

ENCLOSURE 4

Westinghouse Non-Proprietary Class 3

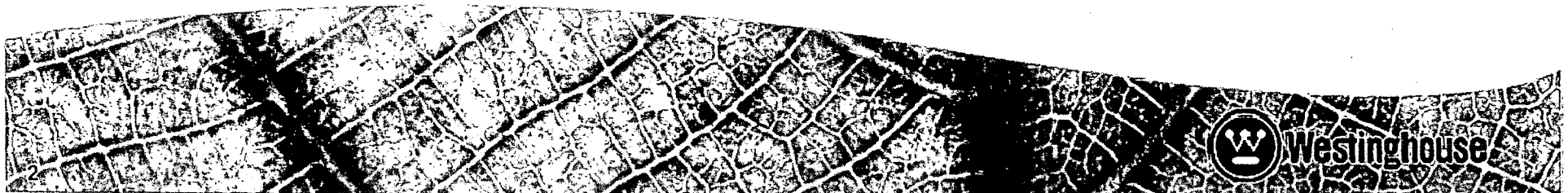
AP1000 RCP Casing: Cast Stainless Steel Weld Inspectability
8/26/10 Presentation – (Non-Proprietary)

AP1000 RCP Casing: Cast Stainless Steel Weld Inspectability

Westinghouse Electric Company

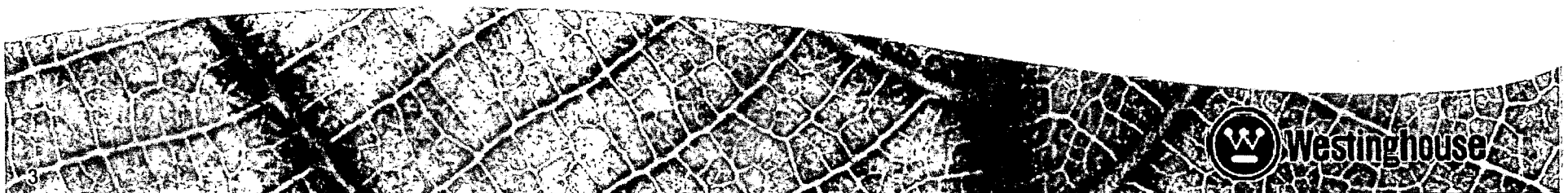
Agenda

- Safety Brief
- Purpose of the Meeting
- Compliance with DCD and ASME Code Requirements
- AP1000 RCP Casing Configuration and Examination Categories
- Current Volumetric (UT) Inspection Requirements
- Inspection Solutions
- Estimated Schedule
- Conclusions
- Questions and Actions



Purpose of the Meeting

- Provide technical information on WEC examination plans for the RCP-SG and the RCP-MCL welds
- Demonstrate proactive approach consistent with current industry practice for Class 1 dissimilar and similar metal welds
- Provide schedule for actions
- Develop future communication plans



