FRAMATOME COGEMA FUELS

July 25, 2000
GR00-084.doc

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Subject: NRC/FCF Meeting on Fuel Performance and Licensing

Gentlemen:

Enclosed is the information to be discussed with the NRC staff on July 26, 2000. FCF requests in accordance with 10CFR2.790 that this information be considered proprietary. An affidavit supporting this request is included as Attachment 1. Attachment 2 is the proprietary version of the material. Attachment 3 is the non-proprietary version.

Very truly yours,

T A Coleman

T. A. Coleman, Vice President
Government Relations

cc: S. N. Bailey, NRC
M. S. Chatterton, NRC
R. Caruso, NRC
J. S. Wermiel, NRC
M. A. Schoppman

FRAMATOME TECHNOLOGIES

Framatome Cogema Fuels
3315 Old Forest Road, P.O. Box 10935, Lynchburg, VA 24506-0935
Telephone: 804-832-3000 Fax: 804-832-3663

T007

Attachment 1

Affidavit for Proprietary Classification Materials Presented to NRC on July 26, 2000

AFFIDAVIT OF THOMAS A. COLEMAN

A. My name is Thomas A. Coleman. I am Vice President of Government Relations for Framatome Cogema Fuels (FCF). Therefore, I am authorized to execute this Affidavit.

B. I am familiar with the criteria applied by FCF to determine whether certain information of FCF is proprietary and I am familiar with the procedures established within FCF to ensure the proper application of these criteria.

C. In determining whether an FCF document is to be classified as proprietary information, an initial determination is made by the Unit Manager, who is responsible for originating the document, as to whether it falls within the criteria set forth in Paragraph D hereof. If the information falls within any one of these criteria, it is classified as proprietary by the originating Unit Manager. This initial determination is reviewed by the cognizant Section Manager. If the document is designated as proprietary, it is reviewed again by personnel and other management within FCF as designated by the Vice President of Government Relations to assure that the regulatory requirements of 10 CFR Section 2.790 are met.

D. The following information is provided to demonstrate that the provisions of 10 CFR Section 2.790 of the Commission's regulations have been considered:

(i) The information has been held in confidence by FCF. Copies of the document are clearly identified as proprietary. In addition, whenever FCF transmits the information to a customer, customer's agent, potential customer or regulatory agency, the transmittal requests the recipient to hold the information as proprietary. Also, in order to strictly limit any potential or actual customer's use of proprietary information, the substance of the following provision is included in all agreements entered into by FCF, and an equivalent version of the proprietary provision is included in all of FCF's proposals:

"Any proprietary information concerning Company's or its Supplier's products or manufacturing processes which is so designated by Company or its Suppliers and disclosed to Purchaser incident to the performance of such contract shall remain the property of Company or its Suppliers and is disclosed in confidence, and Purchaser shall not publish or otherwise disclose it to others without the written approval of Company, and no rights, implied or otherwise, are granted to produce or have produced any products or to practice or cause to be practiced any manufacturing processes covered thereby.

Notwithstanding the above, Purchaser may provide the NRC or any other regulatory agency with any such proprietary information as the NRC or such other agency may require; provided, however, that Purchaser shall first give Company written notice of such proposed disclosure and Company shall have the right to amend such proprietary information so as to make it non-proprietary. In the event that Company cannot amend such proprietary information, Purchaser shall, prior to disclosing such information, use its best efforts to obtain a commitment from NRC or such other agency to have such information withheld from public inspection.

Company shall be given the right to participate in pursuit of such confidential treatment."

(ii) The following criteria are customarily applied by FCF in a rational decision process to determine whether the information should be classified as proprietary. Information may be classified as proprietary if one or more of the following criteria are met:

a. Information reveals cost or price information, commercial strategies, production capabilities, or budget levels of FCF, its customers or suppliers.

b. The information reveals data or material concerning FCF research or development plans or programs of present or potential competitive advantage to FCF.

c. The use of the information by a competitor would decrease his expenditures, in time or resources, in designing, producing or marketing a similar product.

d. The information consists of test data or other similar data concerning a process, method or component, the application of which results in a competitive advantage to FCF.

e. The information reveals special aspects of a process, method, component or the like, the exclusive use of which results in a competitive advantage to FCF.

f. The information contains ideas for which patent protection may be sought.

The document(s) listed on Exhibit "A", which is attached hereto and made a part hereof, has been evaluated in accordance with normal FCF procedures with respect to classification and has been found to contain information which falls within one or more of the criteria enumerated above. Exhibit "B", which is attached hereto and made a part hereof, specifically identifies the criteria applicable to the document(s) listed in Exhibit "A".

(iii) The document(s) listed in Exhibit "A", which has been made available to the United States Nuclear Regulatory Commission was made available in confidence with a request that the document(s) and the information contained therein be withheld from public disclosure.

(iv) The information is not available in the open literature and to the best of our knowledge is not known by Combustion Engineering, Siemens, General Electric, Westinghouse or other current or potential domestic or foreign competitors of Framatome Cogema Fuels.

(v) Specific information with regard to whether public disclosure of the information is likely to cause harm to the competitive position of FCF, taking into account the value of the information to FCF; the amount of effort or money expended by FCF developing the information; and the ease or difficulty with which the information could be properly duplicated by others is given in Exhibit "B".

E. I have personally reviewed the document(s) listed on Exhibit "A" and have found that it is considered proprietary by FCF because it contains information which falls within one or more of the criteria enumerated in Paragraph D, and it is information which is customarily held in confidence and protected as proprietary information by FCF. This report comprises information utilized by FCF in its business which afford FCF an opportunity to obtain a

competitive advantage over those who may wish to know or use the information contained in the document(s).

T A Coleman

THOMAS A. COLEMAN

State of Virginia)
) SS. Lynchburg
City of Lynchburg)

Thomas A. Coleman, being duly sworn, on his oath deposes and says that he is the person who subscribed his name to the foregoing statement, and that the matters and facts set forth in the statement are true.

T A Coleman

THOMAS A. COLEMAN

Subscribed and sworn before me
this 25th day of July, 2000.

Wanda L. Wade
Notary Public in and for the City
of Lynchburg, State of Virginia.

My Commission Expires 8/31/01

EXHIBITS A & B

EXHIBIT A

Materials handed out at NRC/Framatome Cogema Fuels Meeting on July 26, 2000

EXHIBIT B

The above listed materials contain information which is considered Proprietary in accordance with Criteria b, c, and d of the attached affidavit.

Attachment 3

FCF/NRC Meeting on Fuel Performance and Licensing July 26, 2000

Agenda

I. Introduction - T. A. Coleman

II. Fuel Performance - A. B. Copsey

III. Licensing Activity - C. F. McPhatter

IV. Discussion

V. Conclusion

Objectives of Meeting

- Provide NRC an update of FCF fuel performance
- Discuss future plans
- Summarize licensing activity
- Obtain NRC concurrence with activities and schedule

Performance of FCF Fuel

Presented to the NRC July 2000

Bernie Copsey

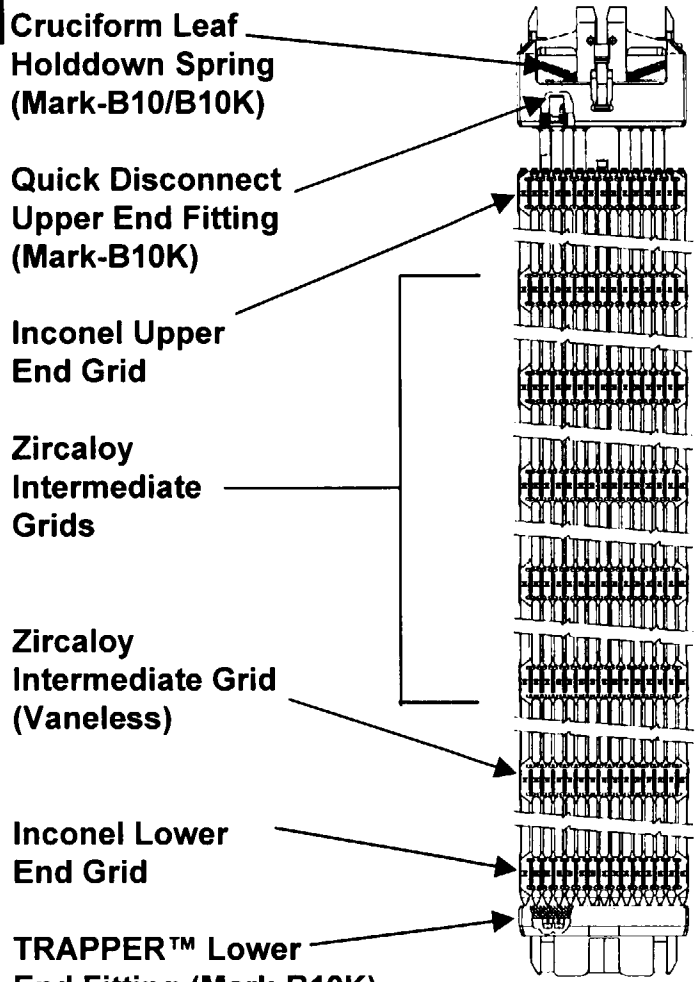
Manager, Analysis Technology

FRAMATOME TECHNOLOGIES

Outline

- Fuel assembly designs
- Fuel reliability
- Spacer grid performance
- Fuel rod oxide
- Fuel assembly and fuel rod growth
- Shoulder gap
- Control rod drop performance
- PIE plans

