  - **GLs 89-10, 96-05 for MOVs; and GL 90-09 for dynamic restraints (snubbers).**
  - **RIS 2000-03 for POVs other than MOVs.**

IST Program Overview

- In accordance with guidance in RG 1.206, Section C.IV.4, and SECY-05-0197, the U.S. EPR FSAR contains a "fully described" IST Program covering both the design and operational related elements of the IST program (FSAR Section 3.9.6).

- This approach reflects the objective of the DCWG to maximize standardization through a "fully described" program in the design certification application.

- This approach differs from other DCD and COL applicants which included "design-related" elements of the IST in the DCD and included "operational-related" elements within the COLA.

- As a result, no departures have been taken from the U.S EPR FSAR IST program by the COL applicants.

AREVA NP and UniStar have maintained awareness of discussions and interactions between the NRC and industry regarding the IST programs for new reactor applications.

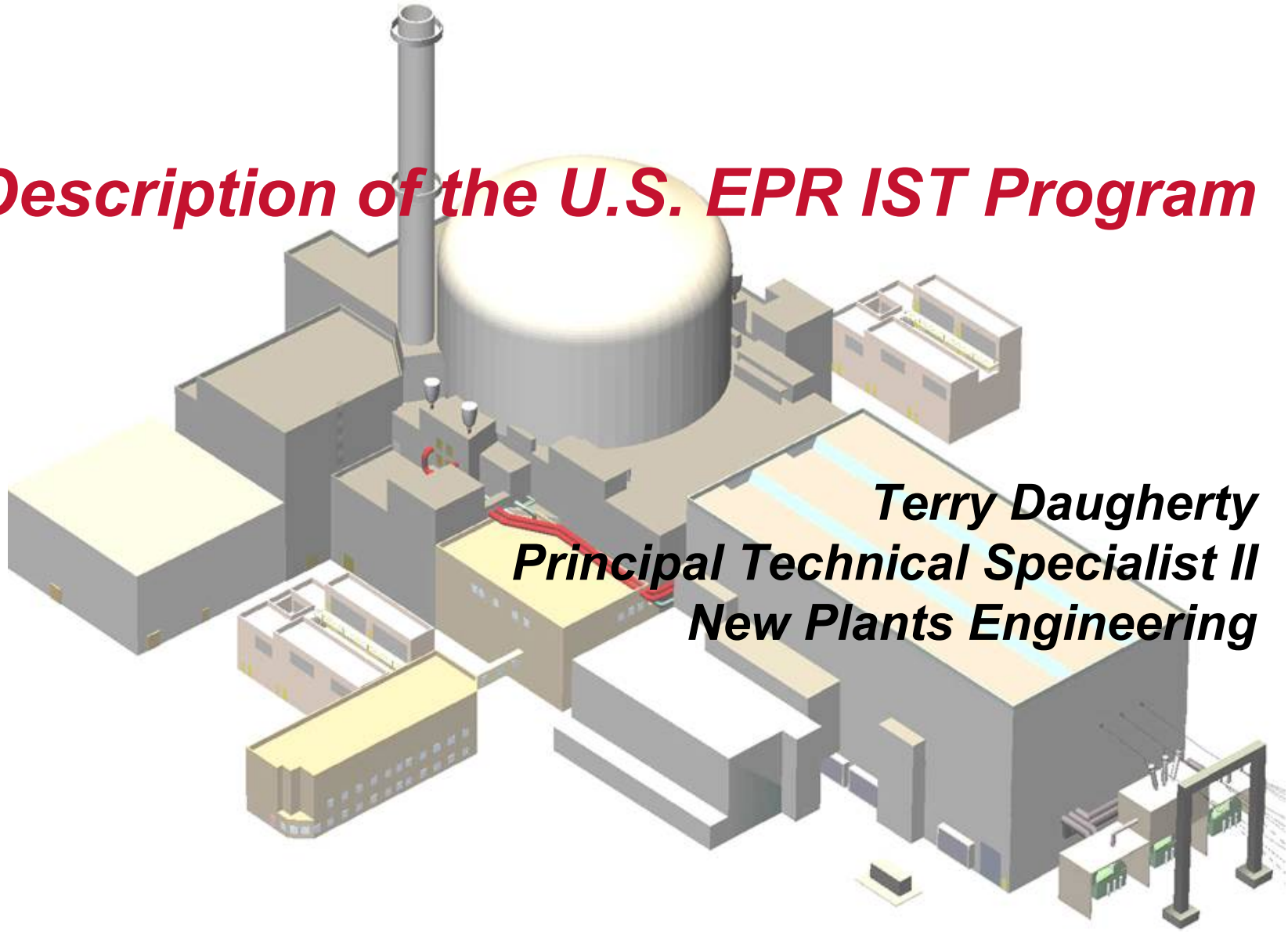
IST Review Status

- One RAI Batch received on the U.S. EPR FSAR IST Program (RAI No. 49).
  - Total of 12 questions.
  - Responses (including FSAR mark-ups) provided to NRC on September 18, 2008 and November 17, 2008.
- One RAI received on the CCNPP Unit 3 IST Program (RAI No. 46, Question 03.09.06-2).
  - Response to the question to be developed following this meeting.

COL Information Items

- Since the IST is "fully described" in the U.S. EPR FSAR, only the following information is required to be provided in the COL FSAR:
  - Site specific pumps and valves (COL Items 3.9-6 and 3.9-8).
  - Program implementation milestones (COL Item 3.9-13).
  - Submission of PST and IST programs following the start of construction and prior to the anticipated date of commercial operation (COL Item 3.9-7).
  - A table identifying the safety-related systems and components that use snubbers in their support systems (COL Item 3.9-12).

Description of the U.S. EPR IST Program



Terry Daugherty
Principal Technical Specialist II
New Plants Engineering