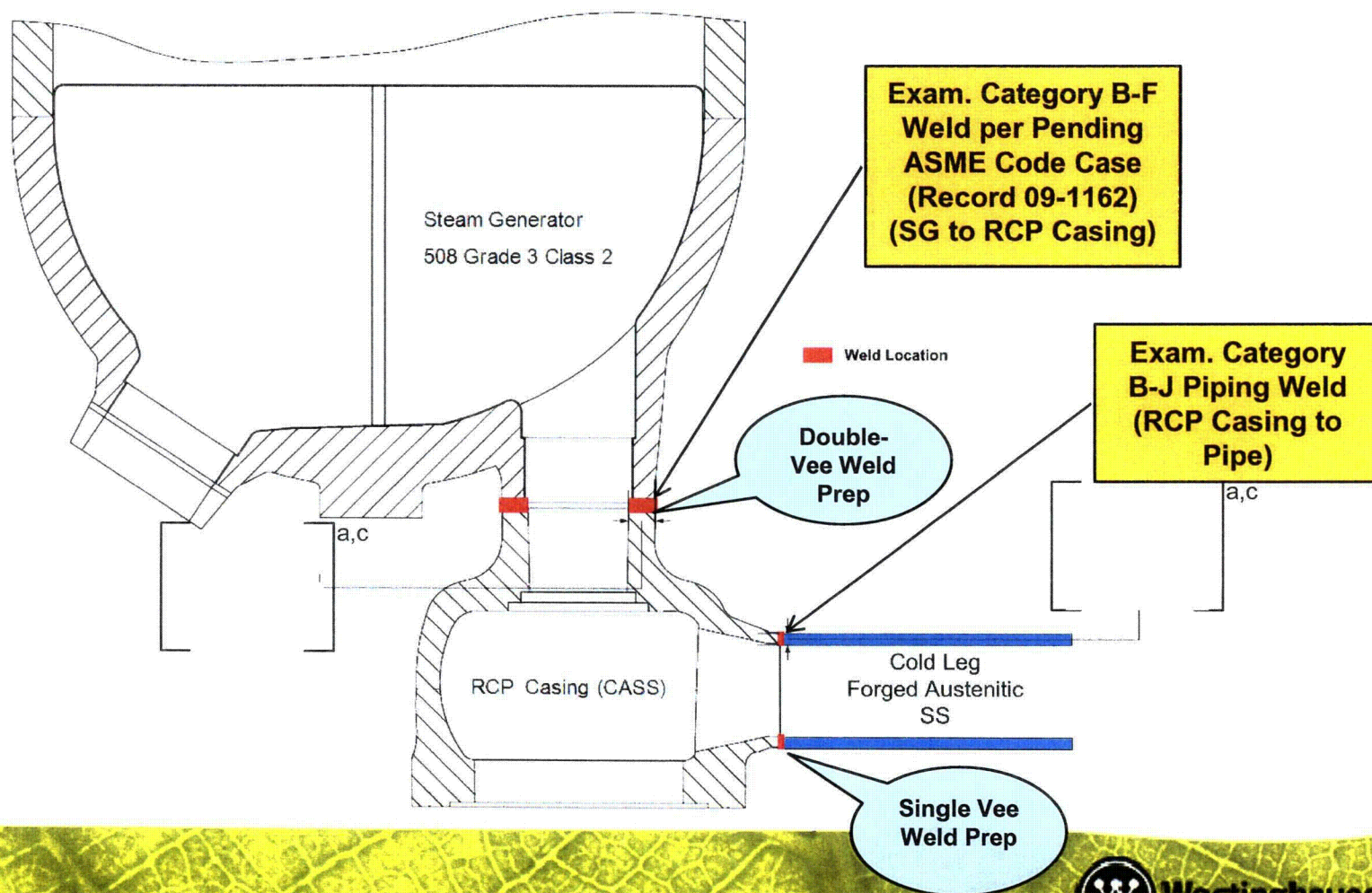
Compliance with DCD and ASME Code Requirements

- The DCD mandates compliance with the following:
 - Access for inspection per Section XI, IWA-1500
 - Examination methods of Section XI, IWA-2200 (visual, surface, volumetric)
 - Volumetric – UT, RT

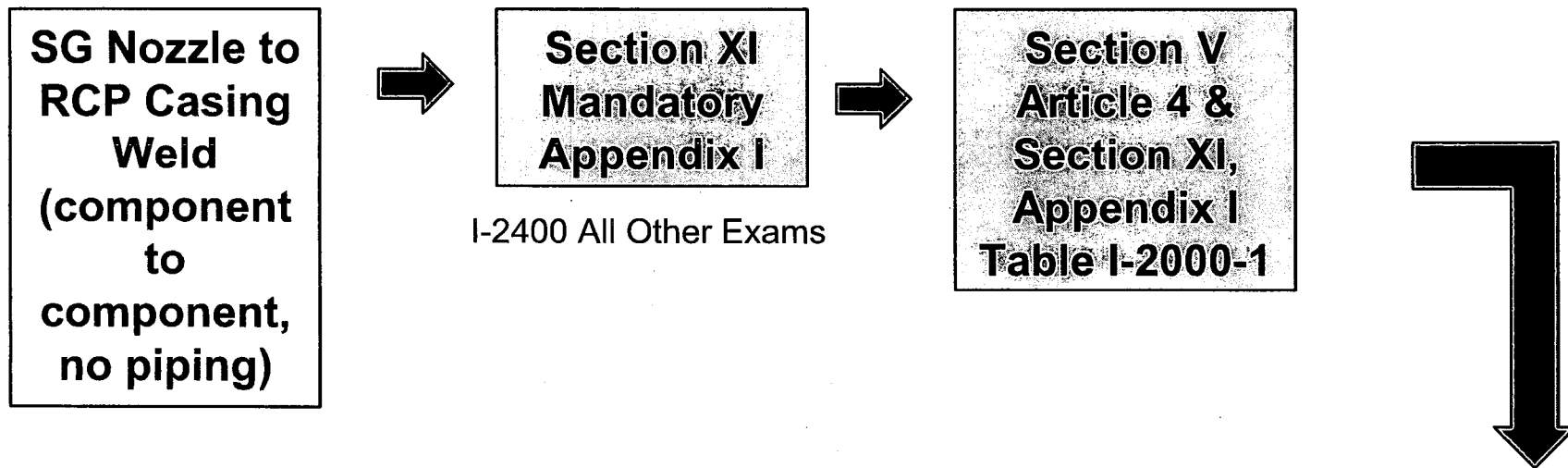
The S/G Outlet Nozzle to RCP Casing weld and RCP Casing to Main Coolant Loop Piping weld are included in these requirements



