

From: Hiser, Matthew
Sent: Wed, 7 Dec 2016 19:07:38 +0000
To: Purtscher, Patrick;Poehler, Jeffrey;Tregoning, Robert;Hiser, Allen
Subject: RE: Harvesting Workshop Agenda Brainstorming
Attachments: NRC Harvesting Workshop Announcement 12-7-16.docx

Note to requester:
Attachment is immediately following. The box with the red X is a Word attachment (Word icon with its file name) that is imbedded into the body of the email.

Updated workshop announcement as requested with figures.



Matthew Hiser

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

Phone: 301-415-2454 | Office: TWFN 10D62

Matthew.Hiser@nrc.gov

From: Hiser, Matthew
Sent: Wednesday, November 09, 2016 10:37 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>
Subject: FW: Harvesting Workshop Agenda Brainstorming

Just wanted to send a reminder for feedback / input on the workshop agenda.

Thanks!
Matt

From: Hiser, Matthew
Sent: Friday, November 04, 2016 12:46 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>
Subject: RE: Harvesting Workshop Agenda Brainstorming

<< File: Workshop Agenda 11-4-16.docx >> << File: NRC Harvesting Workshop Announcement.docx >>

Hi Rob, Pat, and Jeff,

Please find attached my updates to the agenda based on our discussion yesterday. It may be somewhat premature, but I went ahead and tried to put times to the agenda, just to see how it might schedule out. Session 5 is probably the main area of uncertainty along with international presenters in general.

Please take a look and provide any comments or feedback by next Wednesday, so we can hopefully finalize this and share with DOE/EPRI very soon.

I also attached the latest version of the workshop announcement, which we plan to use to publicize to other attendees and presenters.

Thanks!
Matt

Original Appointment-----

From: Hiser, Matthew

Sent: Wednesday, November 02, 2016 2:34 PM

To: Hiser, Matthew; Purtscher, Patrick; Tregoning, Robert; Poehler, Jeffrey

Subject: Harvesting Workshop Agenda Brainstorming

When: Thursday, November 03, 2016 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).

Where: HQ-TWFN-08C01-10p

Hi Rob, Jeff, Pat,

I've put together an outline of an agenda for this workshop on harvesting that we are planning for March. My first cut at it is attached. I'd like to use this meeting to brainstorm how to structure the workshop and, if possible, who to ask to present and on what topics.

Rob and I were discussing trying to selectively target participants and presentations to cover the topics we'd like, rather than simply asking DOE and EPRI and others for their take on "harvesting." I think if we plan this well, we can get an interesting and substantive discussion. If not, we may just get a rehash of SLR-type talks...

Thanks!
Matt

<< File: Agenda Outline.docx >>

Ex-Plant Materials Harvesting Workshop

Location: NRC HQ in Rockville, MD

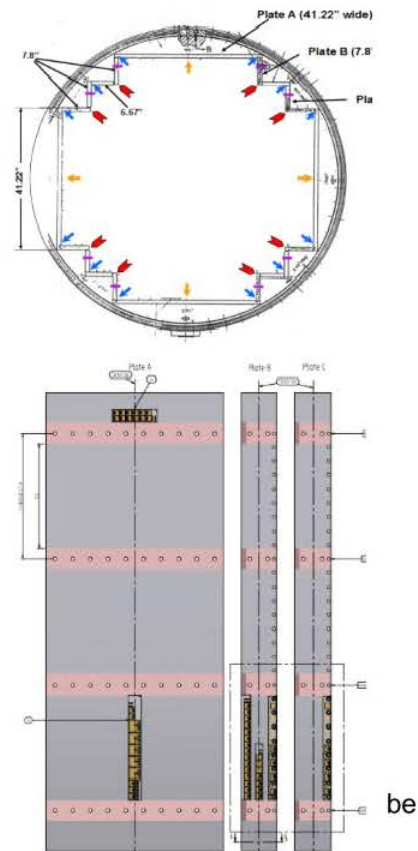
Dates: March 7-8, 2017

Motivation:

- There are increasing opportunities to harvest the safety-critical components from decommissioning plants, both domestic and international.
- The harvested materials are valuable because they have been exposed to actual in-service plant operating conditions (temperature, irradiation, coolant, etc.), unlike virgin materials tested under simulated conditions in the lab.
- Data from ex-plant materials should help address technical gaps identified for extended operation of nuclear power plants due to highly relevant aging conditions.

Purpose and Objective:

- For NRC staff and interested stakeholders to have greater awareness and knowledge of the benefits and challenges associated with ex-plant harvesting.
- Facilitate contacts and communication to enable specific cooperative ex-plant harvesting programs to be initiated.



Workshop Topics:

- Harvesting decision-making and prioritization
 - Technical data needs best addressed by harvesting
 - Technical information needed in advance of harvesting
- Sources of materials:
 - Decommissioning reactors
 - Operating reactors – replaced components
 - Previous harvesting programs – “boneyards”
 - Tracking available materials
- Harvesting process
 - Lessons learned from harvesting experience
 - Perspective of utility-owner and decommissioning contractor on harvesting
 - Communication and coordination between decommissioning and researchers
- International collaborative programs on specific components at specific plants

From: Hiser, Matthew
Sent: Mon, 7 Nov 2016 19:07:59 +0000
To: Purtscher, Patrick
Subject: RE: Harvesting Workshop Agenda Brainstorming

Hi Pat,

Yeah, she's the interface for RES with OIP.

I'm not sure I agree that she needs to be involved in developing the list of invitees. My understanding is we were planning to use contacts RES and NRR staff have with international groups they already work with. Donna-Marie wouldn't know anything about who the right people would be for something like this....

Thanks!
Matt

From: Purtscher, Patrick
Sent: Monday, November 07, 2016 1:49 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Workshop Agenda Brainstorming

Matt,

At the branch chief meeting with Brian today, I mentioned the fact that we might make the harvesting workshop a closed meeting. Brian didn't have any specific issues, but thought that the list of international invitees should be put together and run past Donna-Marie Sangimino. Do you know her?

Pat

From: Hiser, Matthew
Sent: Friday, November 04, 2016 12:46 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>
Subject: RE: Harvesting Workshop Agenda Brainstorming

<< File: Workshop Agenda 11-4-16.docx >> << File: NRC Harvesting Workshop Announcement.docx >>

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When: Thursday, November 03, 2016 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).

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Thanks!
Matt

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From: Hiser, Matthew
Sent: Fri, 4 Nov 2016 16:45:41 +0000
To: Purtscher, Patrick;Tregoning, Robert;Poehler, Jeffrey
Subject: RE: Harvesting Workshop Agenda Brainstorming
Attachments: Workshop Agenda 11-4-16.docx, NRC Harvesting Workshop Announcement.docx

Note to requester:
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Thanks!

