Final Slides for WCAP-15942-P-A, Supplement 1, "ZIRLO® Channels for SVEA-96 Optima2 Fuel Assemblies" Pre-submittal Meeting with the NRC (Non-Proprietary)

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Pre-submittal Meeting for ZIRLO® Channels

WCAP-15942-P-A, Supplement 1

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Pre-Submittal Meeting Agenda

- Introductions
- Background Information
- Implementation and Licensing Approach
- Technical Details on ZIRLO® Channels
- Schedule
- Topical Report Format
- Summary

Background Information

- WCAP-15942-P-A, "Fuel Assembly Mechanical Design Methodology for Boiling Water Reactors, Supplement 1 to CENPD-287"
  - Approved in March 2006
  - Updated codes and methodology from CENPD-287 (1996)
    - STAV 6.2 → STAV 7.2
    - VIK-2 → VIK-3
    - COLLAPS-II → COLLAPS-3.3D
  - Extended Rod-average Burnup from 50 GWD/MTU to 62 GWD/MTU
  - Provided application of the new methodology to the SVEA-96 Optima2 fuel assembly design.
  - NRC Review based on NUREG-0800, Section 4.2 "Fuel System Design"

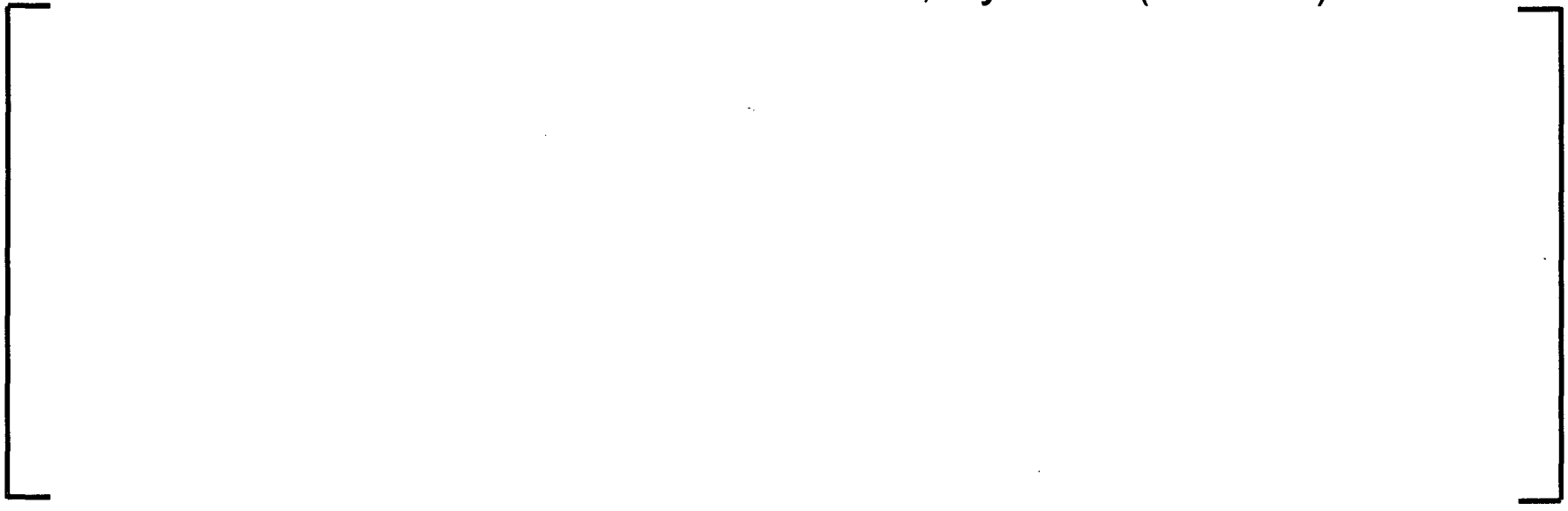
Background Information (cont.)