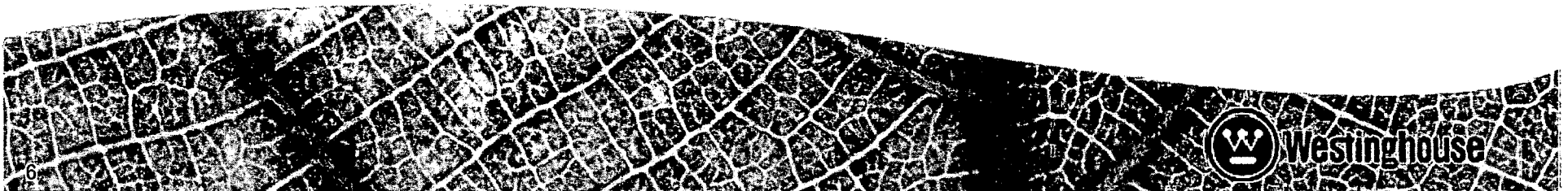
AP1000 RCP Casing Configuration and ASME Code Examination Categories



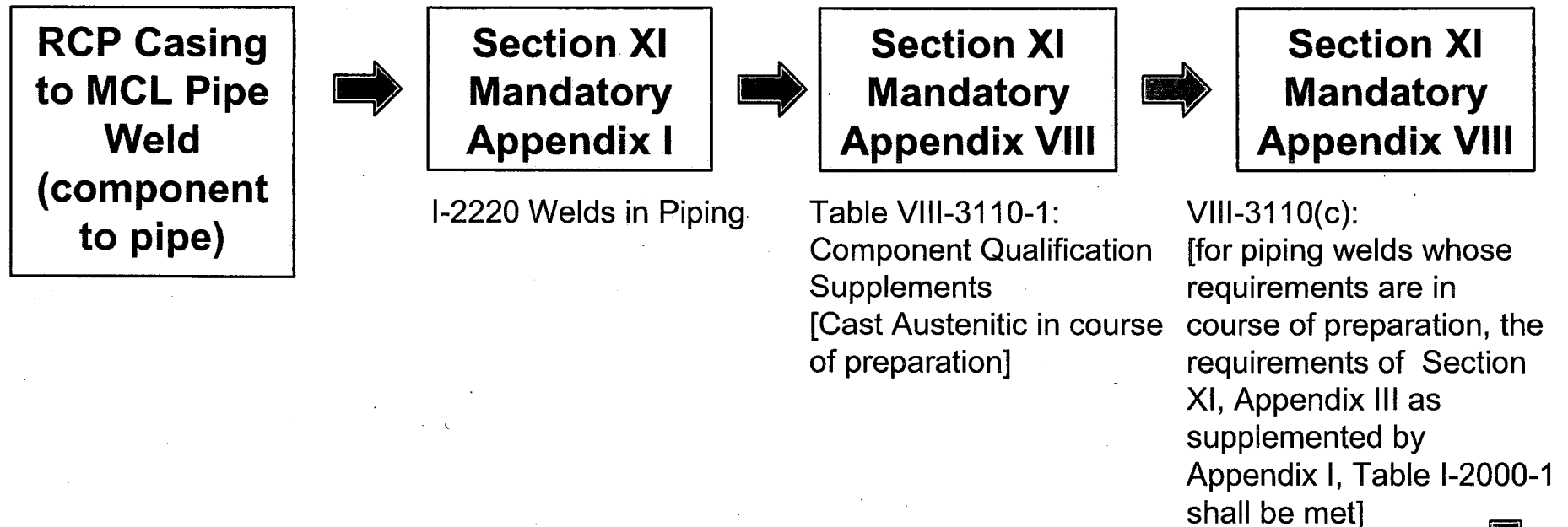
Current Volumetric (UT) Requirements - ASME Section XI Inspection Logic for CASS Materials