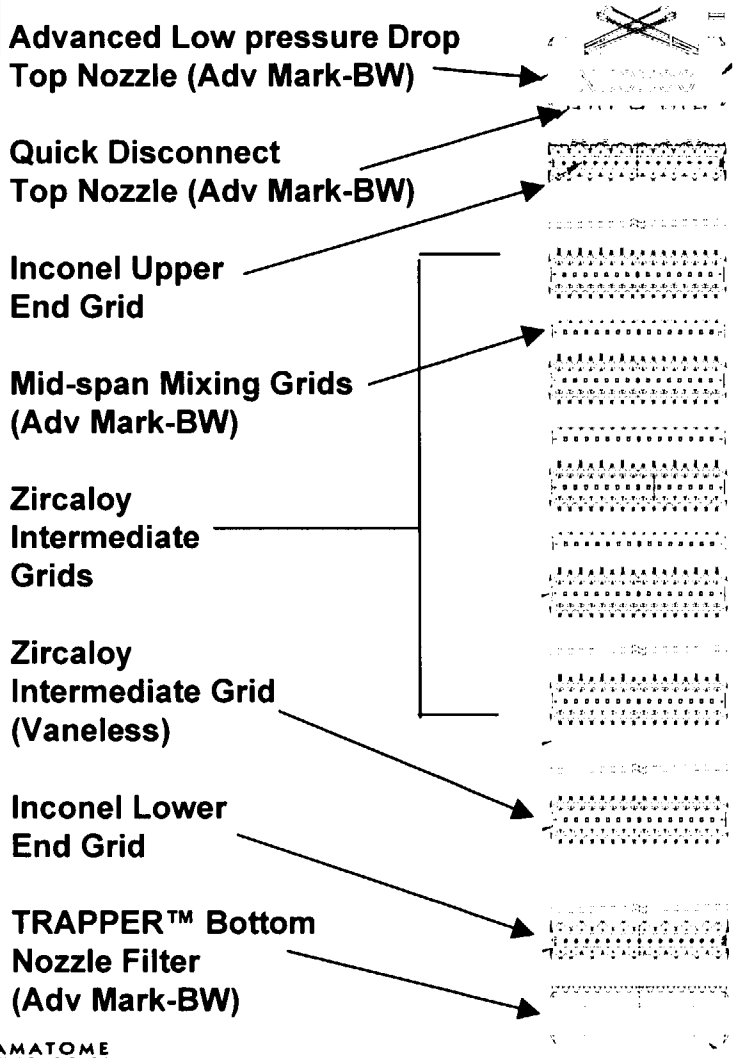
Mark-B 15x15 Design Features



- **Mark-B9**
  - Helical holddown spring
- **Mark-B10**
  - **Cruciform leaf holddown spring**
- **Mark-B10K**
  - Cruciform leaf holddown spring
  - **TRAPPER™ debris filter lower end fitting**
  - **Heavy loaded fuel rod**
  - **M5™ advanced alloy cladding**
  - **Optional quick disconnect upper end fitting**

FRAMATOME TECHNOLOGIES

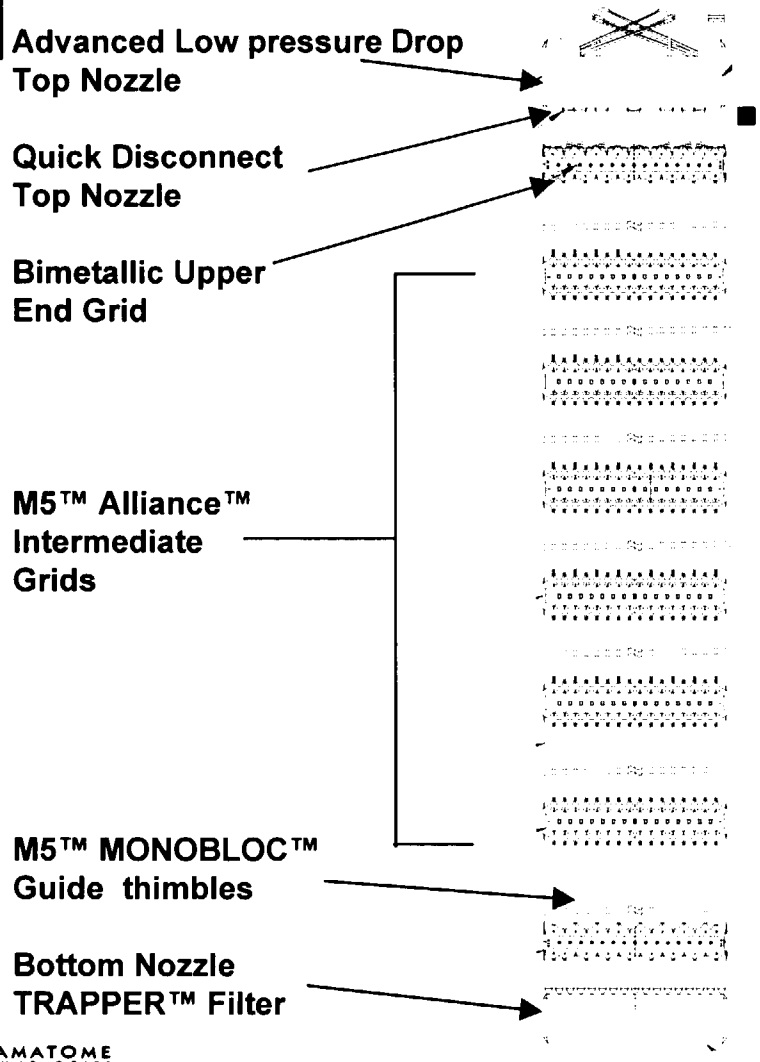
Mark-BW 17x17 Design Features



- **Mark-BW**
  - Leaf spring top nozzle
  - Cloverleaf bottom nozzle
  - High performance Zircaloy mixing grid
  - Inconel end grid
- **Adv Mark-BW**
  - **Advanced low pressure-drop top nozzle**
  - **TRAPPER™ debris filter bottom nozzle**
  - **Heavy loaded fuel rod**
  - **M5™ advanced alloy cladding and guide thimbles**
  - **Quick disconnect upper end fitting**
  - **Mid-span mixing grids (optional)**

FRAMATOME TECHNOLOGIES

Alliance™ 17x17 Design Features

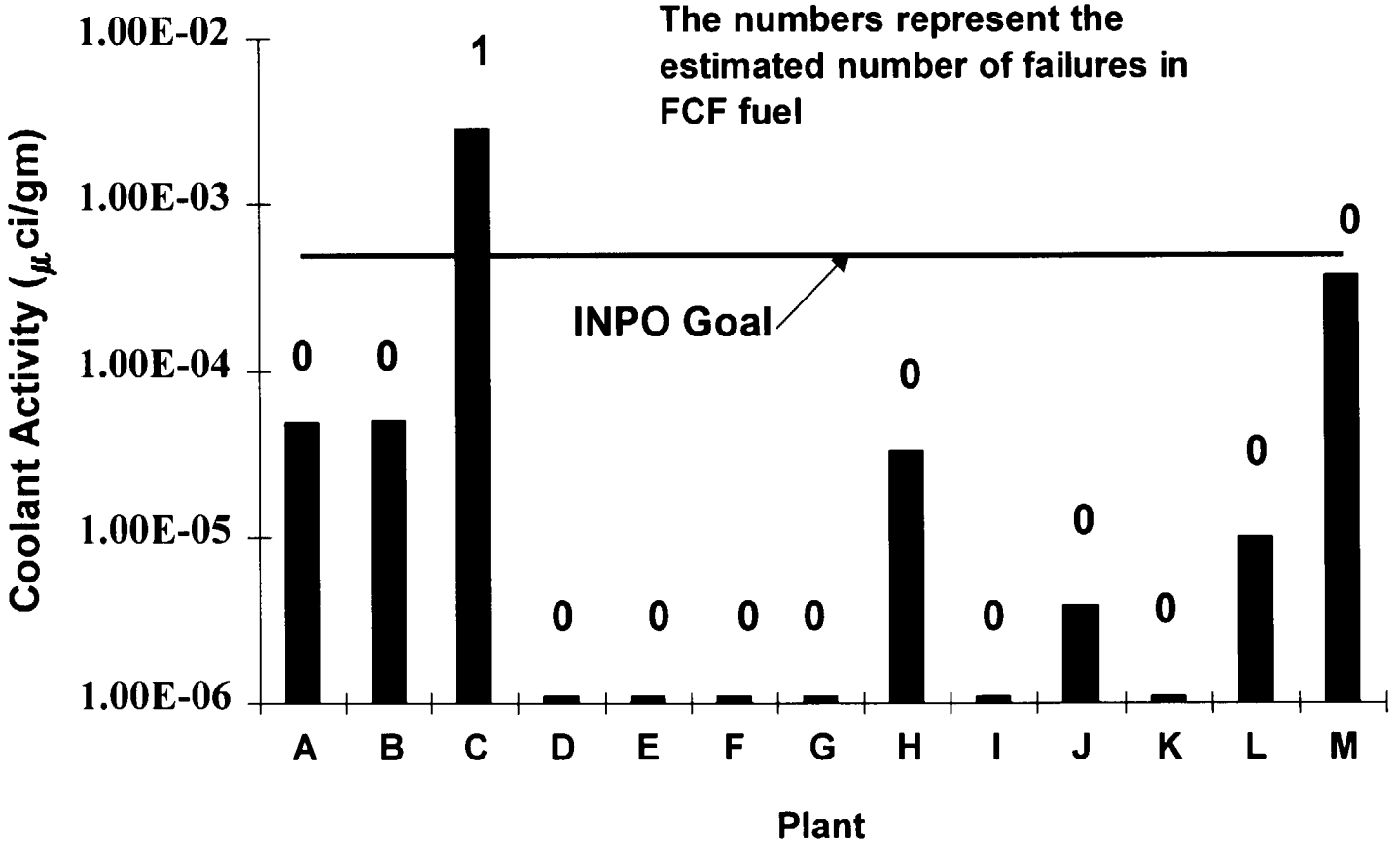


- **Alliance™**
  - Advanced low pressure-drop top nozzle
  - TRAPPER™ debris filter bottom nozzle
  - Heavy loaded fuel rod
  - M5™ advanced alloy cladding, guide thimbles, and **intermediate grids**
  - **High performance Alliance™ intermediate grids**
  - Quick disconnect upper end fitting
  - Mid-span mixing grids (optional)
  - **MONOBLOC™ Guide Thimbles**
  - **Bimetallic end grids**