Matt

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Draft Agenda – March 7-8, 2017 Harvesting Workshop

Tuesday, March 7, 2017

Introduction

- NRC overview of workshop purpose and objectives 8:00 – 8:10

Session 1: Lessons learned from harvesting experience

- EPRI Perspective on Harvesting Lessons Learned 8:10 – 8:45
 - Zorita, Baffle Bolts, Barsebeck, etc.
- DOE Perspective on Harvesting Lessons Learned 8:45 – 9:20
 - Zion, etc.
- NRC Perspective on Harvesting Lessons Learned 9:20 – 9:50
 - Shoreham, St. Lucie, Zorita, Zion, etc.

BREAK 9:50 – 10:05

- Japan – JNES / JNRA 10:05 – 10:40
 - International Perspective on Harvesting Lessons Learned

DISCUSSION 10:40 – 11:30

LUNCH 11:30 – 12:30

Session 2: Technical data needs best addressed by harvesting

- PNNL/NRC 12:30 – 12:55
 - Overview of data needs best addressed by harvesting
- Belgium - Tractebel 12:55 – 1:20
 - Perspective on harvesting data needs, particularly RPV
- Korea – KAERI? 1:20 – 1:45
 - Perspective on harvesting data needs, Kori plant
- Switzerland – ENSI or PSI? 1:45 – 2:10
 - Perspective on harvesting data needs, Muhleberg

DISCUSSION 2:10 – 2:45

BREAK 2:45 – 3:00

Session 3: Sources of Materials

- NRC 3:00 – 3:15
 - Available materials from decommissioning plants and past harvesting programs
- EPRI / NEI 3:15 – 3:45
 - Available materials from operating reactors and past harvesting programs
- DOE (ORNL?) 3:45 – 4:15
 - Available materials at DOE labs from past harvesting programs
- IAEA ? 4:15 – 4:45
 - International harvesting opportunities

DISCUSSION 4:45 – 5:30

Wednesday, March 8, 2017

Session 4: Practical aspects of Harvesting

- US decommissioning company 8:00 – 8:40
 - Decommissioning process vs. harvesting: schedule, site-specific, timing for different components
- International decommissioning company – Germany? 8:40 – 9:20
 - Decommissioning and harvesting plans and experience
- US utility 9:20 – 10:00
 - Decommissioning process and plans
 - Owner perspective on harvesting and decommissioning

BREAK 10:00 – 10:15

- Researcher perspective – EPRI or DOE or international 10:15 – 10:45
 - Practical challenges to plan for and carry out harvesting

DISCUSSION 10:45 – 11:45

LUNCH 11:45 – 12:45

Session 5: Harvesting Decision-making

- PNNL / NRC 12:45 – 1:15
 - Technical information needed for informed harvesting decisions
- EPRI/NEI 1:15 – 1:45
 - Balancing costs and benefits to ensure value from harvesting
- DOE 1:45 – 2:15
 - Applying past experience to future harvesting decisions
- International - ? 2:15 – 2:45
 - Harvesting decision-making
- DISCUSSION 2:45 – 4:00
 - Potential harvesting partnerships
 - RPV, internals, piping, concrete, cables
 - US, international opportunities

Discussion Topics

- Harvesting decision-making and prioritization
 - Technical data needs best addressed by harvesting
 - Technical information needed in advance of harvesting
- Sources of materials:
 - Decommissioning reactors
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 - Communication and coordination between decommissioning and researchers
- International collaborative programs on specific components at specific plants

Ex-Plant Materials Harvesting Workshop

Location: NRC HQ in Rockville, MD

Dates: March 7-8, 2017

Motivation:

- There are increasing opportunities to harvest the safety-critical components from decommissioning plants, both domestic and international.
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From: Hiser, Allen
Sent: Thu, 1 Dec 2016 17:21:48 -0500
To: Hiser, Matthew
Subject: RE: Harvesting Workshop Agenda Brainstorming

A couple of thoughts:

- I interpret Session 1 to focus on lessons learned to facilitate future harvesting efforts. I would suggest adding a presentation to summarize past harvesting activities with an emphasis on the technical results and benefits from the efforts. This would serve as a historical record and may "remind" the technical community of past technical findings.
- Let me know which countries you need to identify a presenter for, and I will pursue this at the IGALL meeting in a couple of weeks.
- I will take whatever form the workshop announcement has to distribute at the IGALL meeting.

 (b)(6)

From: Hiser, Matthew
Sent: Monday, November 21, 2016 10:50 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Subject: FW: Harvesting Workshop Agenda Brainstorming

If you get a chance, please take a look at the draft agenda and provide any comments or feedback.

From: Hiser, Matthew
Sent: Friday, November 04, 2016 12:48 PM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: FW: Harvesting Workshop Agenda Brainstorming

Tying you into this discussion on the harvesting workshop per Rob's suggestion. Any input much appreciated ☺

From: Hiser, Matthew

Sent: Friday, November 04, 2016 12:46 PM

To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>

Subject: RE: Harvesting Workshop Agenda Brainstorming

<< File: Workshop Agenda 11-4-16.docx >> << File: NRC Harvesting Workshop Announcement.docx >>

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Thanks!

Matt

Original Appointment-----

From: Hiser, Matthew

Sent: Wednesday, November 02, 2016 2:34 PM

To: Hiser, Matthew; Purtscher, Patrick; Tregoning, Robert; Poehler, Jeffrey

Subject: Harvesting Workshop Agenda Brainstorming

When: Thursday, November 03, 2016 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).

Where: HQ-TWFFN-08C01-10p

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Rob and I were discussing trying to selectively target participants and presentations to cover the topics we'd like, rather than simply asking DOE and EPRI and others for their take on "harvesting." I think if we plan this well, we can get an interesting and substantive discussion. If not, we may just get a rehash of SLR-type talks...

Thanks!

Matt

<< File: Agenda Outline.docx >>

From: Tregoning, Robert
Sent: Thu, 1 Dec 2016 10:53:18 -0500
To: Hiser, Matthew
Subject: RE: Harvesting Workshop Agenda

Thanks, I'll send the agenda to DOE/EPRI and start circulating the announcement as well....

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Hiser, Matthew
Sent: Thursday, December 01, 2016 10:37 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: Harvesting Workshop Agenda

Hi Rob,

I've incorporated the tweaks to the agenda that we discussed yesterday. We may want to try to schedule a meeting soon, given the rapidly approaching holidays. We should try to get aligned with DOE and EPRI before the holidays and firm up/contact the presenters. When everyone gets back in January, we'll be about 2 months from the workshop!

Thanks!
Matt

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Hiser, Matthew
Sent: Fri, 21 Oct 2016 13:17:36 +0000
To: Tregoning, Robert; lyengar, Raj
Subject: RE: Harvesting Workshop Announcement

Sounds good – thanks Rob!

From: Tregoning, Robert
Sent: Friday, October 21, 2016 9:17 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; lyengar, Raj <Raj.lyengar@nrc.gov>
Subject: RE: Harvesting Workshop Announcement

Let's set the dates based on EPRI/DOE feedback and then I'll start sending internationally once we finalize the dates.