- PSI/ISI logic is currently defined per Code rules
- No performance demonstration requirements



Current Volumetric (UT) Requirements - ASME Section XI Inspection Logic for CASS Materials



- PSI/ISI logic is currently defined for cast SS materials per Code rules
- No performance demonstration requirements for cast SS materials
- Appendix VIII, Supplement 2 applicable for wrought SS of MCL pipe side of weld

**Section XI
Mandatory
Appendix III**

Supplement 1 –
Austenitic and
Dissimilar Metal Welds



Westinghouse

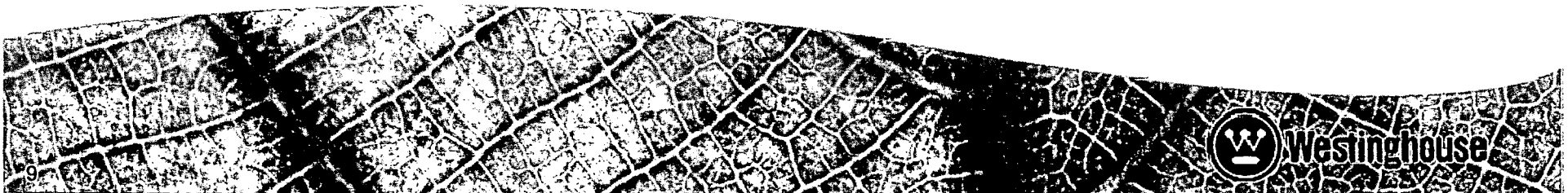
Compliance with DCD and Code Requirements

- For radiographic examination the requirements are defined in IWA-2231 and Section V, Article 2



Compliance with DCD and Code Requirements

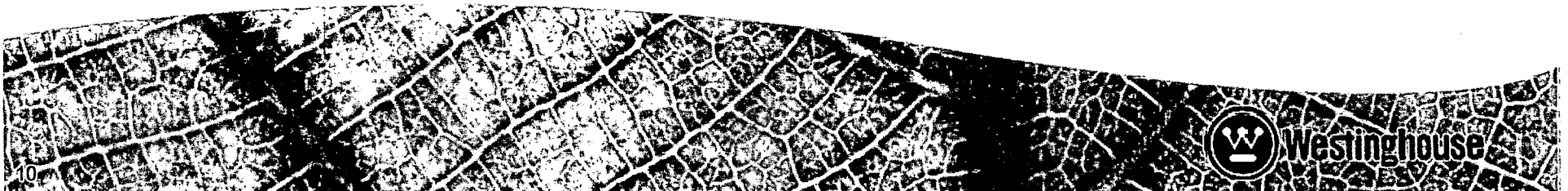
- The current design of the RCP casing attachment welds satisfy all DCD and ASME Section XI requirements for examination
- No relief is needed to meet the applicable DCD and ASME Section XI requirements