FRAMATOME TECHNOLOGIES

- Fuel assembly designs
- **Fuel reliability**
- Spacer grid performance
- Fuel rod oxide
- Fuel assembly and fuel rod growth
- Shoulder gap
- Control rod drop performance
- PIE plans

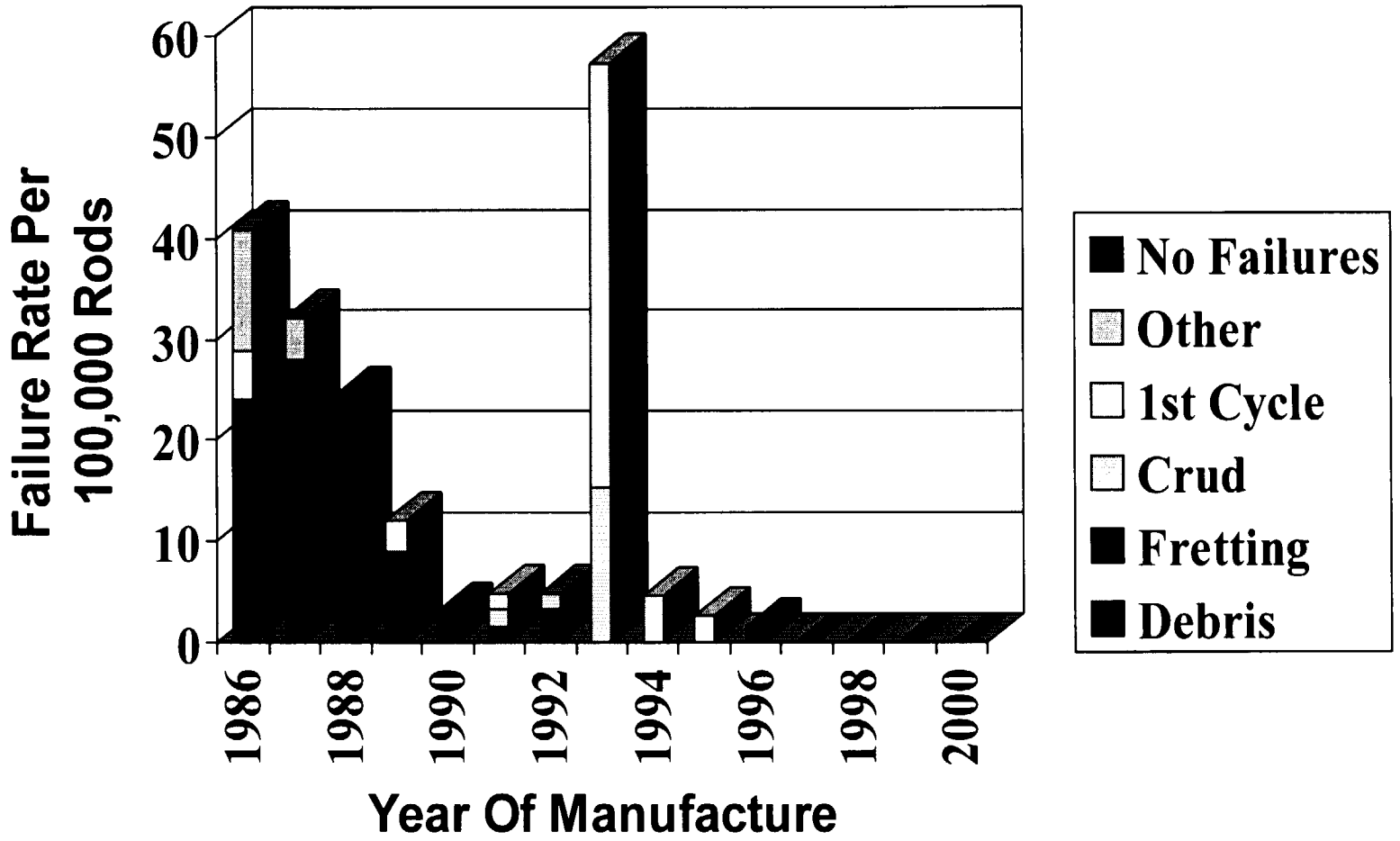
Fuel Performance Status: Failure-Free Except for One Plant



June 2000

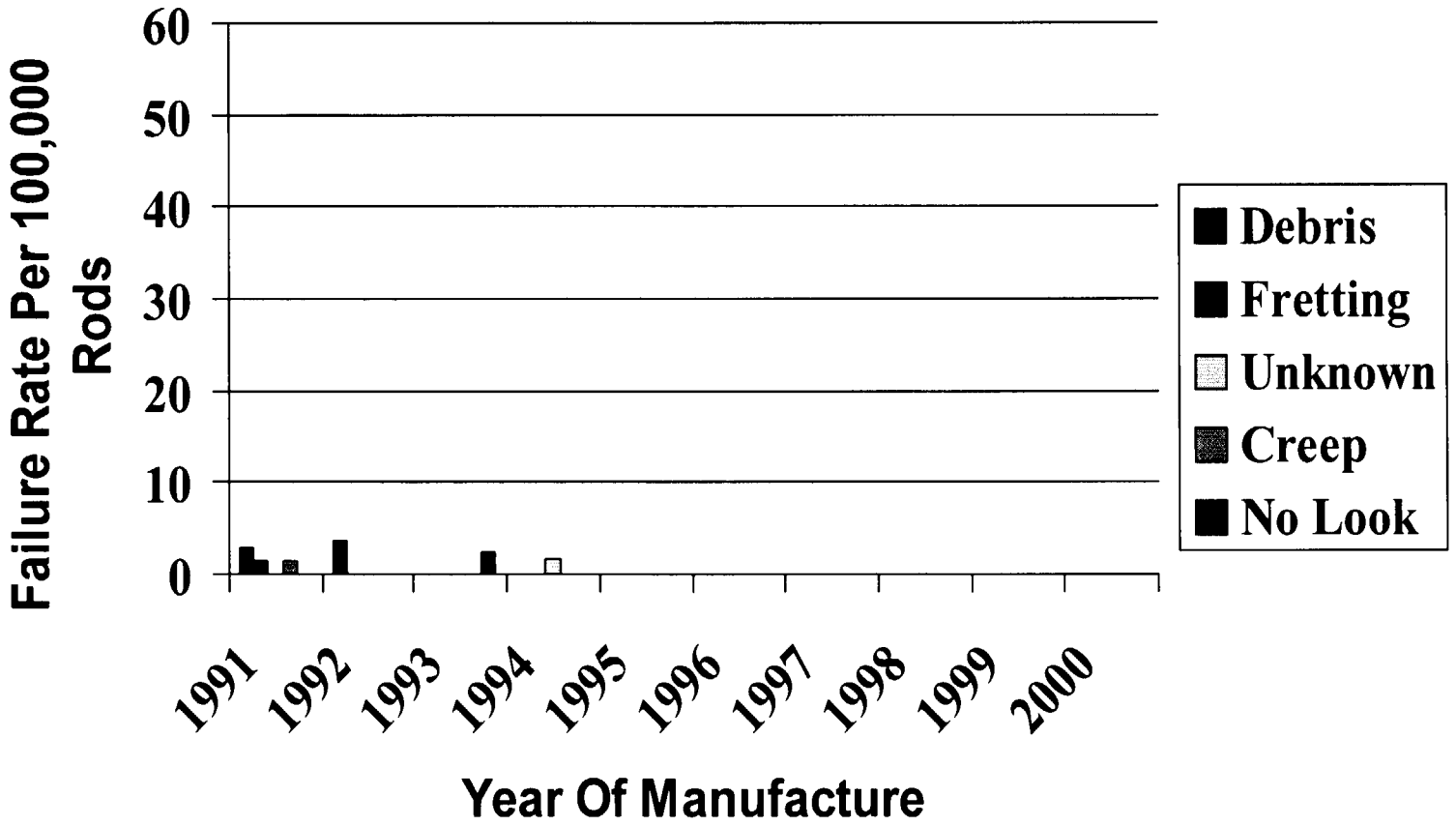
FRAMATOME TECHNOLOGIES

Mark-B Fuel is Failure-Free for Fuel Manufactured after 1996



FRAMATOME TECHNOLOGIES

Mark-BW Fuel is Failure-Free for Fuel Manufactured after 1994



Fuel Reliability Summary

- Fuel reliability remains "best-in-class"
- Reasons for excellent fuel reliability:
  - Fretting-resistant grids
  - Debris resistant features
    - (17x17) TRAPPER™ bottom nozzle
    - (15x15) Long lower end plug and TRAPPER™ lower end fitting
  - Fuel Integrity Quality Improvement Team results
  - Water chemistry control by operating utilities

- Fuel assembly designs
- Fuel reliability
- **Spacer grid performance**
- Fuel rod oxide
- Fuel assembly and fuel rod growth
- Shoulder gap
- Control rod drop performance
- PIE plans

Slipped Spacer Grids

- Except for the next outage for one plant, the redesigned restraint system will be present for all new fuel
- Techniques for repositioning grids and core reloading have been implemented

➢ **No new occurrences of slipped grids seen for fuel with redesigned restraint system**

Damaged Spacer Grids

- Damage continues to occur at some Mark-B reactors
- Increased lead-in on the upper end fitting to be implemented this fall
- Spacer grid changes will begin this fall with the implementation of the Mark-B11 and in 2001 with changes to the other Mark-B corner design