RT

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Hiser, Matthew
Sent: Friday, October 21, 2016 9:05 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; lyengar, Raj <Raj.lyengar@nrc.gov>
Subject: Harvesting Workshop Announcement

Hi Rob and Raj,

Please find attached the final version of the harvesting workshop announcement. If you could share this with your contacts at DOE/EPRI (Raj), and internationally (Rob), that would be great to begin to publicize this workshop and receive feedback on the preferred dates as well as those interested to present at the workshop.

Thanks!
Matt

From: Hiser, Matthew
Sent: Thu, 1 Dec 2016 20:32:10 +0000
To: Purtscher, Patrick
Subject: RE: Harvesting Workshop as Non-Public Meeting

I agree you could certainly make that argument. In many ways those deep dive meetings were closer to NRC regulatory decisions / actions than this harvesting workshop. Obviously a big difference is this workshop envisions broader participation...

From: Purtscher, Patrick
Sent: Thursday, December 01, 2016 2:27 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Workshop as Non-Public Meeting

Matt,

In some ways, I think this workshop is not significantly different than the deep-dive tel con we had with EPRI and DOE, we are just focusing on the one subject and inviting more people to participate, hopefully face-to-face, rather than on the phone.

Pat

From: Hiser, Matthew
Sent: Thursday, December 01, 2016 2:20 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: Harvesting Workshop as Non-Public Meeting

Hi Steve,

We have discussed the option of doing the harvesting workshop as a public vs. non-public meeting. For simplicity in running the meeting and frankness of participants input, we think it would be advantageous to have a non-public meeting.

The relevant management directive on NRC meetings is MD 3.5 and the relevant section E of that directive is here: <http://www.internal.nrc.gov/policy/directives/catalog/md3.5.pdf#H-I.E> . In this section of the directive, it states:

“In general, meetings between NRC staff and outside persons will be public meetings unless the staff determines that the subject matter to be discussed—

...
(g) Is a general information exchange having no direct, substantive connection to a specific NRC regulatory decision or action.”

It seems clear to me that this situation under sub-item (g) accurately describes the harvesting workshop we are planning.

This information should probably be shared with division management for their awareness and agreement as we move forward with planning this workshop.

Thanks!
Matt

Note to requester: Attachment is immediately following.

From: Hiser, Matthew
Sent: Mon, 6 Mar 2017 20:33:41 +0000
To: Frankl, Istvan
Subject: RE: Harvesting Workshop Attendees
Attachments: Harvesting Workshop Final Agenda.pdf

Final agenda!

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Hiser, Matthew
Sent: Monday, March 06, 2017 2:56 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: Harvesting Workshop Attendees

Here you go Steve!

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Frankl, Istvan
Sent: Monday, March 06, 2017 2:30 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting Workshop Attendees

Matt,

Please send me the latest list of attendees.

Thanks,

Steve

Ex-Plant Materials Harvesting Workshop Agenda

Tuesday, March 7

Session	Time	Organization	Speaker	Presentation Title
Intro	8:00	NRC	Michael Weber	Welcome and Introduction to Workshop
			Robert Tregoning	
1	8:15 – 8:45	DOE	Rich Reister	DOE Perspectives on Material Harvesting
		EPRI	Sherry Bernhoft	EPRI Perspective on Harvesting Projects
		NRC	Robert Tregoning	NRC Perspective on Motivation for Harvesting
		GRS	Uwe Jendrich	Role of GRS in Decommissioning and LTO
		CRIEPI	Taku Arai	CRIEPI Motivations for Harvested Material
	8:45 – 9:45	DISCUSSION		
9:45-10:00		BREAK		
2	10:00 – 10:20	PNNL (for NRC)	Pradeep Ramuhalli	Data Needs Best Addressed By Harvesting
	10:20 – 10:30	NRC	Matthew Hiser	High-Priority Data Needs for Harvesting
	10:30 – 10:55	DOE	Keith Leonard	LWRS Program Perspective on the Technical Needs for Harvesting
	10:55 – 11:20	SCK-CEN	Rachid Chaouadi	Review of past RPV sampling test programs and perspective for long term operation
	11:20 – 11:45	Westinghouse	Arzu Alpan	Importance of Harvesting to Evaluate Radiation Effects on Concrete Properties
	11:45 – 12:30	DISCUSSION		
12:30 – 2:00		LUNCH		
3	2:00 – 2:10	NRC	Matthew Hiser	Sources of Materials: Past NRC Harvesting and U.S. Decommissioning Plants
	2:10 – 2:35	EPRI	Al Ahluwalia	Harvesting Plans for Materials Aging Degradation Research in Korea and Sweden
	2:35 – 2:50	DOE/ORNL	Tom Rosseel	Materials Harvested by the LWRS Program
	2:50 – 3:00	DOE/INL	John Jackson	NSUF Material Sample Library
	3:00 – 3:15	Energy Solutions	Gerry van Noordennen	Zion Material Harvesting Program
	3:15 – 3:30	Westinghouse	Arzu Alpan	Potential Harvesting of Concrete from Mihama Unit 1
	3:30 – 3:45	BREAK		
	3:45 – 4:00	GRS	Uwe Jendrich	Plants in Decommissioning in Germany
	4:00 – 4:15	CNSC	Daniel Tello	Evaluating Structures, Systems & Components from Decommissioned/Decommissioning Nuclear Facilities in Canada
	4:15 – 5:00	DISCUSSION		

Wednesday, March 8

Session	Time	Organization	Speaker	Presentation Title
4	8:00 – 8:30	EPRI	Jean Smith	Lessons Learned: Harvesting and Shipping of Zorita Materials
	8:30 – 9:00	DOE	Tom Rosseel	LWRS Program: Harvesting Lessons Learned
	9:00 – 9:30	NRC	Matthew Hiser	NRC Perspective on Harvesting Experience and Lessons Learned
	9:30 – 10:00	CRIEPI	Taku Arai	CRIEPI Research Activities with Harvested Materials
	10:00 – 10:15	BREAK		
	10:15 - 10:45	Energy Solutions	Gerry van Noordennen	Zion Harvesting Experience and Lessons Learned
	10:45 - 11:15	Dominion	Bill Zipp	Kewaunee Insights on Material Harvesting
	11:15 – 12:00	DISCUSSION		
12:00 – 1:30		LUNCH		
5	1:30 – 1:45	PNNL (for NRC)	Pradeep Ramuhalli	Technical Information Needed for Informed Harvesting Decisions
	1:45 – 2:30	DISCUSSION		
	2:30 – 3:00	Action Items and Next Steps		
	3:00 – 4:00	EPRI	Sherry Bernhoft	Closing Thoughts
		DOE	Rich Reister	
		NRC	Robert Tregoning	
		ALL		

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immediately following.