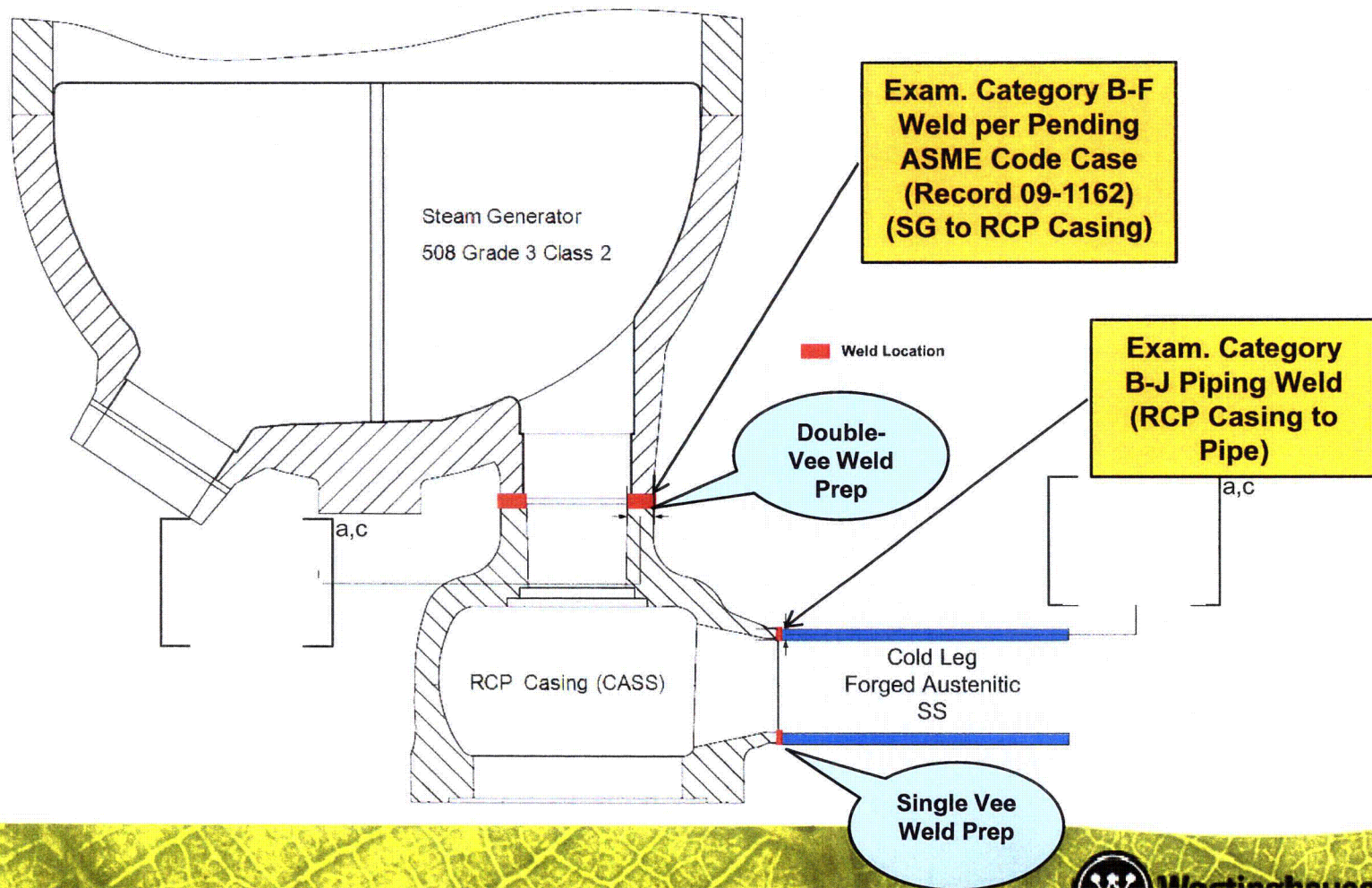
Changing Environment

- The use of radiography for pre-service and in-service inspection is being challenged
- Performance demonstration of UT inspection systems is expected