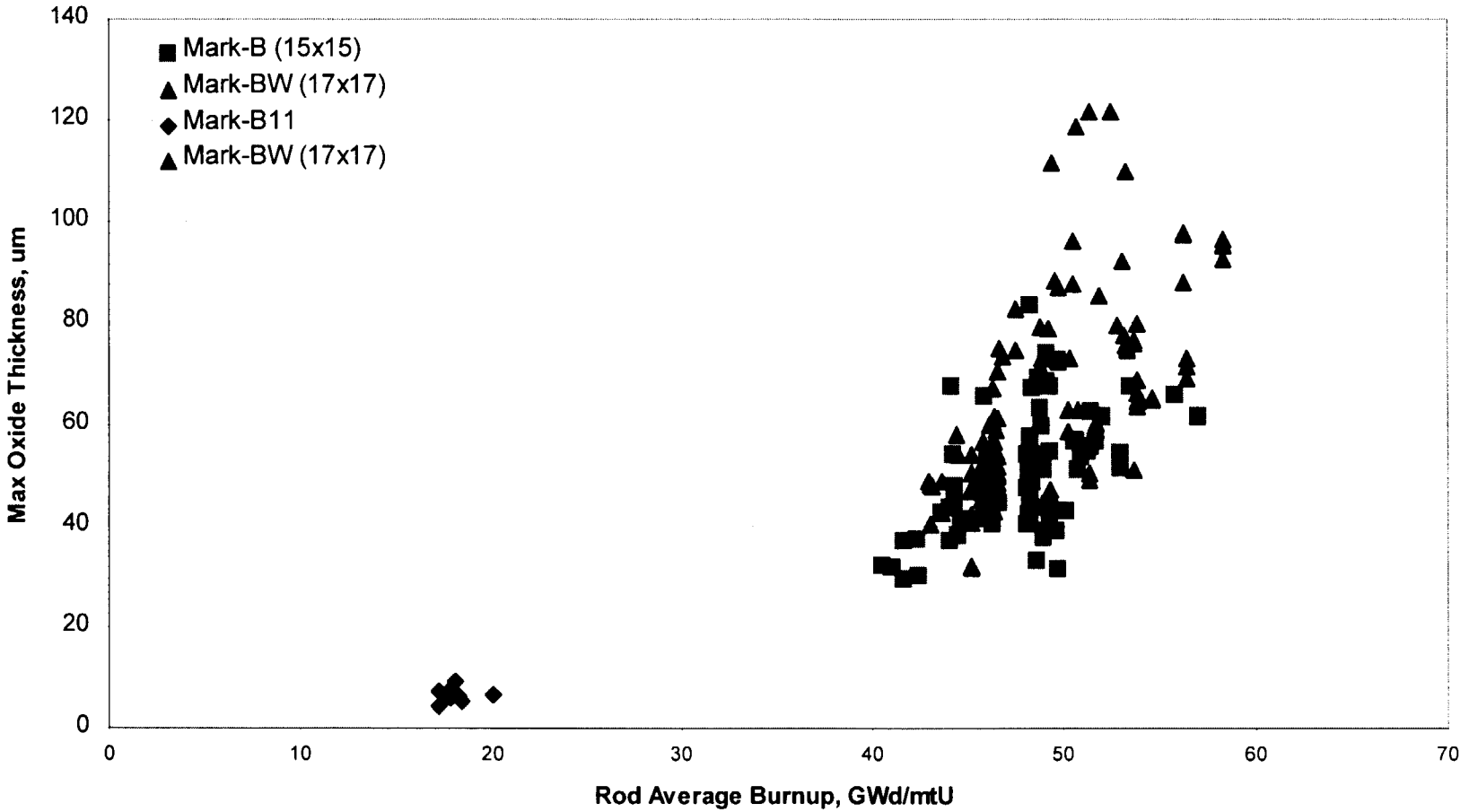
➢ **FCF and utilities will continue to monitor grid damage to assure no operating problems**

Spacer Grid Performance Summary

- Redesigned restraint system and improved handling techniques appear to have mitigated slipped grid problem
- Redesign to reduced grid damage:
  - Lead-in on the upper end fitting
  - Mark-B corner redesign on spacer grid
- Mark-BW has had no grid damage or hang-up problems

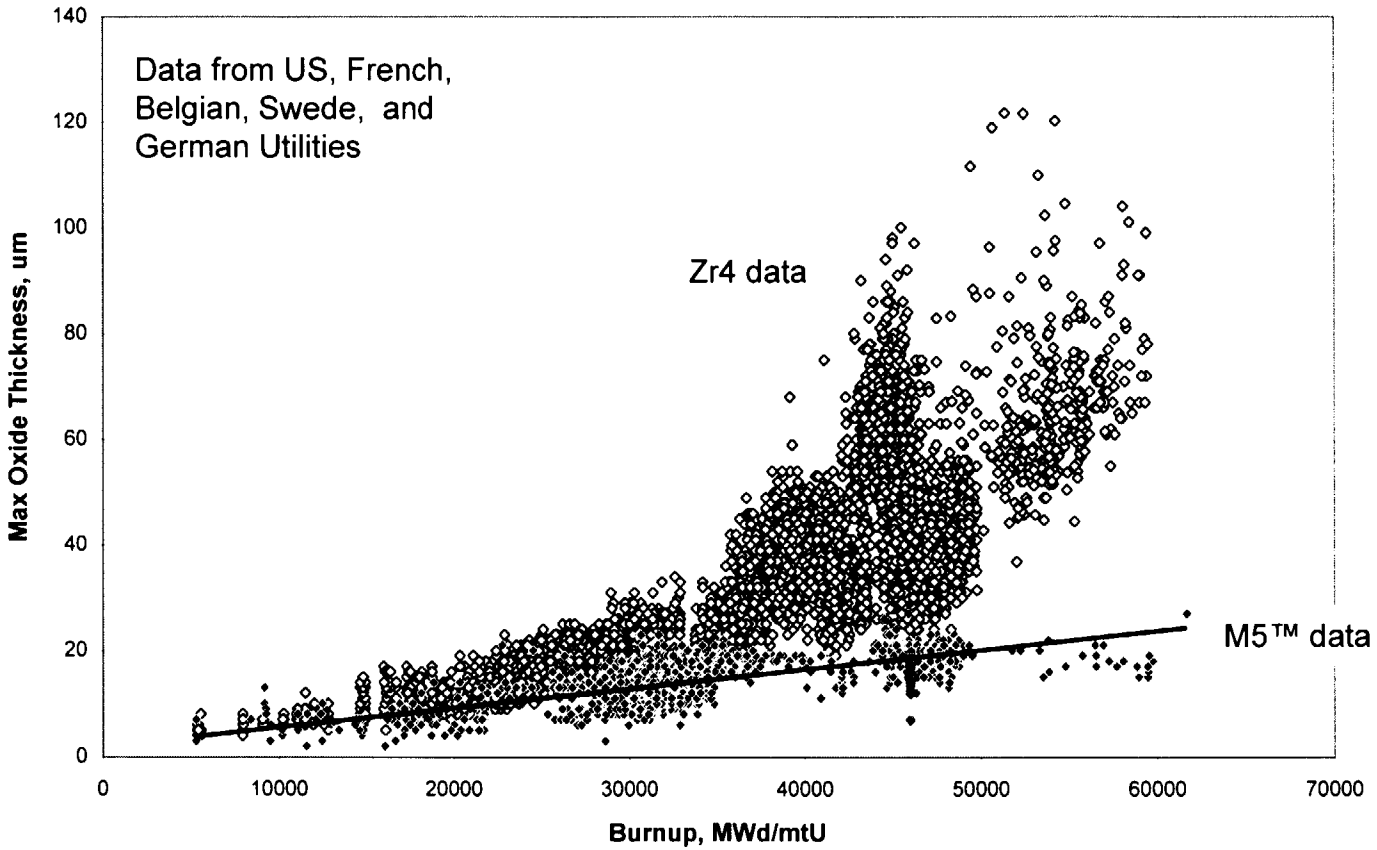
- Fuel assembly designs
- Fuel reliability
- Spacer grid performance
- **Fuel rod oxide**
- Fuel assembly and fuel rod growth
- Shoulder gap
- Control rod drop performance
- PIE plans