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Sent: Mon, 6 Mar 2017 19:56:18 +0000
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Attachments: Final Harvesting Workshop Attendees.docx

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Matthew Hiser

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Matthew.Hiser@nrc.gov

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Sent: Monday, March 06, 2017 2:30 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting Workshop Attendees

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Thanks,

Steve

Workshop Attendees

	Name	Organization	Present?
Japan	Taku Arai	CRIEPI	
	Sadao Higuchi	CRIEPI	
	Kazunobu Sakamoto	JNRA	
	Yasuhiro Chimi	JAEA	
Europe	Uwe Jendrich	GRS	
	Rachid Chaouadi	SCK-CEN	
	Guy Roussel	Bel V	
Canada	Daniel Tello	CNSC	
	Désiré Ndomba	CNSC	
	Karen Huynh	AECL	
US industry	Gerry van Noordennen	Energy Solutions	
	Bill Zipp	Dominion	
	Mark Richter	NEI	
	Arzu Alpan	Westinghouse	
EPRI	Sherry Bernhoft	EPRI	
	Robin Dyle	EPRI	
	Jean Smith	EPRI	
	Al Ahluwalia	EPRI	
DOE	Tom Rosseel	ORNL	
	Rich Reister	DOE	
	Keith Leonard	ORNL	
	Mikhail A. Sokolov	ORNL	
	John Wagner	INL	
	John Jackson	INL	
	Pradeep Ramuhalli	PNNL	
NRC	Pat Purtscher	NRC/RES	
	Rob Tregoning	NRC/RES	
	Matt Hiser	NRC/RES	
	Mita Sircar	NRC/RES	
	Tom Koshy	NRC/RES	
	Jeff Poehler	NRC/NRR	
	Allen Hiser	NRC/NRR	
	Angela Buford	NRC/NRR	
	Pete Ricardella	NRC/ACRS	

Note to requester: Attachment is immediately following.

From: Hiser, Matthew
Sent: Fri, 3 Mar 2017 13:23:22 +0000
To: Koshy, Thomas;Sircar, Madhumita;Poehler, Jeffrey;Hiser, Allen;Buford, Angela
Cc: Tregoning, Robert;Purtscher, Patrick
Subject: RE: Harvesting Workshop Information
Attachments: Ex-Plant Materials Harvesting Workshop.pptx

I also wanted to share the workshop introduction slides that cover meeting logistics, motivation, approach, expected outcome, and session expectations. We are hoping these slides provide a common vision for the workshop that will allow for a focused, productive discussion.

Thanks!
Matt

From: Hiser, Matthew
Sent: Thursday, March 02, 2017 4:18 PM
To: Koshy, Thomas <Thomas.Koshy@nrc.gov>; Sircar, Madhumita <Madhumita.Sircar@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>; Buford, Angela <Angela.Buford@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: Harvesting Workshop Information

Dear NRC staff workshop attendees,

I have attached the final workshop agenda and list of attendees. The workshop will begin at 8 AM on next Tuesday and Wednesday, March 7-8 in 3WFN 1C3. There will also be a webinar available for additional staff, in case any of your colleagues are interested:

<https://attendee.gotowebinar.com/register/6076202901971284226> .

I have also attached the planned NRC slides. These slides have been developed with input primarily from RES staff, as well as some NRR staff. The plan is for all workshop presentations to be accessible via the following Google Drive link:

<https://drive.google.com/drive/folders/0B5DWMlch5YSXcnpZZ0JOS055QUU?usp=sharing> .

We have made a reservation for a dinner with workshop attendees on Tuesday evening at 6 PM. Please let me know if you would like to join the dinner and I will include you in the headcount.

Please let me know if you have any questions or suggestions.

Thanks!
Matt

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62

Matthew.Hiser@nrc.gov

Ex-Plant Materials Harvesting Workshop

March 7-8, 2017

USNRC HQ

Rockville, MD, USA

Meeting Logistics

- Workshop will be held at NRC's Three White Flint North building
 - Directly adjacent to the White Flint Metro station
 - Nearest hotel within walking distance: Bethesda North Marriott Hotel & Conference Center
- Workshop is a non-public meeting to encourage open discussion
 - Presentations and meeting summary will be distributed among meeting participants only
- GoToMeeting webinar will be available to support additional attendees
 - Webinar attendees will be primarily observers
 - Limited opportunities for webinar attendee participation in discussion if time allows
 - Discussion will be recorded through GoToMeeting software to aid capturing discussion in meeting summary

Meeting Logistics

- Presenters, please keep presentations brief and within the allotted time on the agenda
 - Please limit questions following presentations to specific, clarification-type questions
- For broader discussion questions, please save and raise during discussion towards end of each session
- All presentations and meeting summary will be available on Google Drive:
<https://drive.google.com/drive/folders/0B5DWMLch5YSXcnpZZ0JOS055QUU?usp=sharing>

Motivation

- With plants shutting down both in the U.S. and internationally, there are increasing opportunities to harvest components from decommissioning plants
 - Past harvesting efforts generally more reactive as opportunities arose, rather than proactively planned
- Ex-plant materials may be valuable because they have been exposed to actual in-service plant operating conditions
 - Can reduce the uncertainty associated with the applicability of the aging conditions
- Insights from research on harvested materials can address technical data needs identified for extended plant operation
- Lessons learned from past harvesting programs can help improve future harvesting efforts
 - Challenges encountered in previous programs can be shared and mitigated or avoided in future programs

Approach

- Domestic and international researchers, industry, regulators, and decommissioning companies' discuss benefits and challenges with ex-plant harvesting
 - Encourage sharing of lessons learned as well as areas of common interest
 - Workshop consists of topical sessions with short presentations and significant time for open discussion
 - Goal is to maximize engagement among meeting participants
 - Scope includes any materials aging issue that could benefit from harvesting, including metals, cables, and concrete
-

Expected Outcome

- Participants become better informed and aware of the benefits and challenges associated with ex-plant harvesting
- Discussions help identify areas of common interest for harvesting to address technical data needs
- Presentations and discussions provide the starting point for a “database” of harvested materials and future harvesting opportunities
- Contacts are made among research organizations to allow for further discussion of specific harvesting projects
- Workshop summary documenting discussion will be distributed among participants

Session Expectations

- Session 1 Motivation for Harvesting
 - Perspective from panel participants on their organizations' interest in and motivation for harvesting
 - Brief (5-10 minute) presentation from each panel member followed by general discussion
- Session 2 Technical Data Needs for Harvesting
 - Presenters share high-priority data needs that may be best addressed by harvesting
 - Where does harvesting hold particular value compared to other sources of technical data
 - 15-20 minute presentations followed by open discussion of technical data needs for harvesting

Session Expectations

- Session 3 Sources of Materials
 - Information on previously harvested materials and future harvesting opportunities
 - Materials located at research and vendor facilities
 - Decommissioning plants that may allow for future harvesting
 - Short 5-10 minute presentations followed by open discussion
 - Starting point for potential database of previously harvested materials and future harvesting opportunities

Session Expectations

- Session 4 Harvesting Experience: Lessons Learned and Practical Aspects
 - Improving future efforts with lessons learned from past programs
 - Pitfalls to avoid and strategies to improve likelihood of success
 - Practical perspective from non-researchers on how harvesting interfaces with the decommissioning process
 - International decommissioning and harvesting experience
 - 20-30 minute presentations followed by open discussion

Session Expectations

- Session 5 Future Harvesting Program Planning
 - Technical and logistical information needed when planning a specific harvesting program
 - Perspective from panel participants on the workshop
 - Next steps and actions from workshop
 - Potential areas of common interest for future harvesting programs
 - Brief (5-10 minute) presentation from each panel member followed by general discussion

From: Wong, Albert
Sent: Mon, 6 Mar 2017 11:29:16 -0500
To: Hiser, Matthew
Subject: RE: Harvesting Workshop Information

Many thanks for the info, looking forward to working with you and Patrick in the future.