Overview

- U.S. EPR IST Program developed in accordance with the 2004 Edition of the ASME OM Code.
- U.S. EPR FSAR Tables 3.9.6-1 and 3.9.6-2 identifies the pumps and valves that are within the scope of the IST program with the exception of site specific pumps and valves.
- U.S EPR design layout permits IST to be performed in accordance with the OM Code requirements.
- The U.S. EPR FSAR IST description is at a level of detail for all COLs to use such that implementation choices by different COL applicants/holders will not materially or negatively affect the IST program effectiveness and acceptability.
- Program description was developed by individuals with prior experience in plant IST programs and consideration of regulatory guidance and past precedent associated with new reactors.
- Participation in ASME OM Code Committee and engagement with industry IST Program peers.

Program Basis

- Inservice Testing required by 10 CFR 50.55a(f):
  - 10 CFR 50.55a(b)(3) incorporates by reference (limitations and modifications) the 2004 Edition of the ASME OM Code.
  - U.S. EPR Design Certification code of record is ASME OM Code-2004, no Addenda.
  - Regulatory Guide 1.192 – ASME OM Case Acceptability.
  - NUREG 1482, Revision 1 – Guidelines for Inservice Testing at Nuclear Power Plants.
- Incorporates Guidance provided in:
  - Regulatory Guide 1.206.
  - SRP 3.9.6

Program Description for Pumps and Valves

- ASME OM Code Subsections ISTA, ISTB and ISTC.
- U.S. EPR FSAR Table 3.9.6-1 and 3.9.6-2 identifies pumps and valves respectively included in the program.
- Group A pumps are operated continuously or routinely during normal operation, cold shutdown, or refueling operations. Group B pumps are in standby systems that are not operated routinely, except for testing.
- Program applies to valves classified as ASME Code Class 1, 2, or 3 valves and non-ASME valves that perform a safety-related function.
- Reference values developed during preservice testing program.
- System design requirements documents contain functional layout criteria for testing.