Mark-B and Mark-BW Zr4 Maximum Oxide Thickness Supports Model

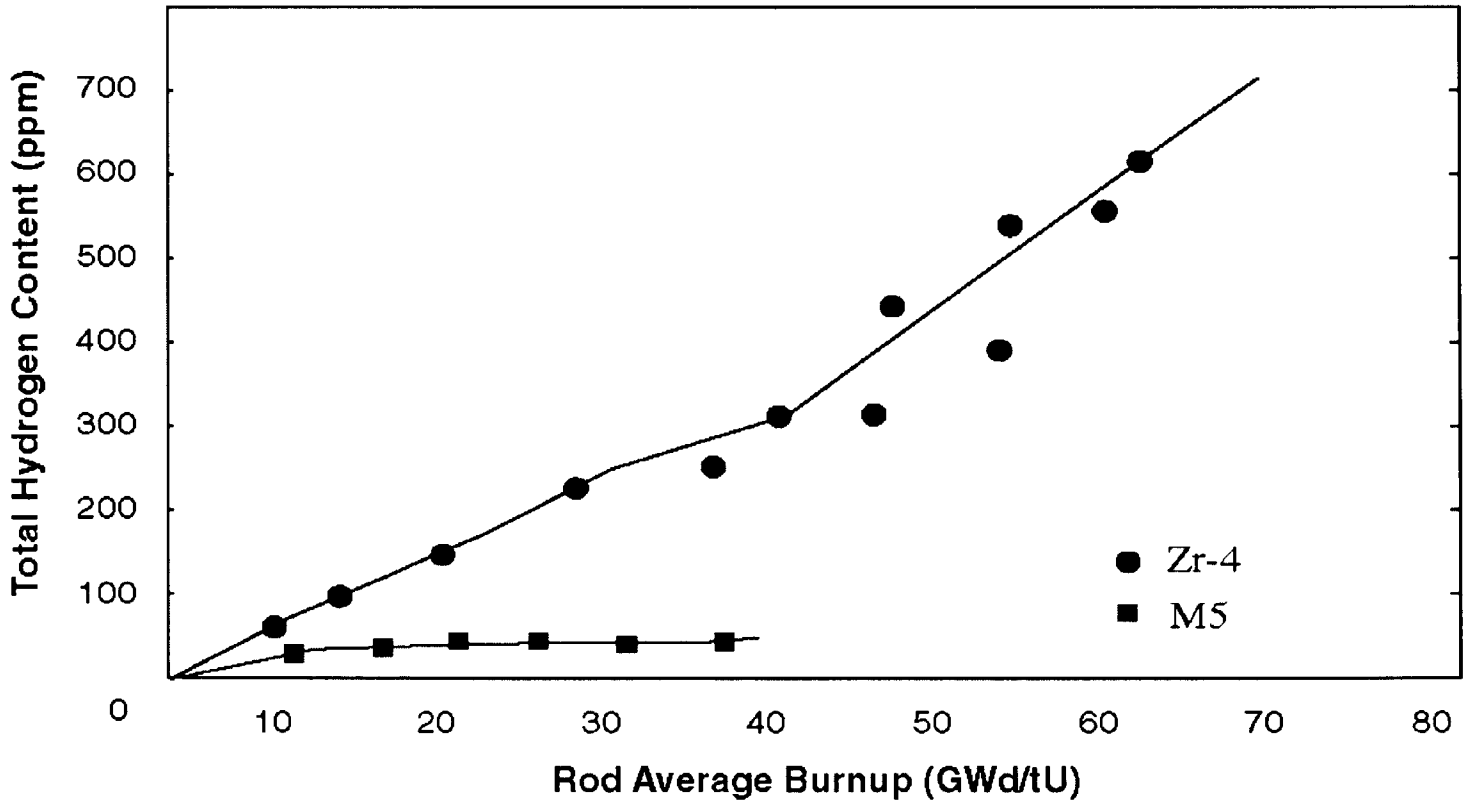


FRAMATOME TECHNOLOGIES

M5™ Maximum Oxide Thickness is Significantly Less Than Zr4

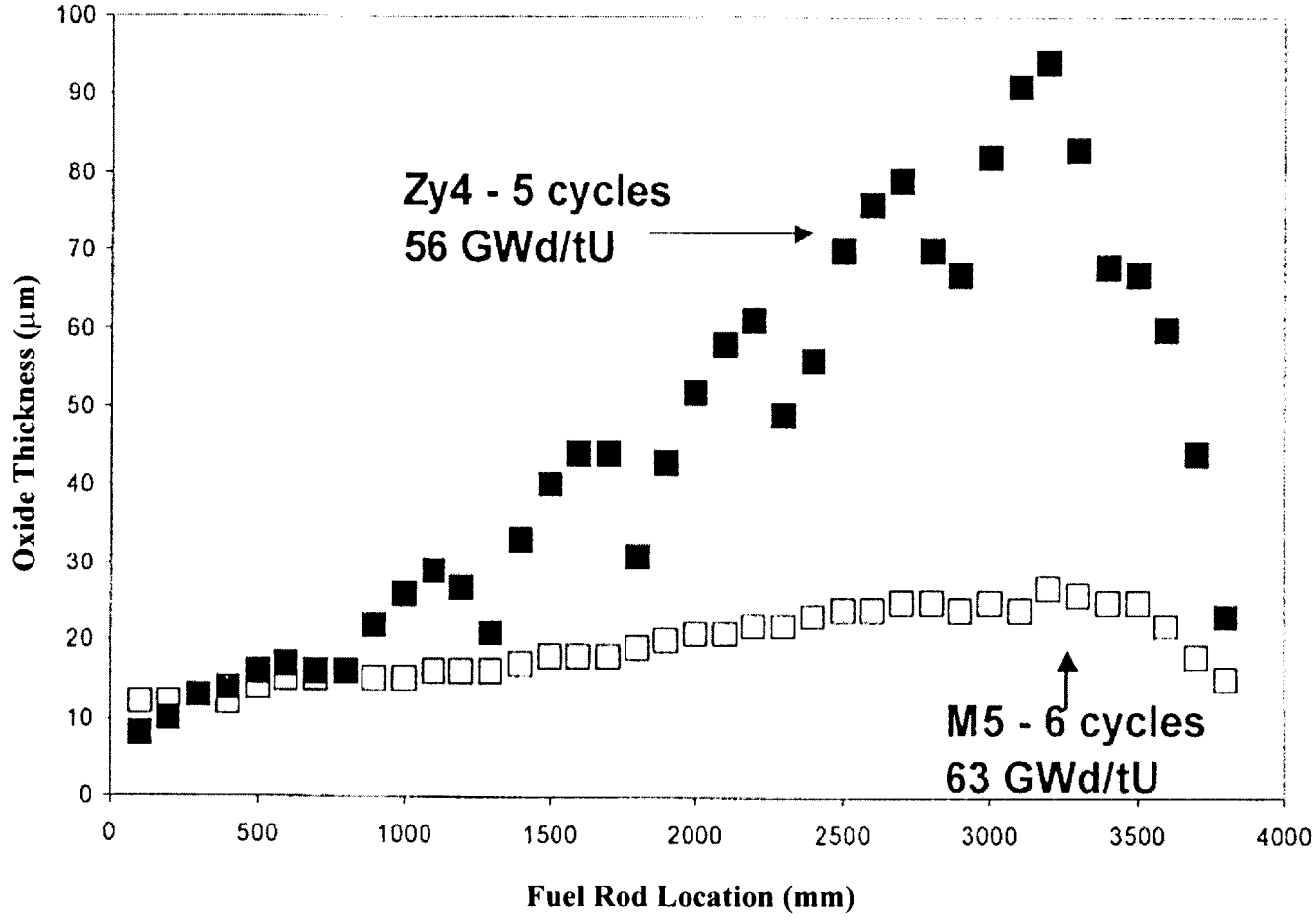


M5™ Hydrogen Content is Significantly Less Than Zr4



FRAMATOME TECHNOLOGIES

M5™ has a Low Sensitivity to Temperature



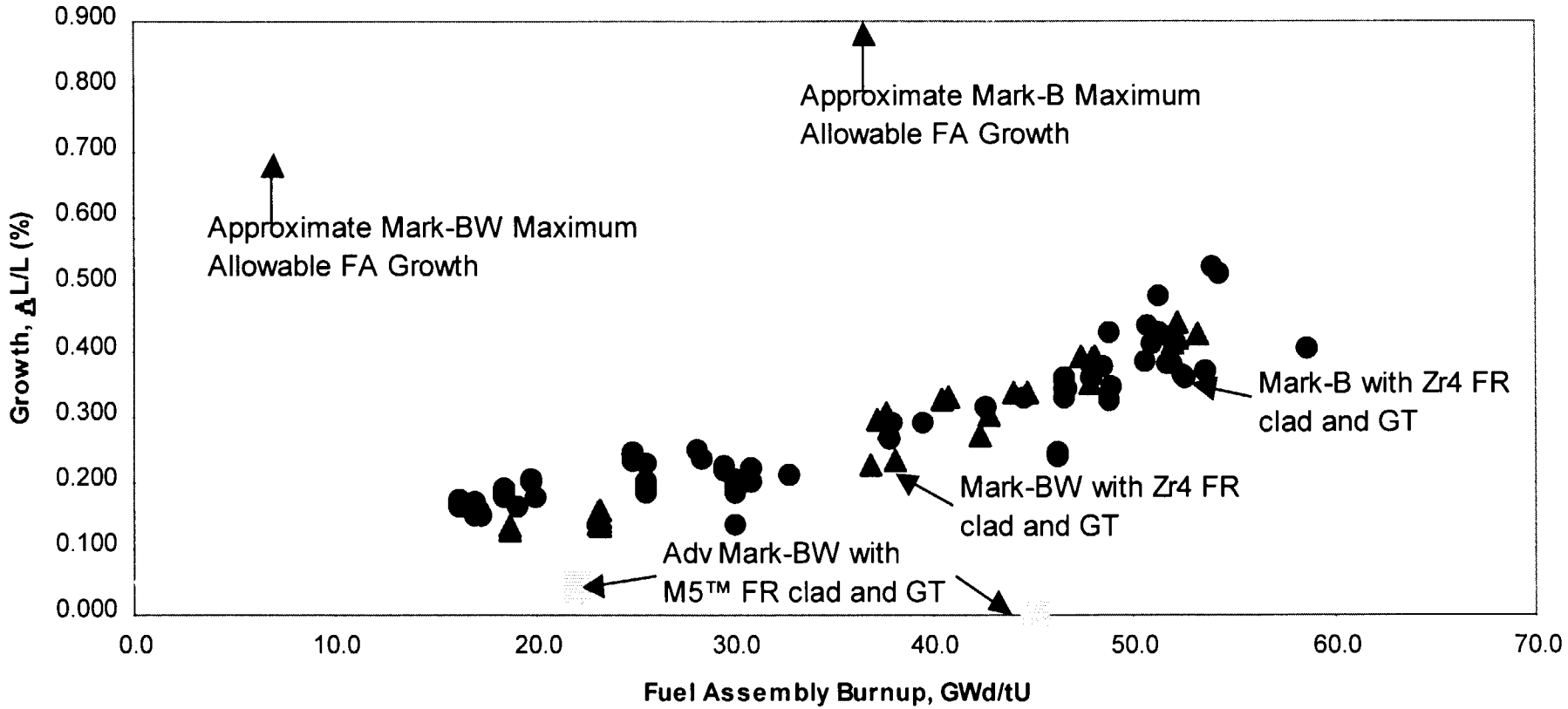
FRAMATOME TECHNOLOGIES

Fuel Rod Oxide Summary

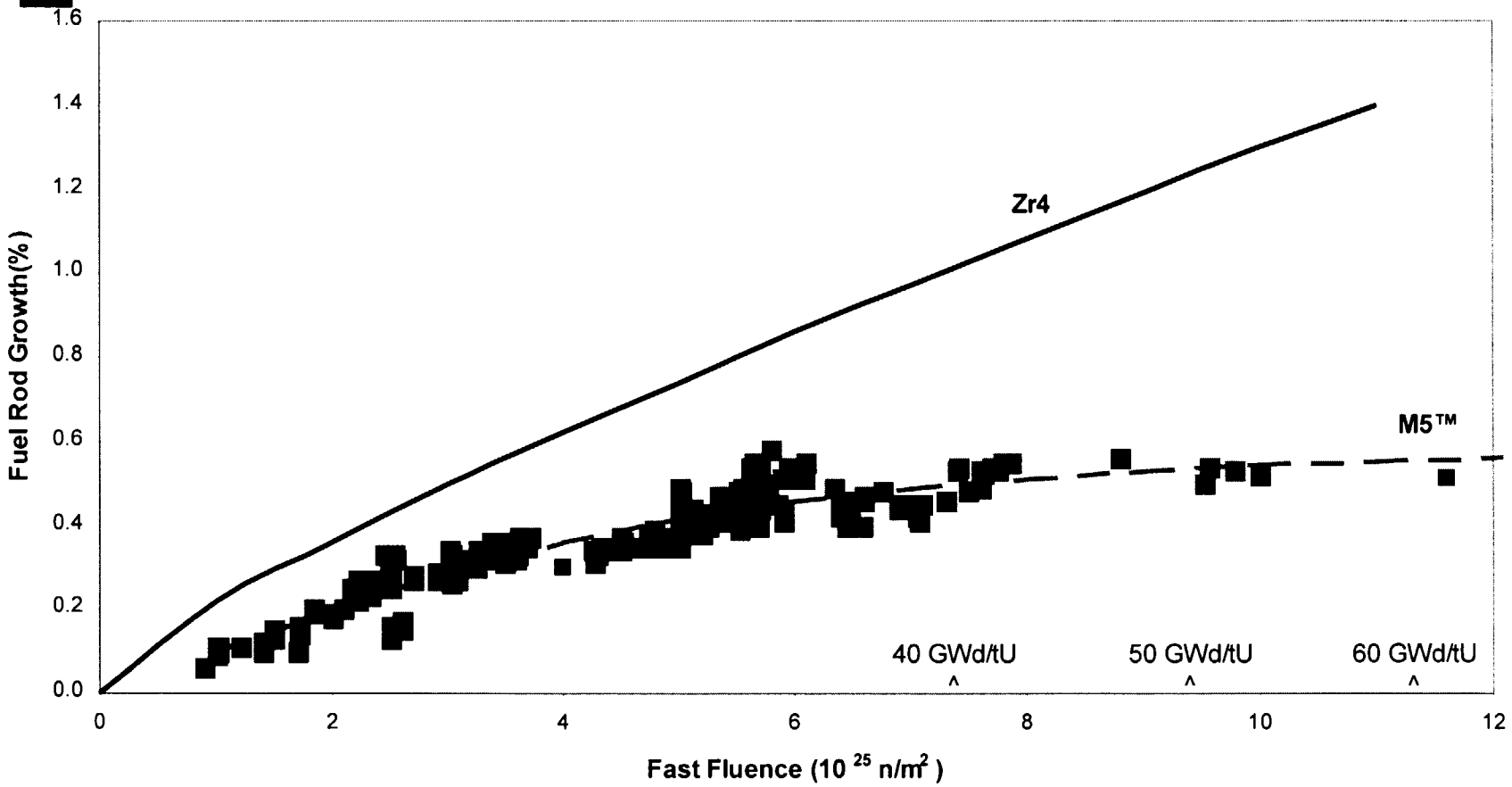
- Zr4 fuel rod oxide models are validated by measurement
- M5™ fuel rod oxide continues to be significantly lower than Zr4
- M5™ fuel rod hydrogen content continues to be significantly lower than Zr4
- M5™ fuel rod oxide does not have a sensitivity with temperature

- Fuel assembly designs
- Fuel reliability
- Spacer grid performance
- Fuel rod oxide
- **Fuel assembly and fuel rod growth**
- Shoulder gap
- Control rod drop performance
- PIE plans

Fuel Assembly Growth: Zr4 Supports Model, M5™ is Low



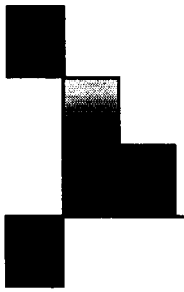
Mark-BW Fuel Rod Growth: Zr4 Supports Models, M5™ is Low



FRAMATOME TECHNOLOGIES