From: Hiser, Matthew
Sent: Monday, March 06, 2017 11:11 AM
To: Wong, Albert <Albert.Wong@nrc.gov>
Subject: FW: Harvesting Workshop Information

FYI

From: Hiser, Matthew
Sent: Thursday, March 02, 2017 4:18 PM
To: Koshy, Thomas <Thomas.Koshy@nrc.gov>; Sircar, Madhumita <Madhumita.Sircar@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>; Buford, Angela <Angela.Buford@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: Harvesting Workshop Information

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I have attached the final workshop agenda and list of attendees. The workshop will begin at 8 AM on next Tuesday and Wednesday, March 7-8 in 3WFN 1C3. There will also be a webinar available for additional staff, in case any of your colleagues are interested:
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We have made a reservation for a dinner with workshop attendees on Tuesday evening at 6 PM. Please let me know if you would like to join the dinner and I will include you in the headcount.

Please let me know if you have any questions or suggestions.

Thanks!
Matt

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62

Matthew.Hiser@nrc.gov

From: Hiser, Allen
Sent: Mon, 6 Mar 2017 08:01:47 -0600
To: Hiser, Matthew
Subject: RE: Harvesting Workshop Information

Note to requester: The referenced ADAMS document, ML111310052, is publicly available.

Additional prior harvesting work:

<https://www.nrc.gov/docs/ML1113/ML111310052.pdf>

From: Hiser, Matthew
Sent: Monday, March 06, 2017 8:11 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Subject: RE: Harvesting Workshop Information

Thanks Comment incorporated...
(b)(6)

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Hiser, Allen
Sent: Friday, March 03, 2017 1:14 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Koshy, Thomas <Thomas.Koshy@nrc.gov>; Sircar, Madhumita <Madhumita.Sircar@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Buford, Angela <Angela.Buford@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop Information

One suggestion on slide 4 to put the problem first:

Put as the first motivation the fact that plants (and regulators) are considering long term operation to exposure conditions for which confirmation of expected degradation levels are needed to ensure that plants will implement adequate aging management.

This puts the emphasis on plant operation and not on decommissioning plants, as if harvesting is a solution looking for a problem.

Allen

From: Hiser, Matthew
Sent: Friday, March 03, 2017 8:23 AM
To: Koshy, Thomas <Thomas.Koshy@nrc.gov>; Sircar, Madhumita <Madhumita.Sircar@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>; Buford, Angela <Angela.Buford@nrc.gov>

Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop Information

I also wanted to share the workshop introduction slides that cover meeting logistics, motivation, approach, expected outcome, and session expectations. We are hoping these slides provide a common vision for the workshop that will allow for a focused, productive discussion.

Thanks!
Matt

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Sent: Thursday, March 02, 2017 4:18 PM
To: Koshy, Thomas <Thomas.Koshy@nrc.gov>; Sircar, Madhumita <Madhumita.Sircar@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>; Buford, Angela <Angela.Buford@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: Harvesting Workshop Information

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Please let me know if you have any questions or suggestions.

Thanks!
Matt

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Hiser, Matthew
Sent: Wed, 31 Jan 2018 16:04:17 +0000
To: Tregoning, Robert
Cc: Purtscher, Patrick
Subject: RE: Harvesting Workshop Presentations

I think that sounds reasonable to me.

From: Tregoning, Robert
Sent: Wednesday, January 31, 2018 10:53 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop Presentations

I'm going to send it to him under our umbrella agreement with CSN that covers information sharing but ask him not to distribute or share outside of his organization.....

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Hiser, Matthew
Sent: Wednesday, January 31, 2018 10:51 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop Presentations

I'm fine with it...

From: Tregoning, Robert
Sent: Wednesday, January 31, 2018 10:50 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop Presentations

Ah yes, I forgot you put them on google drive and when I scanned the summary report I didn't see a link. Do you see any problems with sending the summary and link to Carlos?

Robert Tregoning
Technical Advisor for Materials

US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Hiser, Matthew
Sent: Wednesday, January 31, 2018 10:48 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop Presentations

Here's the final report – the presentations are on a folder in my Google Drive that is accessible via a private link (anyone with the link can access them, but otherwise no one can see them): <https://drive.google.com/open?id=0B5DWMLch5YSXcnpZZ0JOS055QUU> . This link is in the final report on page 17 under Action Items.

From: Tregoning, Robert
Sent: Wednesday, January 31, 2018 10:45 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop Presentations

Matt:

Thanks, that's what I thought but just wanted confirmation. I got a request from CSN (Carlos Castelao) about the workshop. I was planning on sending him the workshop summary. Are there any issues with this? I was also thinking about sending him the presentations. Thoughts? How did we ultimately send these to the workshop participants if they are just on the g:\?

Rob

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Hiser, Matthew
Sent: Wednesday, January 31, 2018 10:38 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop Presentations

Hi Rob,

They are not in ADAMS (since we were in this non-public working space, I never bothered).
Here's their location on the G: drive: G:\DE\CMB\Harvesting Workshop Presentations .

Thanks!
Matt

From: Tregoning, Robert
Sent: Wednesday, January 31, 2018 8:38 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: Harvesting Workshop Presentations

Matt/Pat:

I'm assuming that we put all the presentations in ADAMS in a single package. Is this the case?
Can you send me the ADAMS number?

Rob

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Tregoning, Robert
Sent: Tue, 5 Sep 2017 11:21:43 -0400
To: Hiser, Matthew
Subject: RE: Harvesting workshop report

(b)(6)

No, [REDACTED]

----- Original Message -----

From: "Hiser, Matthew" <Matthew.Hiser@nrc.gov>
Date: Tue, September 05, 2017 11:20 AM -0400
To: "Tregoning, Robert" <Robert.Tregoning@nrc.gov>
Subject: RE: Harvesting workshop report

Thanks Rob! Do you when you'll be back? [REDACTED]

(b)(6)

From: Tregoning, Robert
Sent: Tuesday, September 05, 2017 11:11 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting workshop report

Matt:

(b)(6) I've reviewed the summary report and have a marked up version to provide you as soon as I get back from [REDACTED]. Most of my markup is editorial, but you may not be able to make out my chicken scratch. Also, I have a few questions or comments that will require some discussion. Therefore, let's plan on a short meeting to go over the report when I get back.

Rob

From: Tregoning, Robert
Sent: Tue, 17 Jan 2017 16:56:11 -0500
To: Hiser, Matthew
Subject: RE: Harvesting Workshop Sessions 3 & 4

Would like to hear more about the call when you get a chance....

