

The background of the slide features a repeating pattern of blue and white geometric shapes, specifically stylized chevrons or arrows, pointing in various directions. These shapes are arranged in a grid-like fashion, creating a dynamic and modern visual effect.

framatome

ANP-10359 Revision 0,

*PROtect Incorporation of
Chromium-Coated M5_{Framatome}
Cladding Material Properties in
Framatome PWR Methods
Topical Report*

June 24, 2025



Safety Message - Complacency is one of the biggest risks we face in terms of completing our day-to-day tasks safely. In our industry, complacency can kill.

Complacency is when someone becomes so comfortable or secure in a situation or task that it leads to unawareness of actual dangers or deficiencies. This state of overconfidence can cause us to disregard weak signals and take potentially dangerous shortcuts, resulting in serious consequences affecting safety, production and quality. If you find yourself saying, “it’s always been that way” or “we’ve always done it this way,” then complacency and overconfidence are your enemy. No activity is hazard-free.

Examples of how using error-prevention tools strengthens the use of this critical element and aids employees in being proactive in identifying, assessing and controlling hazards and preventing safety incidents:

N.A. Standards of
Operational Excellence

Safety tool: Reviewing the **job hazard analysis** regularly helps maintain awareness of hazards and risks.

Page 27

Quality tool: Looking for **weak signals** increases awareness of potential precursors to major events.

Page 48

HU tool: **STAR** Self-checking helps to focus attention on the task before performing a critical activity.

Page 91

Content

1. Objectives
2. Background
3. Topical Report Preliminary Content
4. Next Steps

Proprietary

Objectives

- Inform the NRC of:
 - The topical report preliminary content
 - The strategy for making the topical report
 - The associated submittal schedule
- Provide opportunity for NRC feedback

Objectives

Previous FRA-NRC Exchanges on E-ATF	
E-ATF Touchpoints	2017, 2018, 2019
E-ATF Testing Plans	7/2019
E-ATF Test Plan Update	11/2020
E-ATF Test Plan Update	11/2021
Fuel Performance Meeting	9/2024