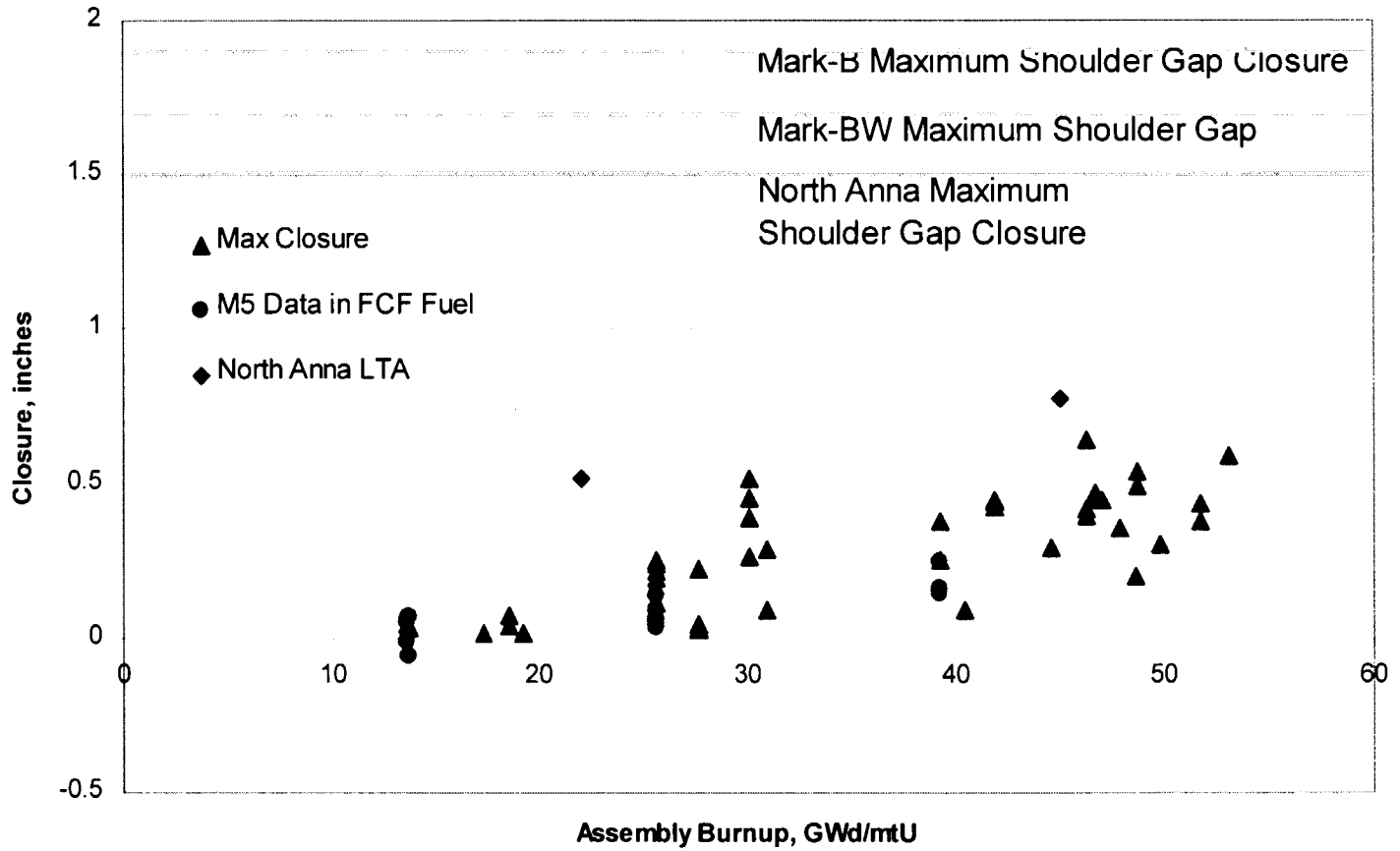
Fuel Assembly and Fuel Rod Growth Summary

- Mark-BW and Mark-B Zr4 fuel assembly growth supports existing model
- Adv. Mark-BW M5™ fuel assembly growth is low
- Zr4 fuel rod growth supports existing Zr4 model
- M5™ fuel rod growth supports existing M5™ model
- Lower M5™ fuel rod and fuel assembly growth allows an increase in plenum and/or pellet stack length



- Fuel assembly designs
- Fuel reliability
- Spacer grid performance
- Fuel rod oxide
- Fuel assembly and fuel rod growth
- **Shoulder gap**
- Control rod drop performance
- PIE plans

Mark-B and Mark-BW Maximum Closure Shoulder Gap



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Shoulder Gap Summary

- Sufficient margin is available for shoulder gap closure for Mark-B, Mark-BW, and Adv. Mark-BW
- Adv. Mark-BW has higher gap closure than the Zr4 fuel assemblies due to M5™fuel rods and guide thimbles
  - Sufficient margin to full closure exists

- Fuel assembly designs
- Fuel reliability
- Spacer grid performance
- Fuel rod oxide
- Fuel assembly and fuel rod growth
- Shoulder gap
- **Control rod drop performance**
- PIE plans