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Hiser, Matthew
Sent: Tuesday, January 17, 2017 3:36 PM
To: Bernhoft, Sherry <sbernhoft@epri.com>; Rosseel, Thomas M. <rosseeltm@ornl.gov>; Dyle, Robin <rdyle@epri.com>; Demma, Anne <ademma@epri.com>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop Sessions 3 & 4

Thanks everyone for participating today. I appreciate all the comments and suggestions and we'll adjust the agenda accordingly.

One follow-up: could DOE and EPRI identify who they expect their presenter to be for each of the 5 sessions?

Notes from today's call:

- Matt H. described general plans for workshop:
 - Non-public, keep participation to around 30 individuals for more focused interactive discussion
 - Goal is to have well-balanced discussion of harvesting, not sales pitches for specific projects or programs
- Sherry B. suggested fewer presentations with more panel discussion time
 - Plan is for roughly 50-60% presentations and remaining time for discussion
 - Sessions 1 and 5 should be primarily panel discussion

- Session 2:
 - o Question raised about covering metals, cables, and concrete
 - Agreed that all presenters can cover all three types materials, hopefully just a few slides
 - Suggest presenters focus on high-priority data needs from their organization's perspective
 - Perhaps some background on what informs their priorities
- Session 3:
 - o Suggestions to include EnergySolutions, PWROG, Korea, Japan, and French presentation slots
 - Emphasize to presenters to avoid "sales pitch," but please provide information on sources of materials
 - Short ~10 min presentations on sources of materials with remaining time for discussion
 - o Hopefully use presented information as starting point for previously harvested materials database
- Session 4:
 - o Longer (20-30 min) presentations focused on forward-looking lessons learned
 - o Suggestion to reach out to Exelon (Zion experience plus many operating facilities) if Dominion can't support
 - o Also consider Japan and France for international presentations

Actions:

- Brian Bergos provide Matt with PWROG contact
- Matt look into if affidavit would be needed for any proprietary information from EPRI/industry
- Matt update agenda for sessions 3 and 4 and finalize speakers

Thanks!
Matt

Matthew Hiser

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

Phone: 301-415-2454 | Office: TWFN 10D62

Matthew.Hiser@nrc.gov

-----Original Appointment-----

From: Hiser, Matthew

Sent: Monday, January 16, 2017 9:48 AM

To: Hiser, Matthew; Bernhoft, Sherry; Rosseel, Thomas M.; Dyle, Robin; Demma, Anne

Subject: Harvesting Workshop Sessions 3 & 4

When: Tuesday, January 17, 2017 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).

Where: Telecon: 888-677-8615 passcode: [REDACTED] (b)(6)

888-677-8615 passcode: [REDACTED] (b)(6)

<< File: Sessions 3 & 4.docx >> << File: Harvesting Workshop Agenda 1-12-17.docx >>

There have been previous discussions between NRC, DOE, and EPRI on the workshop agenda overall to discuss what the workshop is trying to accomplish and the best way to do so. Those conversations did not dig down into each session and make a final decision on exactly who will be the presenters and topics in each session. Internally here at NRC, we've worked to lay that out in the attached documents.

The purpose of this call is to discuss all the specifics of sessions 3 and 4 to identify the right presenters for each slot. This discussion could also lead to adding, eliminating or changing some of the planned presentations if you all have other ideas or suggestions. Our main goal is to have a well-balanced, comprehensive discussion of harvesting that will benefit all participants. We think working with you all up front to help plan and make decisions will give us a better workshop in the end. So please come with ideas and suggestions for sessions 3 and 4 on sources of materials and lessons learned/practical aspects of harvesting.

From: Tregoning, Robert
Sent: Wed, 1 Mar 2017 15:16:47 -0500
To: Hiser, Matthew
Subject: RE: Harvesting Workshop Slides

Awesome, we're in the home stretch....

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Hiser, Matthew
Sent: Wednesday, March 01, 2017 3:14 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Harvesting Workshop Slides

Yep, got input from DE/SGSEB on concrete, DE/ICEEB on electrical, DRA on electrical for fire, and Mark Kirk on RPV.

Only remaining thing is I'm planning to send an FYI to Steve about these slides and we could do similarly for NRR.

Thanks!
Matt

From: Tregoning, Robert
Sent: Wednesday, March 01, 2017 3:12 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: FW: Harvesting Workshop Slides

So have we gotten everything we need from everyone?

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
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11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Hiser, Matthew

Sent: Wednesday, March 01, 2017 3:06 PM

To: Sircar, Madhumita <Madhumita.Sircar@nrc.gov>; Pires, Jose <Jose.Pires@nrc.gov>; Seber, Dogan <Dogan.Seber@nrc.gov>; Philip, Jacob <Jacob.Philip@nrc.gov>; Ray, Sheila <Sheila.Ray@nrc.gov>; Koshy, Thomas <Thomas.Koshy@nrc.gov>; Taylor, Gabriel <Gabriel.Taylor@nrc.gov>; Murdock, Darrell <Darrell.Murdock@nrc.gov>; Kirk, Mark <Mark.Kirk@nrc.gov>

Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>

Subject: Harvesting Workshop Slides

Thank you for your input on the NRC slides for the harvesting workshop. I have incorporated all comments and input received and attached the latest version of the slides to be presented next week.

Thanks!

Matt

From: Hiser, Matthew
Sent: Tue, 2 May 2017 12:46:07 +0000
To: Tregoning, Robert
Cc: Purtscher, Patrick
Subject: RE: Harvesting Workshop Summary Report Draft

Thanks Rob! I'll keep plugging on the summary report and then try to reengage on the wishlists and sources database...

From: Tregoning, Robert
Sent: Monday, May 01, 2017 10:57 AM
To: Hiser, Matthew
Cc: Purtscher, Patrick
Subject: RE: Harvesting Workshop Summary Report Draft

Matt:

Thanks, I'm pretty tied up again both this week and early next week (through Wednesday) but I'll do my best. Proceed if you don't hear from me by end of this week. We do need to keep the effort moving on developing wish lists and the sources database. I spoke with Kazu Sakamoto last week and he indicated that he's getting pressure from his bosses to do something in this area so he is now motivated more so than during the workshop to collaborate with us on this. I can provide more details....

Rob

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US Nuclear Regulatory Commission
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11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Hiser, Matthew
Sent: Monday, May 01, 2017 10:45 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: Harvesting Workshop Summary Report Draft

Hi Rob,

I have started working on the workshop summary report (attached). I bounced this off of Pat last week and he and I are largely aligned in terms of scope and level of detail.

I have currently written up through the background / intro, session 1 and session 2. When you get a chance, please take a look and provide any feedback on the organization, scope, and level of detail. There is a high-level outline on the first page.

I am hoping to get to a complete first draft by the end of next week and then hopefully something ready to share with workshop participants by the end of May.