- WCAP-15942-P-A, "Fuel Assembly Mechanical Design Methodology for Boiling Water Reactors, Supplement 1 to CENPD-287"
  - The SER for WCAP-15942-P-A allows for fuel design changes to accommodate plant compatibility issues: a, c

[redacted]

ZIRLO® Channel Implementation in US

- Current plans are to initially implement SVEA-96 Optima2 fuel assemblies with ZIRLO® Channels as Lead Test Assemblies (LTA's)
  - 8 ZIRLO® Channels in Quad Cities Unit 1, Cycle 22 (6/2011)
  - 8 ZIRLO® Channels in Dresden Unit 2, Cycle 23 (11/2011) a, c, e



ZIRLO® Channel Licensing Approach

[ ] a, c

Channel Materials

a, c

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ZIRLO® History

- ZIRLO® was originally developed for PWR fuel
  - PWR standard for many years
    - Cladding as well as skeleton
- ZIRLO® is characterized by
  - Low corrosion rate
  - Good mechanical properties
  - Low irradiation growth and creep rate

[ ] a, b, c

[ ] a, b, c

Data implies ZIRLO® also behaves well for BWRs

Potential Life Limiting Phenomena

a, c

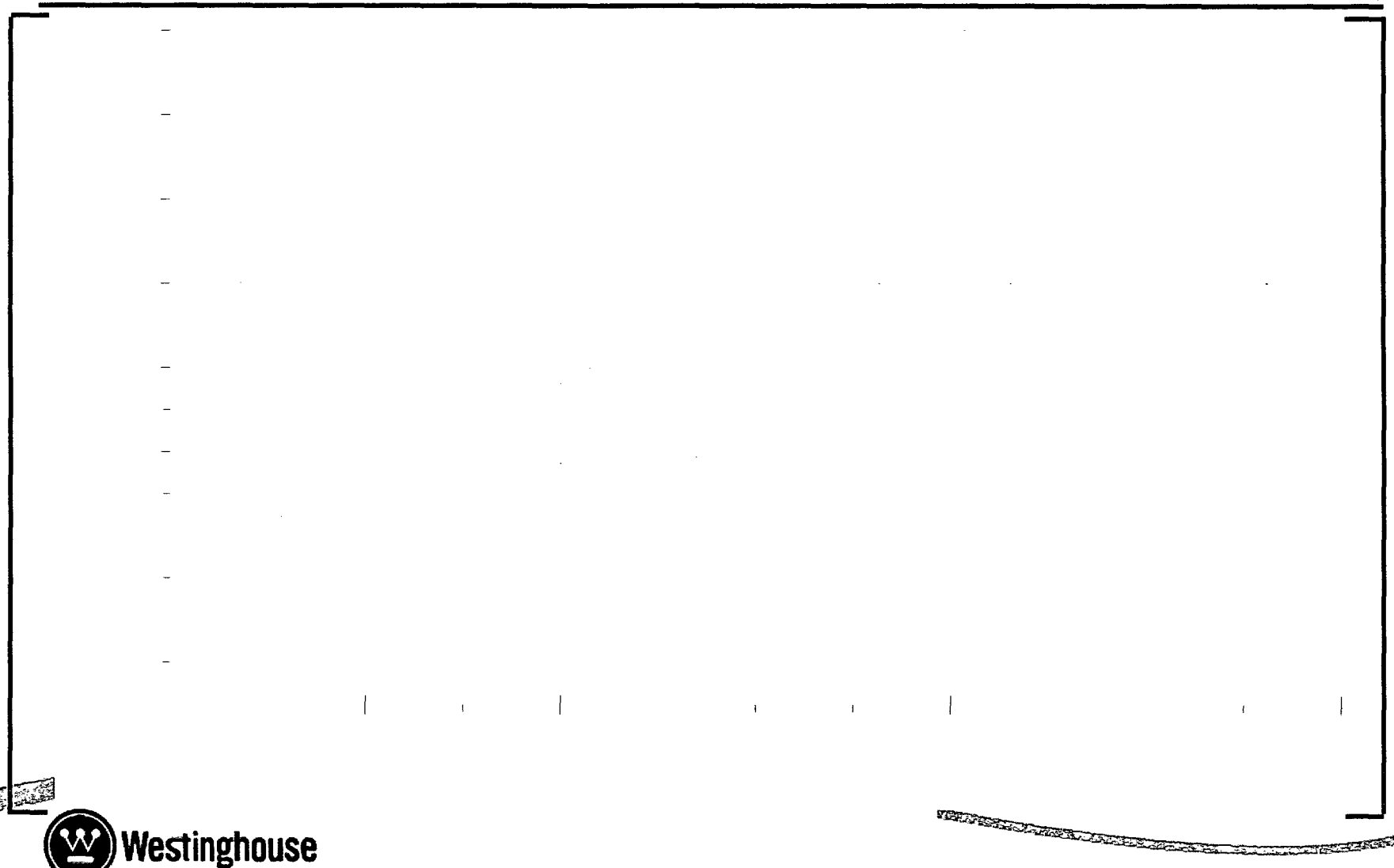
[ ]