Program Description for MOVs

- IST of ASME Section III Class 1, 2, and 3, and safety-related MOVs is performed in accordance with the OM Code, as required by 10 CFR 50.55a(f).
- Incorporates the guidance of ASME OM Code-2004, RG 1.192, NUREG-1482, GL 96-05, GL 89-10.
- Diagnostic equipment use to assess valve performance in both static and dynamic conditions.
  - Hard seat contact.
  - Margin to design basis considering potential inaccuracies.
  - Maximum torque/thrust within margin for structural and motor limits.

Program Description for Power-Operated Valves (POVs) other than MOVs

- The ability of POVs to perform their design-basis functions is verified either before installation or as part of preoperational testing performed during the initial plant startup test program, as described in U.S. EPR FSAR Section 14.2.
- This includes verification that solenoid-operated valves (SOVs) continue to be capable of performing their design-basis safety functions.
- Incorporates the guidance of GL 96-05, GL 89-10, and INPO operating experience.
- The IST program for POVs includes lessons learned as addressed in RIS 2000-03.

Program Description for Check Valves

- Check valve testing requires verification that obturator movement is in the direction required for the valve to perform its safety function.
- For check valves that perform a safety function in the open and closed directions, the valve is tested by initiating flow and observing whether or not the obturator moves to the full-open position.
- Verification of check valve functions is performed using approved diagnostic testing methods or by internal inspection methods as specified by ASME OM Code, NUREG-1482, Revision 1.

Program Description for Pressure Isolation Valve Leak Testing

- Pressure isolation valves (PIV) are the two normally closed valves, in series, within the RCPB that isolate the RCS from an attached low-pressure system.
- PIVs are classified as A or A/C in accordance with the provisions of Subsection ISTC-1300 of the OM Code.
- PIV seat leakage rate tests are conducted in accordance with Subsection ISTC-3630.
- PIV leakage tests are described further in the Technical Specifications.

Program Description for Containment Isolation Valve Leak (CIV) Testing

- CIVs are leak tested in accordance with 10 CFR Part 50, Appendix J.
- Additional information on CIVs is provided in U.S. EPR FSAR Sections 6.2.4 and 6.2.6.
- A list of CIVs included in the IST program is provided in U.S. EPR FSAR Table 3.9.6-2. U.S. EPR Section 6.2.4 also contains a list of CIVs.

Program Description for Safety and Relief Valves

- Safety and relief valve tests are conducted in accordance with Appendix I to the OM code.
- Power operated relief valves subject to the IST program are tested in accordance with Subsection ISTC-5100 for Category B valves and Subsection ISTC-5240 for Category C valves.