Thanks!
Matt

Matthew Hiser

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

Phone: 301-415-2454 | Office: TWFN 10D62

Matthew.Hiser@nrc.gov

From: Hiser, Matthew
Sent: Mon, 6 Mar 2017 17:19:02 +0000
To: Purtscher, Patrick
Subject: RE: Harvesting Workshop talking points.docx

Sorry Pat – I think it's a good idea. I just don't want to open a whole can of worms for a couple talking points... Easier to just use what we've already developed...

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Purtscher, Patrick
Sent: Monday, March 06, 2017 12:11 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: Harvesting Workshop talking points.docx

OK

From: Hiser, Matthew
Sent: Monday, March 06, 2017 12:07 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: Harvesting Workshop talking points.docx

Hi Pat,

I certainly think the idea of helping "future harvesting programs to be successful" is an objective, but I don't think it's really related to "facilitating contacts and communication". The idea of facilitating contacts and communication is directly tied to initiating new harvesting projects.

For reference, this bullet came from the workshop announcement. In the interest of simplicity, I'd leave it as-is...

Thanks!
Matt

Matthew Hiser

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Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Purtscher, Patrick
Sent: Monday, March 06, 2017 11:56 AM

To: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>

Subject: RE: Harvesting Workshop talking points.docx

I would suggest some slight changes in wording. What do you think?

Pat

Purpose and Objective:

- For NRC staff and interested stakeholders to have greater awareness and knowledge of the benefits and challenges associated with ex-plant harvesting.
- Facilitate contacts and communication to enable ~~specific~~ FUTURE ~~cooperative~~ ex-plant harvesting programs to be initiated ~~SUCCESSFUL~~.

From: Frankl, Istvan

Sent: Monday, March 06, 2017 11:39 AM

To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>

Subject: FW: Harvesting Workshop talking points.docx

Importance: High

Matt, Pat,

Are you OK with Rob's inputs? Any revisions/ additions?

Please let me know ASAP.

Thanks,

Steve

From: Tregoning, Robert

Sent: Monday, March 06, 2017 11:33 AM

To: Frankl, Istvan <Istvan.Frankl@nrc.gov>

Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>

Subject: Harvesting Workshop talking points.docx

Steve:

Here are some talking points that Mike can use to introduce the workshop tomorrow. I think it's best if it comes through your branch so please forward it to Brian/John so that they can send it along to Mike. Let me know if you have any questions.

Cheers,

Rob

From: Tregoning, Robert
Sent: Mon, 6 Mar 2017 13:58:46 -0500
To: Hiser, Matthew
Subject: RE: Harvesting Workshop talking points.docx

Call me at [REDACTED] (b)(6)

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Hiser, Matthew
Sent: Monday, March 06, 2017 1:58 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Harvesting Workshop talking points.docx

Rob,

We're all setup here in 1C3. Join in whenever you can.

Thanks!
Matt

From: Tregoning, Robert
Sent: Monday, March 06, 2017 11:33 AM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting Workshop talking points.docx

Steve:

Here are some talking points that Mike can use to introduce the workshop tomorrow. I think it's best if it comes through your branch so please forward it to Brian/John so that they can send it along to Mike. Let me know if you have any questions.

Cheers,

Rob

From: Hiser, Matthew
Sent: Mon, 6 Mar 2017 16:39:56 +0000
To: Frankl, Istvan; Purtscher, Patrick
Subject: RE: Harvesting Workshop talking points.docx

Hi Steve,

I was in Rob's office to discuss this, so I was looking over his shoulder. They're OK with me.

Thanks!
Matt

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Frankl, Istvan
Sent: Monday, March 06, 2017 11:39 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: FW: Harvesting Workshop talking points.docx
Importance: High

Matt, Pat,

Are you OK with Rob's inputs? Any revisions/ additions?

Please let me know ASAP.

Thanks,

Steve

From: Tregoning, Robert
Sent: Monday, March 06, 2017 11:33 AM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting Workshop talking points.docx

Steve:

Here are some talking points that Mike can use to introduce the workshop tomorrow. I think it's best if it comes through your branch so please forward it to Brian/John so that they can send it along to Mike. Let me know if you have any questions.

Cheers,

Rob

From: Frankl, Istvan
Sent: Mon, 6 Mar 2017 18:15:05 +0000
To: Tregoning, Robert
Cc: Purtscher, Patrick;Hiser, Matthew
Subject: RE: Harvesting Workshop talking points.docx

Thank you all for your inputs on such short notice.

Steve

From: Tregoning, Robert
Sent: Monday, March 06, 2017 11:33 AM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting Workshop talking points.docx

Steve:

Here are some talking points that Mike can use to introduce the workshop tomorrow. I think it's best if it comes through your branch so please forward it to Brian/John so that they can send it along to Mike. Let me know if you have any questions.

Cheers,

Rob

From: Frankl, Istvan
Sent: Tue, 23 Aug 2016 10:52:32 -0400
To: Hiser, Matthew
Subject: RE: Harvesting Workshop

Thanks, Matt.

This is a good start. I left my comments on your chair.

I mentioned this initiative to Kathryn at the weekly DE management meeting yesterday and promised a briefing on it as soon as we are ready. Incidentally, when do you think we will be in good position to officially "roll this out"?

As discussed during our prior meeting, timing is the essence of success for this initiative, so please move it along.

Steve

From: Hiser, Matthew
Sent: Friday, August 19, 2016 4:23 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: Harvesting Workshop

Hi everyone,

Following from the meeting yesterday, I wanted to share the attached "initial plan" for the workshop, describing the purpose and objective, approach, and intended outcome, as well as potential dates and discussion topics. Please edit and/or comment freely.

I think this document could be useful for "socializing" this topic to a greater degree in NRR, in advance of a meeting of the internal steering committee on harvesting sometime next month. At that meeting we could hopefully do some significant brainstorming on what this workshop should look like and who to contact for participation.

Thanks!
Matt

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Moyer, Carol
Sent: Thu, 23 Feb 2017 22:08:35 +0000
To: Hiser, Matthew
Subject: RE: Harvesting

Matt,

Thanks very much for sharing this info. I see a few names that I recognize here.

If I can help with this, or provide any link to the SRP program that would be beneficial, please let me know. I am not planning to take up a seat in the workshop, but I probably will try to participate in parts of it through the webinar.

-Carol

From: Hiser, Matthew
Sent: Friday, February 17, 2017 8:08 AM
To: Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: RE: Harvesting

Hi Carol,

Here's my current list of outside attendees at the workshop. There may be one or two additional, but that's all.

I also attached the list of speakers and topics for each presentation. Sessions 1-3 will be on March 7 and Sessions 4 and 5 on March 8. The agenda is not quite final as we're waiting to see on one last potential talk.

Thanks!