Lead Fuel Assemblies with ZIRLO® Channels

a, c

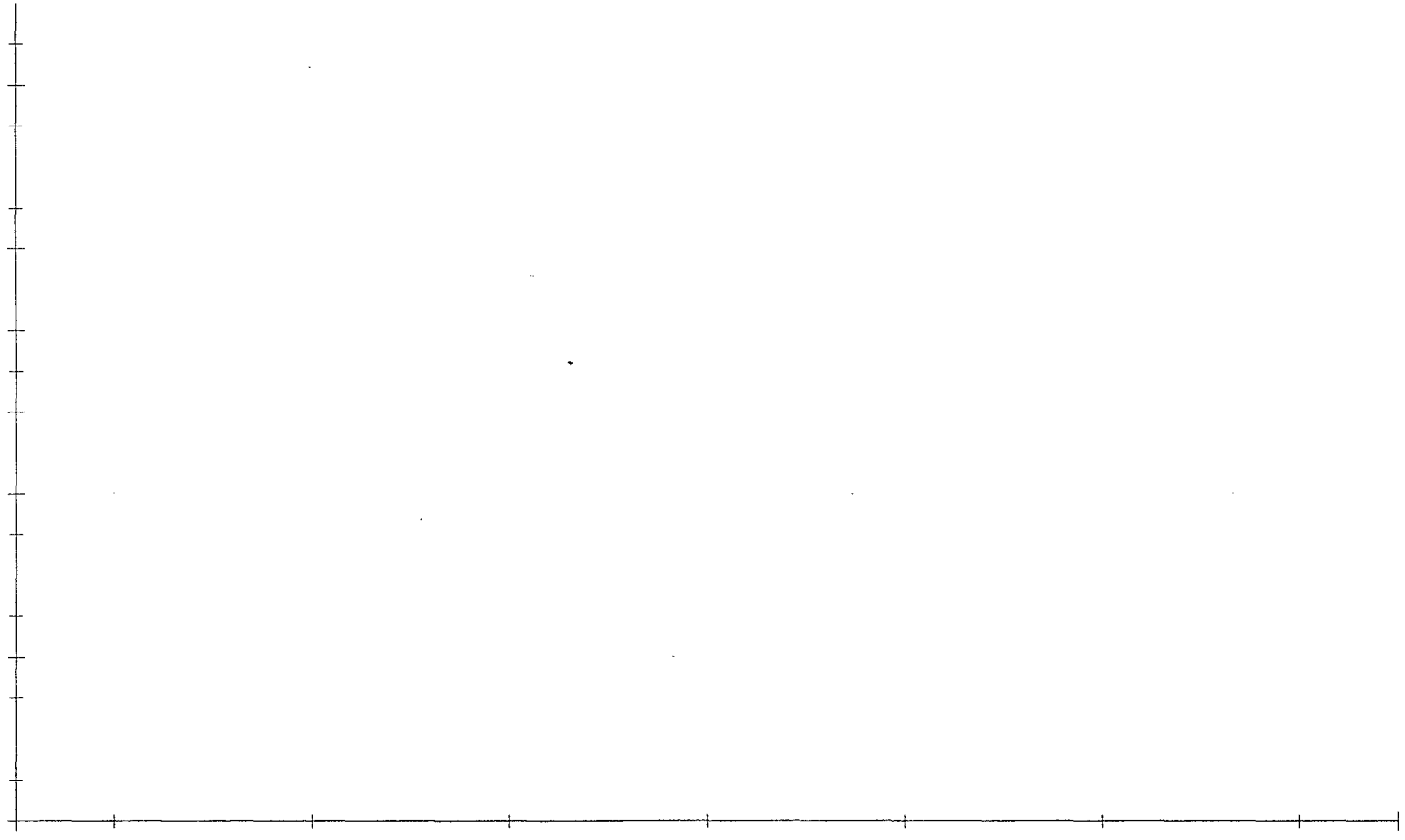
Channel Corrosion