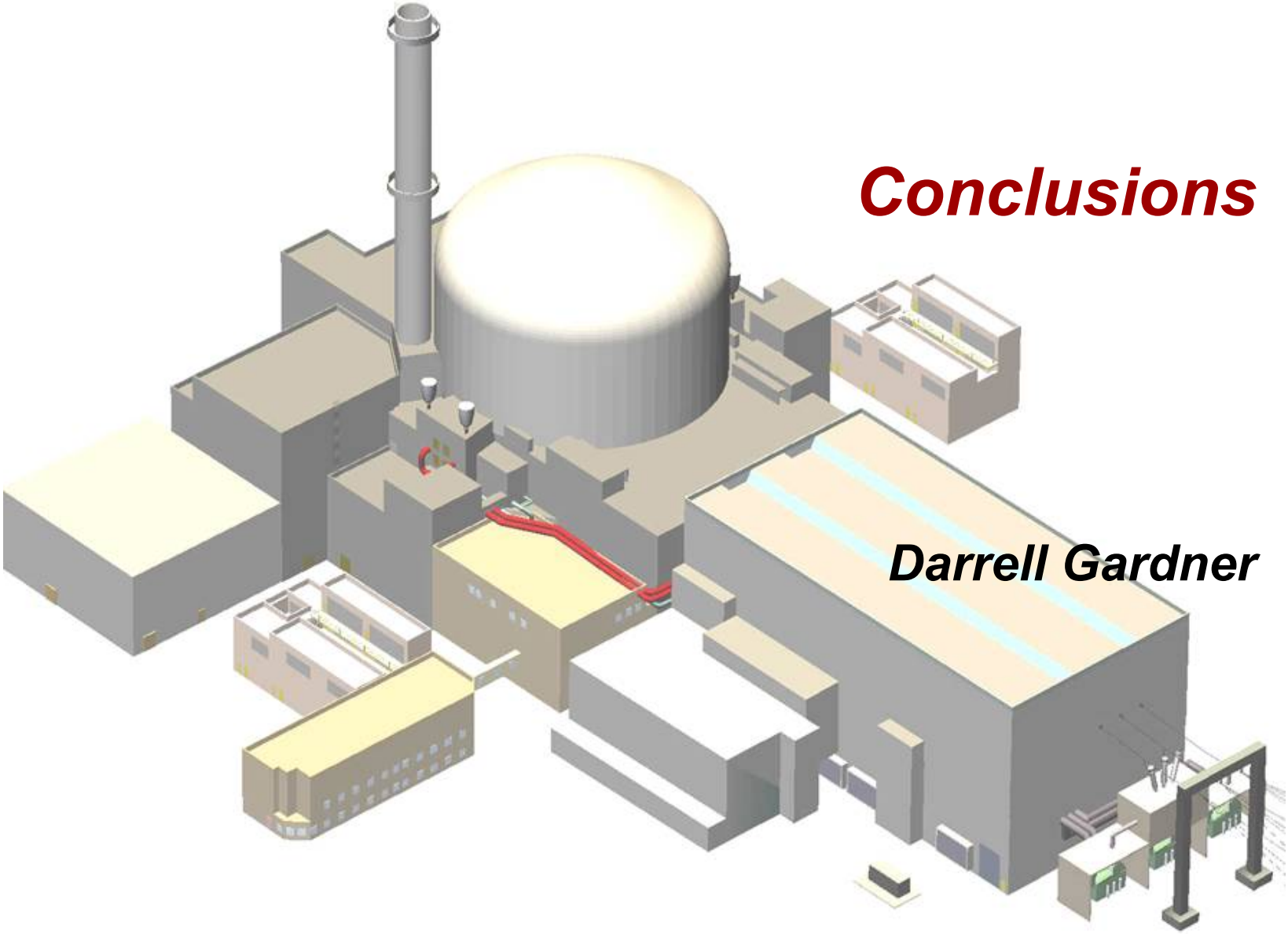
Program Description for Dynamic Restraints

- Snubbers are designed to meet the requirements of the ASME OM Code.
- The criteria for the size and location of the snubbers are further described in Section 6.6 of the NRC approved U.S. EPR Piping Analysis and Pipe Support Design Topical Report (ANP-10264NP-A), which also identifies the type of information to be provided in the design specification, as well as the design and analysis considerations that enable the snubbers to activate correctly for their design loadings.
- A COL applicant that references the U.S. EPR design certification will provide a table identifying the safety-related systems and components that use snubbers in their support systems.

Program Description for Dynamic Restraints (cont'd)

- **Program Description includes the following elements:**
  - **Snubber Installation - The correct installation and operation of snubbers is confirmed as part of the ITP described in Section 14.2.**
  - **Snubber Examination and Testing Program - Snubber PST and IST are performed in accordance with the ASME OM Code Subsection ISTD.**
  - **Functional testing – Addresses both preservice and inservice functional testing.**
  - **Service Life Monitoring.**

Conclusions



Darrell Gardner

Conclusions

- U.S. EPR FSAR contains a "fully described" IST Program covering both the design and operational related elements of the IST program.
- Purpose is to maximize standardization through a "fully described" program in the U.S. EPR design certification application.
- IST Program includes current regulatory guidance and incorporates lessons learned from operating experience.
- Only elements that need to be specifically addressed by the COL applicants are site specific components, implementation milestones, and identifying snubbers used in safety-related systems.

AREVA

PURE ENERGY