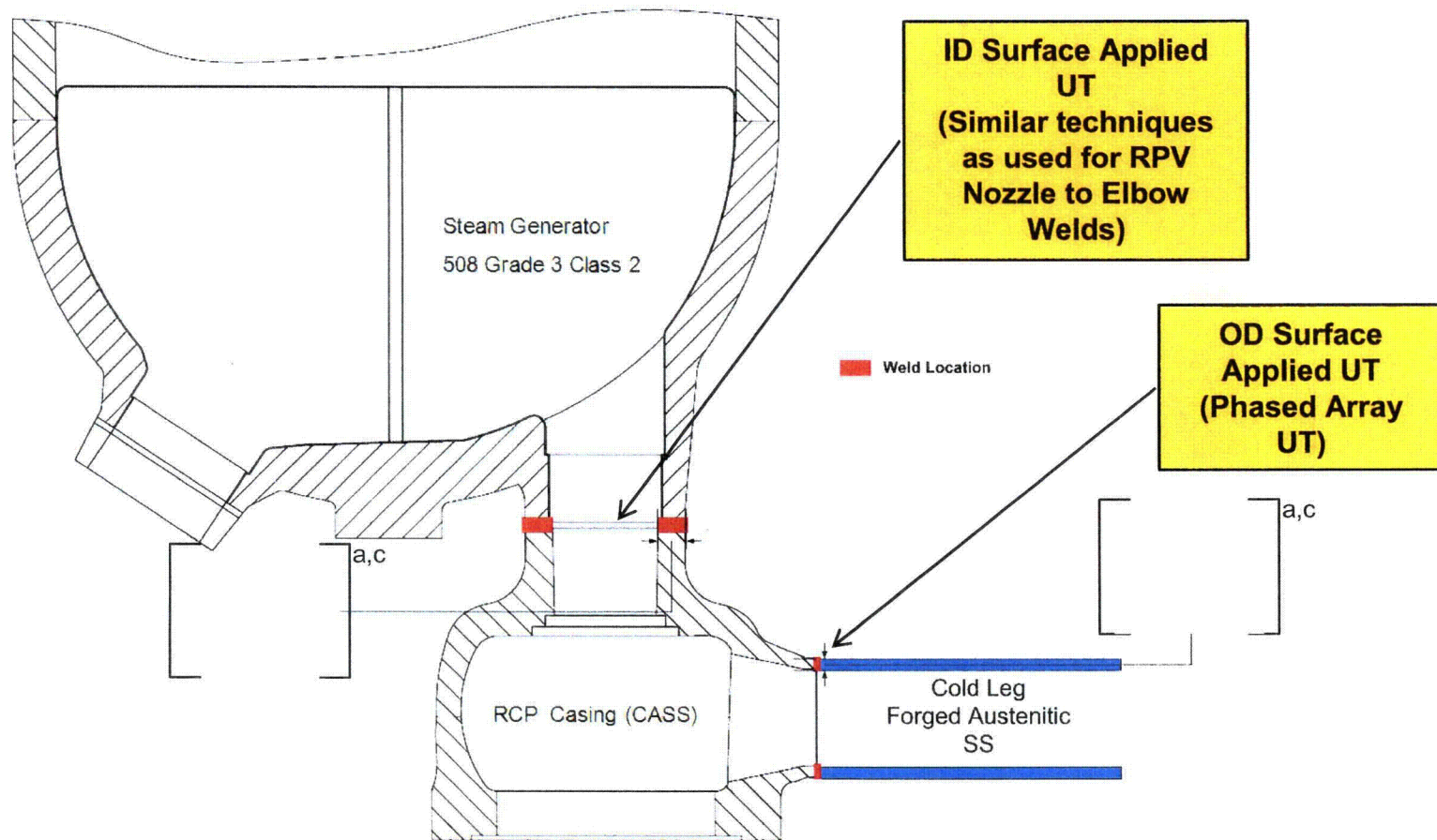
As such, Westinghouse and the COL applicants are looking beyond current requirements



AP1000 RCP Casing Configuration and ASME Code Examination Categories

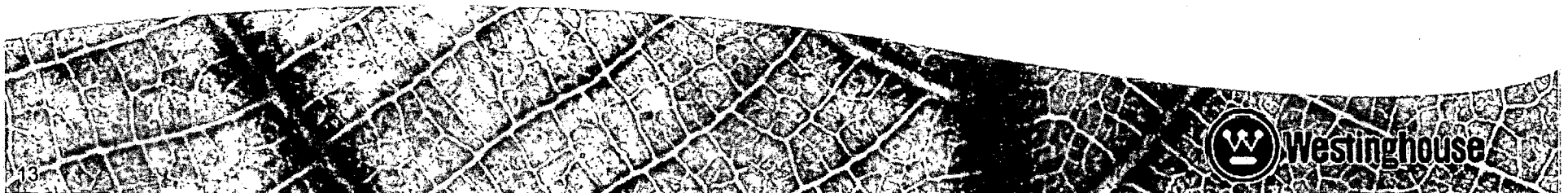


AP1000 RCP Casing Weld UT Inspection Logic for PSI/ISI



Inspection Solution Approach

- Consistent with ASME Code Section XI, Appendix VIII and PDI requirements, where applicable (i.e. diameter and thickness ranges) assuming non-cast SS materials
- Incorporate performance demonstration consistent with methodology in ASME Code Section V, Article 14 for procedures and personnel for the cast SS materials
- Use EPRI as the PDA