Background

M. Aumand, L. Gerken

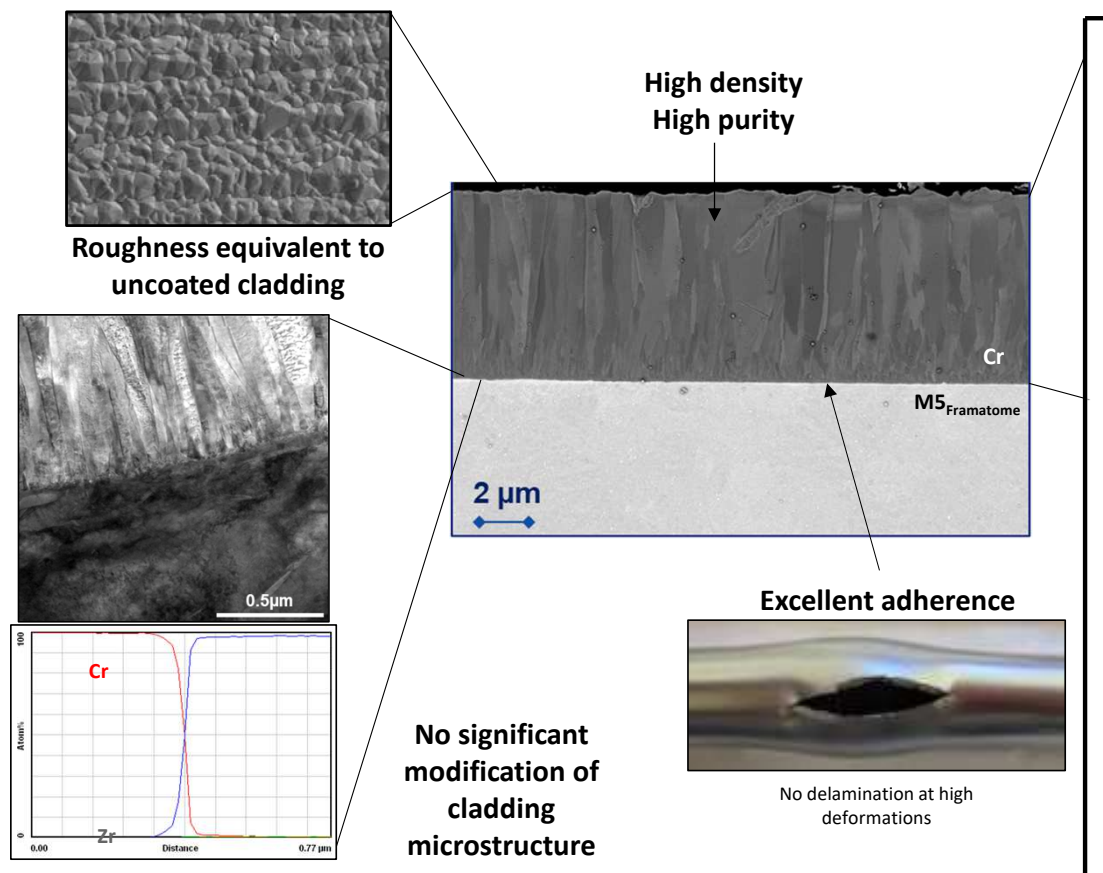
Background

“PROtect: Incorporation of Chromium-Coated M5_{Framatome} Cladding Material Properties in Framatome PWR Methods”





PROtect Cr Concept





PROtect Cr Readiness

OSIRIS 2015



Halden 2017



Vogtle 2019



ANO 2019



Blayais 3 2023



Calvert Cliffs
2021



Gösgen 2019



ATR 2018



IMAGO 2016



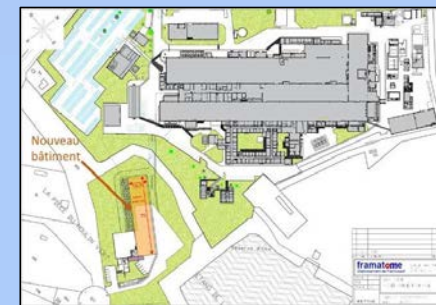
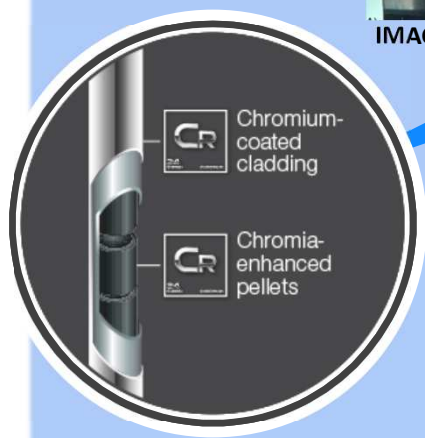
2016: Cr-coating of small samples mastered

2018: Cr-coating of full-length cladding begins

2020: Full-length Cr-coating begins at Framatome Paimboeuf

2023: Manufacturing of industrial pilot line and facilities begins

On-track for 2026 reload capacity readiness



Background

Background

Cr Topical Report is applicable to Framatome's Advanced Codes and Methods

Background

Topical Report Preliminary Content

M. Aumand, Y. Qi, L. Gerken

Topical Report Preliminary Content

Topical Report Preliminary Content

Topical Report Preliminary Content

Topical Report Preliminary Content

Topical Report Preliminary Content

Topical Report Preliminary Content

Topical Report Preliminary Content

Topical Report Preliminary Content

Sample Problems

Summary

DISCUSSION

A. Meginnis

Next Steps

Acronyms/Nomenclature

- C&M: Codes and Methods
- E-ATF: Enhanced Accident Tolerant Fuel
- ECR: Equivalent Cladding Reacted
- EDF: Electricité de France
- GWd: Gigawatt days
- INL: Idaho National Laboratory
- LOCA: Loss Of Coolant Accident
- LTA: Lead Test Assembly
- LTR: Lead Test Rod
- mtU: Metric Ton of Uranium
- NDE: Non-Destructive Examination
- NPP: Nuclear Power Plant
- ORNL: Oak Ridge National Laboratory
- PCT: Peak Cladding Temperature

M5, M5_{Framatome}, PROtect, GALILEO, ARCADIA, AREA, and ARITA are trademarks or registered trademarks of Framatome or its affiliates, in the USA or other countries.

Acknowledgment: “This material is based upon work supported by the Department of Energy under Award Number(s) DE-NE0009034.”

Disclaimer: “This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.”

Any reproduction, alteration, transmission to any third party or publication in whole or in part of this document and/or its content is prohibited unless Framatome has provided its prior and written consent.

This document and any information it contains shall not be used for any other purpose than the one for which they were provided.

Legal and disciplinary actions may be taken against any infringer and/or any person breaching the aforementioned obligations.

framato**me**

Thank
you