a, b, c



Channel Growth

a, b, c



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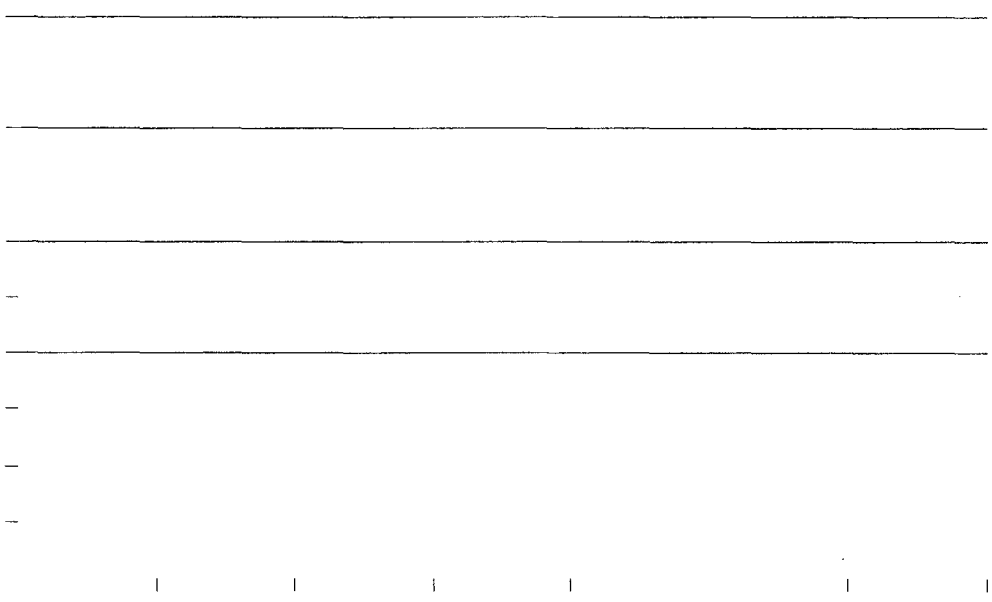
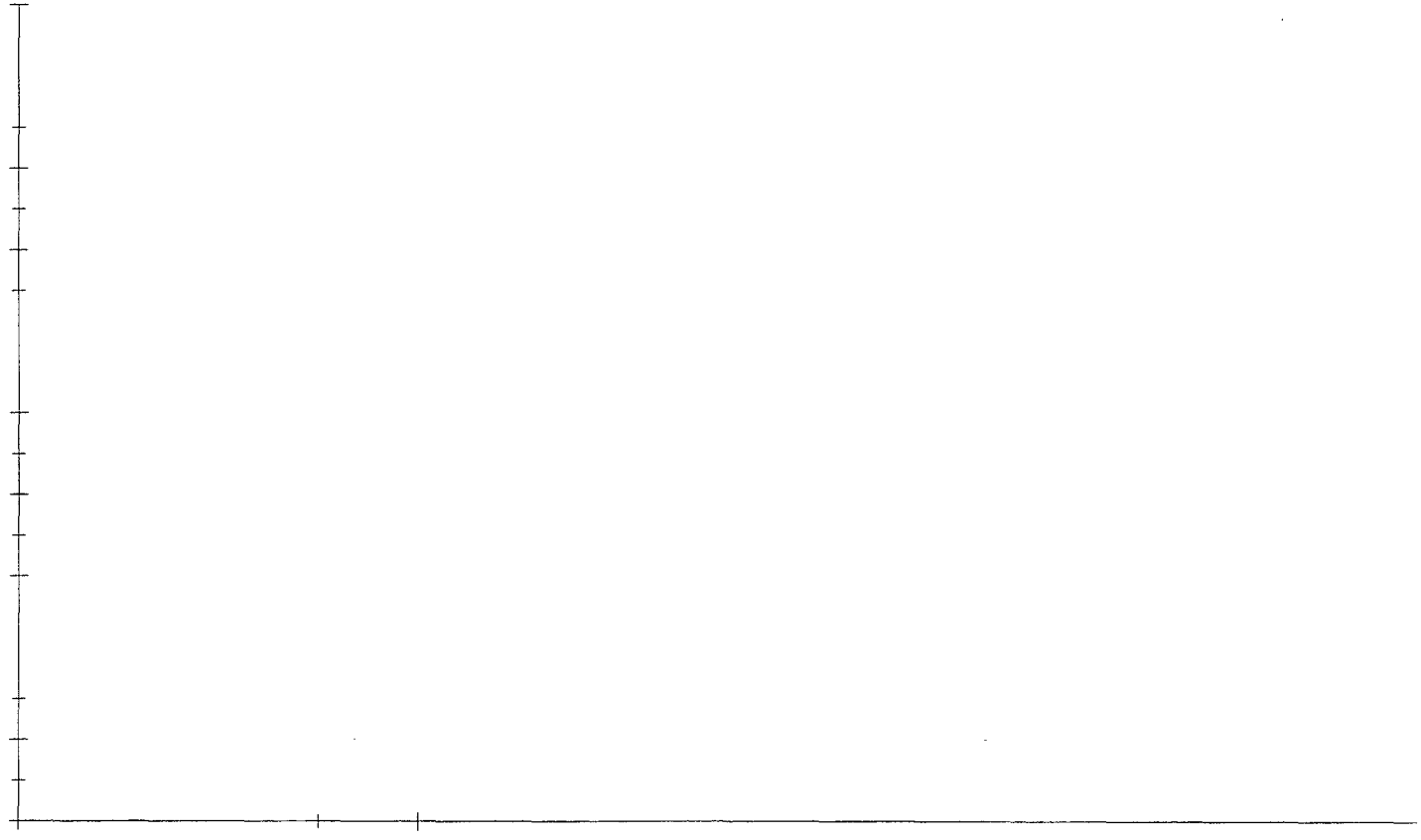
Hydrogen Impact on Growth