Inspection Solution Project Team

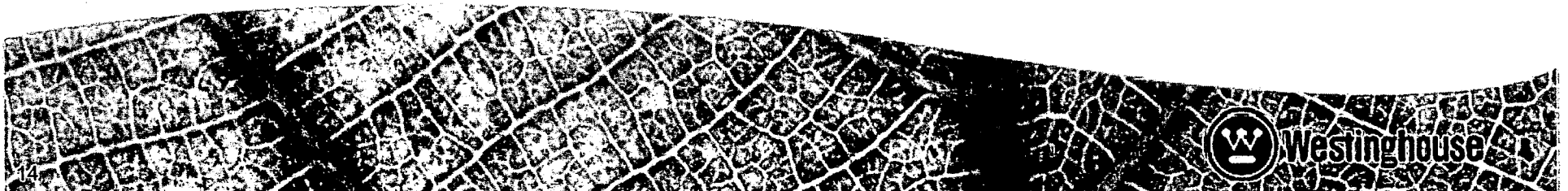
Implementers

- Westinghouse
- WesDyne
- EPRI



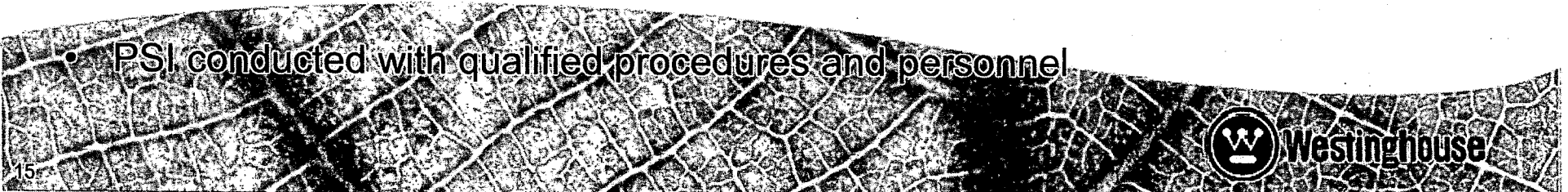
Technical Advisory Team

- Westinghouse
- WesDyne
- EPRI
- Southern Nuclear
- SCANA



Inspection Solution Plan

- EPRI to fabricate 2 qualification test specimens representative of each weld configuration; one 'open' specimen and one 'blind' specimen
- A technical justification is prepared for each weld configuration and submitted to EPRI for independent assessment
- A procedure performance demonstration (non-blind) is conducted for each weld configuration with EPRI as the administrator in accordance with EPRI/PDI protocol document
- Personnel performance demonstrations (blind) are conducted for each weld configuration with EPRI as the administrator in accordance with EPRI/PDI protocol document
- PSI conducted with qualified procedures and personnel



Qualification Test Specimens (Mockups)

- Qualification flaw matrix defined in the technical justifications
- Specimens (particularly blind specimens) designed and fabricated by EPRI
- Blind specimens controlled under the EPRI/PDI protocol document



Inspectability Assessment of Materials

- Secondary Program Objective:
 - Develop a non-destructive in-shop process by which the inspectability of CASS RCP pump casing material (production) can be determined to be within the bounds of the PSI performance demonstration. Possible methods:
 - Comparison of through-wall macrostructures (macro-etch comparison)
 - UT characterization (attenuation, degree of beam skewing, shear/longitudinal wave ratios, etc.)