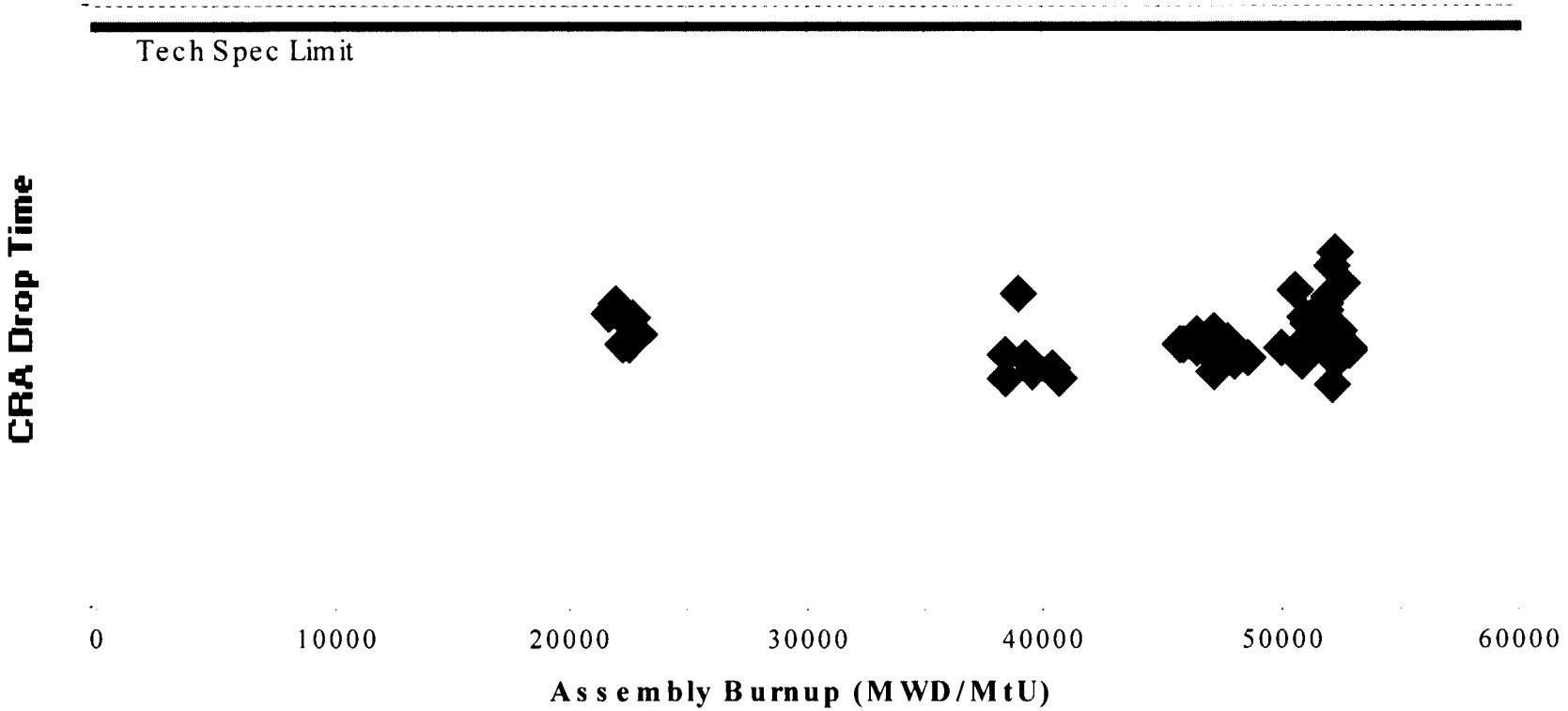
Review of Previous Control Rod Drop Times Meetings with NRC

- Meetings with the NRC held October 1999 and February 2000
- Data was collected and analyzed for Mark-B plants
- Spring set and shuffle-improvements were made to the cycles
- Analysis will be performed when additional drop time data is available
- Only plants with 24-month cycles, Mark-B10 Upper End Fitting, and long, continuous operations have observed IRI

Latest Mark-B Plant Shutdown Following 24-month Cycle

- All control rod drop times met tech specs
- 2 control rod slowed down at 99% inserted and slowly finished last 1%
- 5 control rods had BOC-to-EOC increase greater than 0.1 sec
- In-pool drag data was taken and confirmed drop time model (drop time vs drag force)
- All control rod drop times after refueling are acceptable
- Spring set and shuffle-improvements were made

Latest Mark-B Plant Shutdown Control Rod Drop Times



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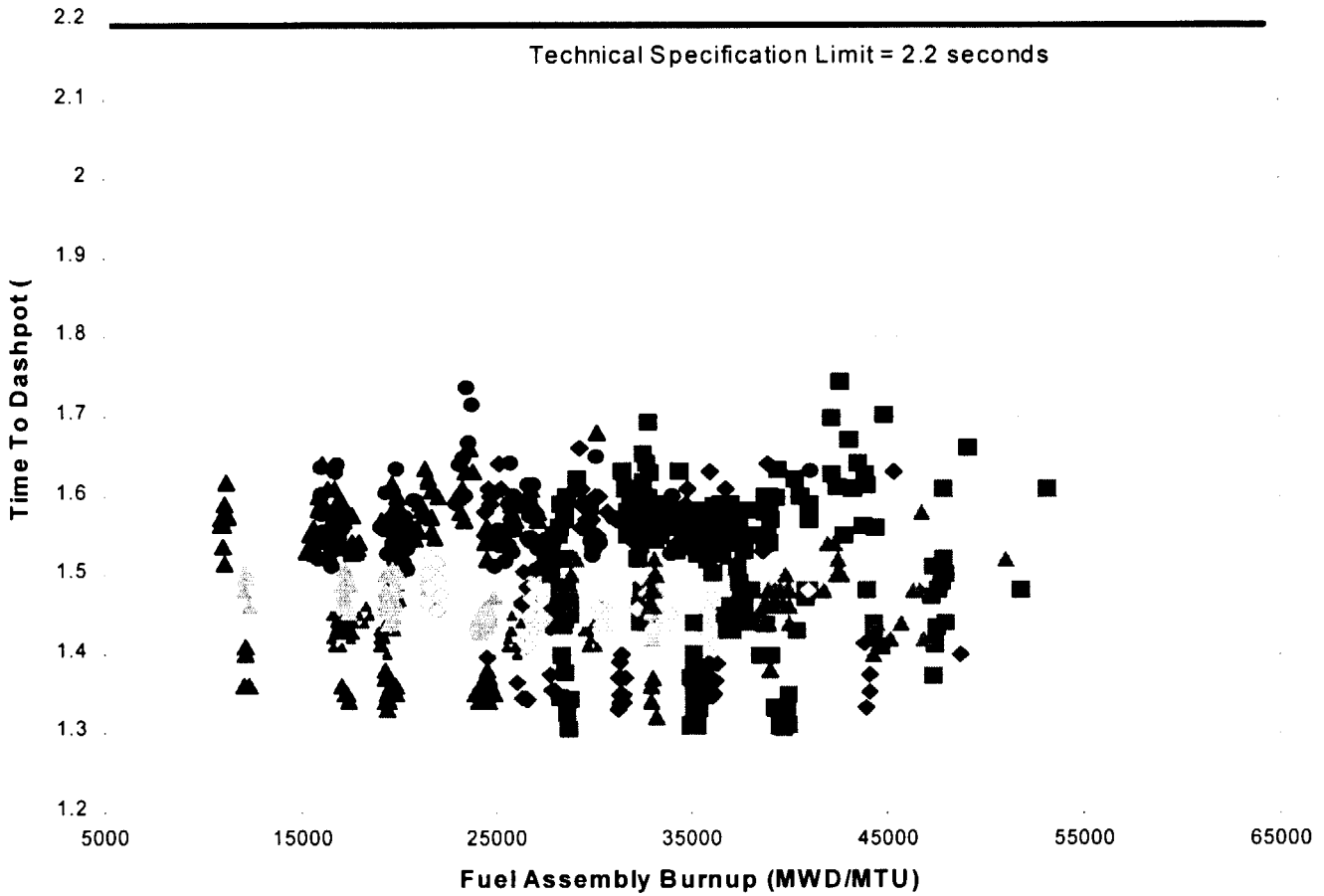
Mark-BW Control Rod Drop Times

- No Mark-BW fuel has had IRI
- Mark-BW fuel has lower loads per guide tube
- Mark-BW fuel has 18-month cycles
- FCF is continuing to monitor Mark-BW control rod drop time data