a, b, c

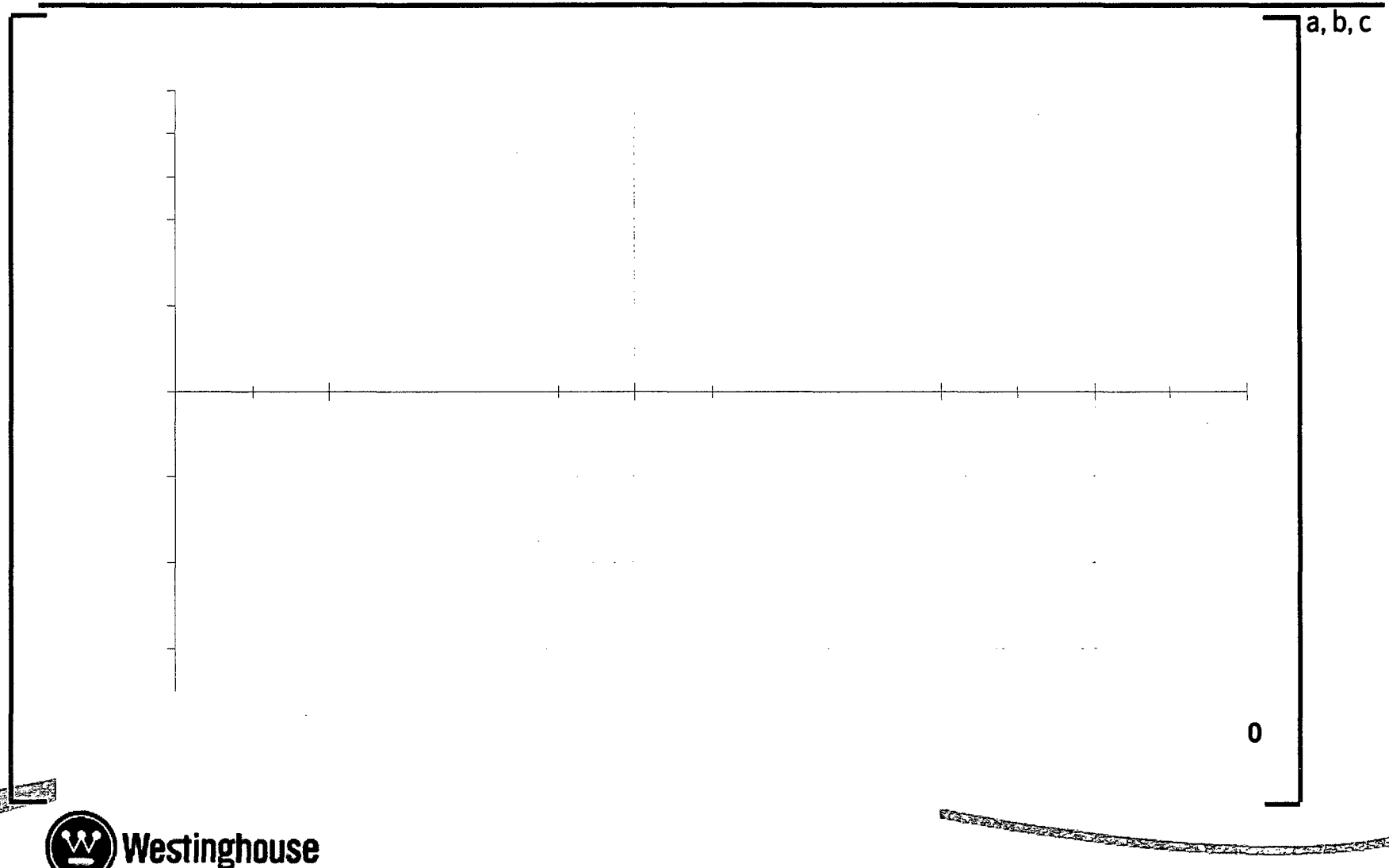


Hydrogen Content Based on Growth

a, b, c



Channel Bow



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ZIRLO® Channel Inspection

a, c, e

Future Verification

[a, c, e]