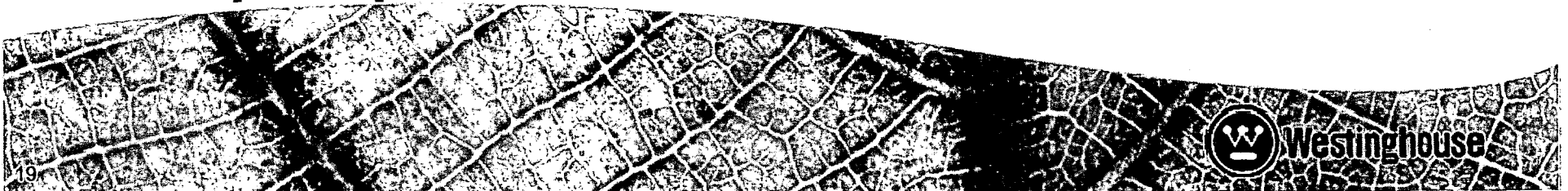
EPRI Involvement

- Design and fabricate representative flaws in the cast materials while minimizing changes in base material
- Design and fabricate flawed mockups in a controlled manner consistent with EPRI/PDI protocol document
- Maintain confidentiality of the 'blind' mockups consistent with EPRI/PDI protocol document
- Parallel developments on the inspection of cast materials
- Conduct of procedure and personnel performance demonstrations consistent with EPRI/PDI protocol document



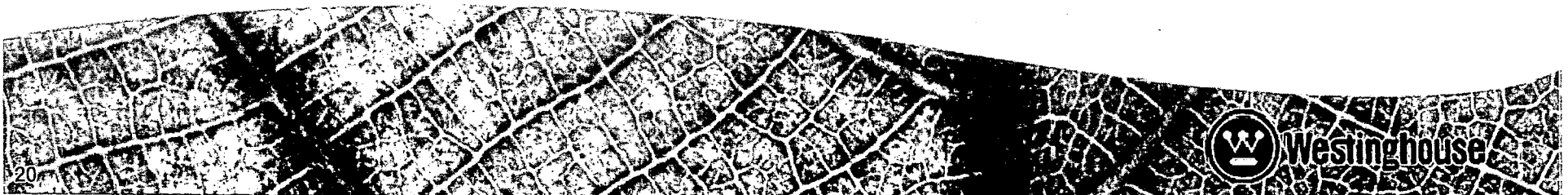
Tentative Schedule

- Acquisition of Test Specimen Materials – []^{a,c} [long lead items]
- Test Specimens Design – []^{a,c}
- Technical Justifications (1st Issue) Development – []^{a,c}
- Non-Blind Test Specimens Completion – []^{a,c}
- Inspection Procedures Final Development – []^{a,c}
- Blind Test Specimens Completion – []^{a,c}
- Procedure Performance Demonstrations – []^{a,c}
- Personnel Performance Demonstrations – []^{a,c}
- Technical Justifications (Final Issue) – []^{a,c}
- PSI – []^{a,c}



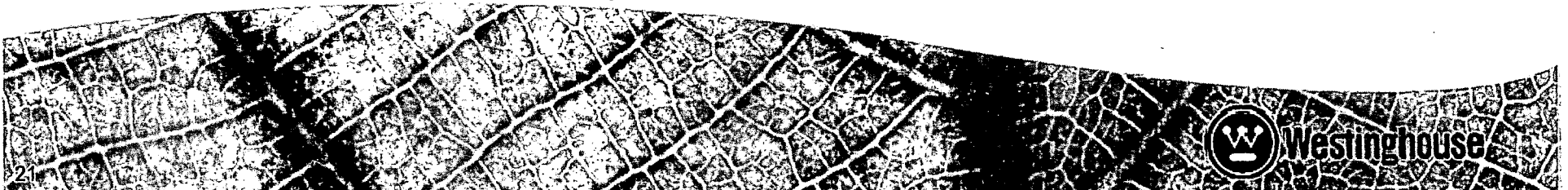
Project Challenges

- Schedule
- Inspectability of cast SS materials
- Realistic flaws suitable for qualification purposes



Conclusions

- Westinghouse moving forward with new plant customers to develop high quality, proactive plant specific demonstration program for the RCP/SG and RCP/MCL connection welds
- Work will be consistent with Industry Standards for demonstration program
- Results of demonstration program not directly applicable to existing plants; specific to AP1000 materials and configurations
- Goal to keep NRC informed of progress and maintain periodic communications and be open to feedback



Future Direction

- Results of work can be factored into the ASME Code process to the extent practical



QUESTIONS & ACTIONS