Rod Drop Times In Mark-BW are Constant Over Burnup Range



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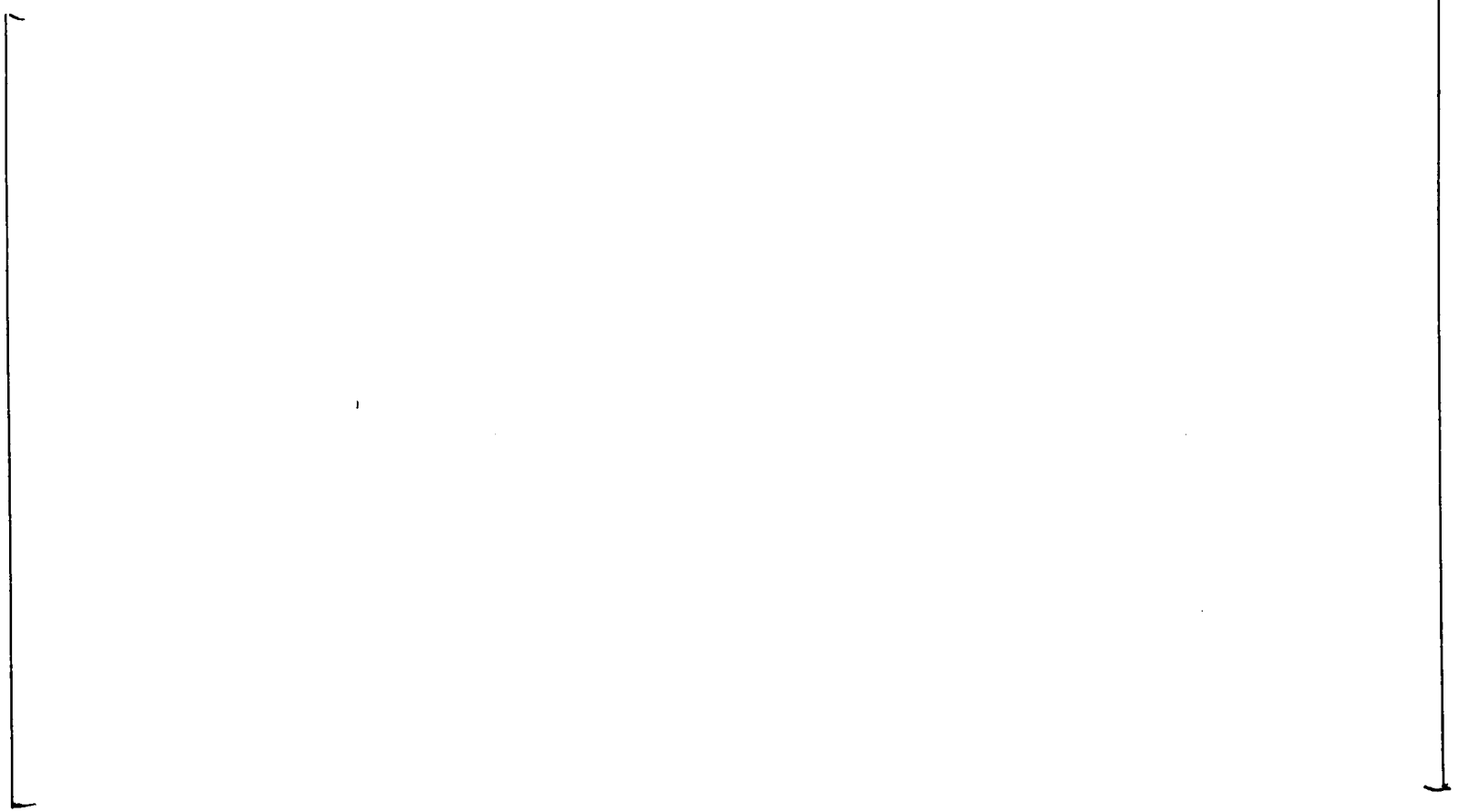
Control Rod Drop Time Summary

- Mitigative Actions Performed
  - Plastic setting of hold-down springs
  - Shuffle improvements
- Future Actions
  - M5™ guide tube and fuel rod clad material
  - Mark-B10 leaf spring re-design
  - Hydraulic lift methodology
- We are continuing to monitor data and develop analytical tools

- Fuel assembly designs
- Fuel reliability
- Spacer grid performance
- Fuel rod oxide
- Fuel assembly and fuel rod growth
- Shoulder gap
- Control rod drop performance
- **PIE plans**

PIE Summary
1999/2000 PIE's



Planned Long-Term PIE's

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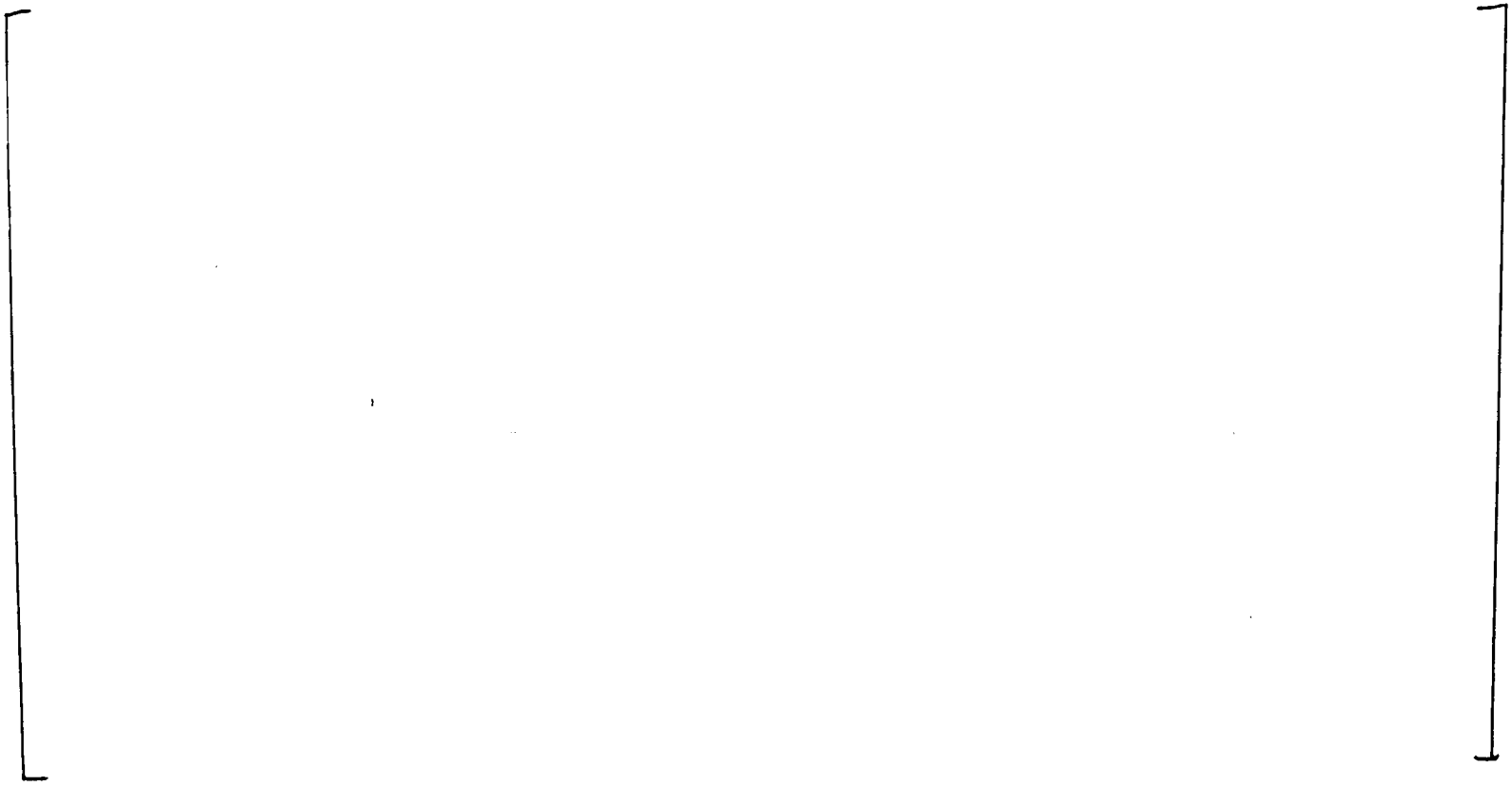
FRAMATOME TECHNOLOGIES

Planned Long-Term PIE's
continued

Long Term PIE Goals



Planned M5™ Implementation

PIE Plans Summary

Conclusion

- FCF fuel is performing well with in-core performance behaving as expected from design models
- FCF continues to have excellent fuel integrity as burnups increase
- Preventive actions have been taken for fuel handling issues
- M5™ performance is excellent
- Control rod drop times
  - Mitigative actions have been performed
  - We are continuing to monitor data and develop analytical tools

Licensing Activity
Frank McPhatter

- Topical Reports
- Extended Burnup
- Mixed Oxide
- Other licensing activity

Approvals Since July 1999

- BAW-10179 - Reload Methodology
- BAW-10229 - Mark-B11 Fuel Assembly
- BAW-10228 - SCIENCE
- BAW-10227 - M5 Cladding and Structural
- BAW-10199 - Mark-B11 CHF

Topicals in Review

- BAW-10133 Addenda 1 and 2 - Faulted Condition Methodology - RAI submitted on July 21, 2000.

- BAW-10231 - COPERNIC - MOX addendum to be submitted August 2000

Future Submittals

- BAW-10231 - COPERNIC MOX Addendum
- BAW-10186, Rev. 2 - Extended Burnup
- BAW-10227, Rev. 1 - M5 Topical (For Extended Burnup)
- BAW-10179, Rev. 4 - Methodology
- BAW-10199, Addendum 2 - Mark-BW CHF Testing and Correlation
- BAW-10172, Rev. 2 - Mark-BW Fuel
- BAW-10XXX - Alliance Design Report

Topical Report Submittal Schedule

■ BAW-10231	8/2000
■ BAW-10186, Rev. 2	12/2000
■ BAW-10227, Rev. 1	12/2000
■ BAW-10179, Rev. 4	12/2000
■ BAW-10199, Addendum 2	12/2000
■ BAW-10172, Rev. 1	9/2001
■ BAW-10XXX	9/2002

Lead Test Assembly Licensing Criteria for Extended Burnup

Corrosion LTA Licensing Criteria

- Max Predicted Oxide is 100 microns
- Eight Fuel Assemblies may have predicted oxide >100 microns and will be designated as Lead Corrosion Assemblies
- Total number of LTAs shall not exceed twelve

Proposed Licensing Criteria for High Burnup LTAs

- Up to twelve fuel assemblies may have predicted burnups > current limits
- These assemblies will be designated as LTAs at BOC in cycle where BU limit will be exceeded.
- PIEs of the LTAs will be conducted and results provided to NRC

M5 High Burnup Rods

- M5 High Burnup Rods in TMI-1 Cycle 14
- Four M5 rods will be inserted in core location H8
- BOC M5 rod burnups in mid forties
- Target EOC M5 rod burnups will be in mid sixties

Mixed Oxide Schedule

■ Fuel Qualification Plan	7/2000
■ COPERNIC MOX Addendum	8/2000
■ Mechanical Design Topical	8/2001
■ LOCA EM Topical	8/2001

Other Licensing Activity

- Petition for rulemaking change to 10 CFR 50.46 and 10 CFR 50.44 to delete specific material references and to include "approved zirconium alloys"