Future Inspection Plans

a, c, e

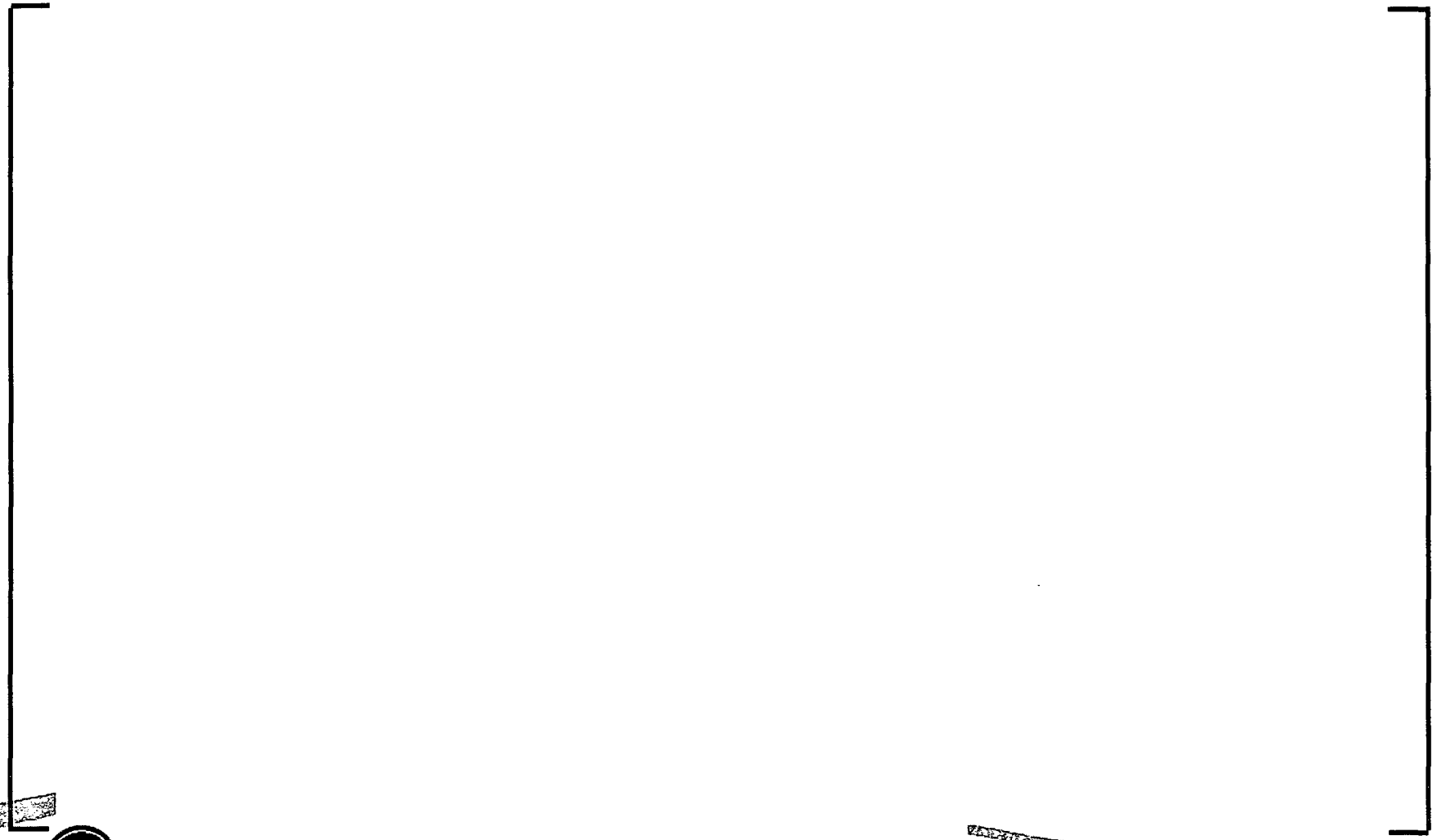
[ ]

Implementation Schedule

a, c

Topical Report Format

a, c



Summary

- The primary operational issue with BWR fuel is channel distortion and bowing

a, c