Matt

	Name	Organization	Email
Japan	Taku Arai	CRIEPI	arait@criepi.denken.or.jp
	Sadao Higuchi	CRIEPI	higuchi@criepi.denken.or.jp
	Kazunobu Sakamoto	JNRA	kazunobu_sakamoto@nsr.go.jp
	Yasuhiro Chimi	JAEA	chimi.yasuhiro@jaea.go.jp
Europe	Uwe Jendrich	GRS	Uwe.Jendrich@grs.de
	Rachid Chaouadi	SCK-CEN	rachid.chaouadi@sckcen.be
Canada	Daniel Tello	CNSC	daniel.tello@canada.ca
	Désiré Ndomba	CNSC	desire.ndomba@canada.ca
	Karen Huynh	AECL	khuynh@aecl.ca
US industry	Gerry van Noordennen	Energy Solutions	gpvannoordennen@energysolutions.com
	Bill Zipp	Dominion	william.f.zipp@dom.com
	Arzu Alpan	Westinghouse	alpanfa@westinghouse.com
EPRI	Sherry Bernhoft	EPRI	sbernhoft@epri.com
	Robin Dyle	EPRI	rdyle@epri.com
	Jean Smith	EPRI	jmsmith@epri.com
	Al Ahluwalia	EPRI	kahluwal@epri.com
DOE	Tom Rosseel	ORNL	rosseeltm@ornl.gov
	Rich Reister	DOE	Richard.Reister@nuclear.energy.gov
	Keith Leonard	ORNL	leonardk@ornl.gov
	Mikhail A. Sokolov	ORNL	sokolovm@ornl.gov
	Pradeep Ramuhalli	PNNL	Pradeep.Ramuhalli@pnnl.gov

From: Moyer, Carol
Sent: Thursday, February 16, 2017 3:38 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting

Hi Matt,

Would you share with me the agenda and guest list for the Harvesting Workshop?

Thanks,

Carol

From: Purtscher, Patrick
Sent: Mon, 27 Aug 2018 11:02:46 +0000
To: Hiser, Matthew
Subject: RE: harvesting_composite

Let me know when you will have time to talk about this.

Pat

From: Purtscher, Patrick
Sent: Friday, August 24, 2018 3:13 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: harvesting_composite

I think 2 major changes can be considered. First, I think the Abstract and Summary should be condensed and combined.

Second, Sections 1 and 2 can also be combined and condensed.

I will be looking over the rest so we can discuss on Monday.

Pat

From: Hiser, Matthew
Sent: Tue, 5 Dec 2017 19:40:07 +0000
To: Purtscher, Patrick
Subject: RE: Harvesting-TLR-final DRAFT-12_04_2017.docx

I think when we met last week we talked about having a meeting with the appropriate folks over there to explain this report and what is going on with harvesting, rather than just lobbing it over the fence... You might want to reach out to Bennett to figure out who would be the right staff in NRR to pull into such a meeting.

From: Purtscher, Patrick
Sent: Tuesday, December 05, 2017 2:27 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: FW: Harvesting-TLR-final DRAFT-12_04_2017.docx

Should I send this over to Bennett Brady too?

From: Purtscher, Patrick
Sent: Tuesday, December 05, 2017 8:20 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: Harvesting-TLR-final DRAFT-12_04_2017.docx

Here is the final draft of the harvesting report.

Pat

From: Hiser, Matthew
Sent: Wed, 27 Jul 2016 20:07:25 +0000
To: Thompson, Jacqueline
Subject: RE: Hey Matt, i did this but i still need a 665
Attachments: Harvesting Efforts NRAJ Bilateral 7-20-16.pptx

Attachment is immediately following. ADAMS document referenced in this record is also publicly available.

Thanks! Here you go ☺

From: Thompson, Jacqueline
Sent: Wednesday, July 27, 2016 3:31 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Hey Matt, i did this but i still need a 665

[View ADAMS P8 Properties ML16209A479](#)

[Open ADAMS P8 Document \(Harvesting Efforts NRAJ Bilateral 7-20-16.pptx\)](#)

Strategic Approach for Ex-Plant Materials Harvesting

Matthew Hiser

Amy Hull

Patrick Purtscher

Robert Tregoning

U.S. NRC

NRC-NRAJ Bilateral Technical Information Exchange Meeting
Nuclear Regulatory Commission Headquarters
August 8-9, 2016

Purpose

- Create a framework for a strategic approach to harvesting ex-plant materials to support regulatory needs associated with subsequent license renewal (SLR)
 - Ex-plant materials offer unique environmental exposure that cannot be entirely replicated by laboratory testing with fresh materials
- Align high priority data needs identified in SLR activities with harvesting opportunities from decommissioning plants

Background



- To date, harvesting opportunities have been limited due to few decommissioning plants
 - Zion in U.S., Zorita in Spain
- However, several U.S. plants have already shut down or are planning to do so in the near future
 - Kewaunee, San Onofre, Crystal River, Vermont Yankee, Oyster Creek, Fort Calhoun, Clinton, Quad Cities, Diablo Canyon
- This provides a unique opportunity to plan harvesting to address the highest priority technical and regulatory issues

Harvesting Experience

- Past harvesting efforts have generally involved reactive decision-making
 - Limited opportunities to acquire ex-plant materials
 - Limited strategic planning for harvesting
- Harvesting projects with NRC involvement:
 - Reactors internal materials from Zorita
 - Concrete from Zorita
 - Neutron absorber material from Zion
 - Cables from Zion and Crystal River

Zorita Internals Research Project Timeline

Task	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Project Inception	★									
Feasibility Study										
Project Planning Cutting Plans Equipment Design & Manufacturing On-site Preparations										
Material Extraction On-site Logistics Shipping										
Radiation and Temperature Analyses										
Material Inspection, Inventory, Documentation										
Materials Testing										
Reporting										★

Approach: Assessment of Technical Issues and Available Materials for Harvesting



- Utilize various sources of technical information with respect to anticipated degradation in NPPs out to 80 years of operation
 - NRC, DOE, EPRI, IAEA
- Identify high-priority data needs that could be addressed through harvesting ex-plant materials
 - Focus on identifying characteristics of important systems, structures, and components (SSCs) for harvesting
- Gather information on ex-plant material expected to be available based on identified needs
 - May be from both operating and decommissioning reactors

Implementation

- What might the output of this activity look like?
 - For example, the review may show there is value in acquiring CASS material around 15% delta ferrite with various dose ranges (<0.08 dpa, 1–3 dpa, and >5 dpa)
- Once that need is identified, this activity would identify what SSCs might be the best candidates for harvesting
 - For example, perhaps lower support columns would be identified as the ideal SSC to address the CASS data need
- As decommissioning plants announce their plans, there is a clear list of SSCs and their characteristics (metallurgy, temperature, fluence, etc.) that would be desired to address the data need

Current NRC Activities



- NRC is working with Pacific Northwest National Lab (PNNL) to identify technical issues that may be best addressed by ex-plant harvesting
 - Focused on unique value of harvesting to understand material properties in difficult to replicate environments
- NRC also seeking interest from other stakeholders to better understand availability of materials for harvesting
 - Considering a public workshop in fall 2016
 - Stakeholders include EPRI, DOE, U.S. industry, international partners



Discussion Topics

- Japanese approach to ex-plant material harvesting
- Information on available harvesting opportunities from Japanese reactors
 - Is it known which plants will not restart?
- Opportunities for coordination / cooperation on ex-plant harvesting



Backup Slides



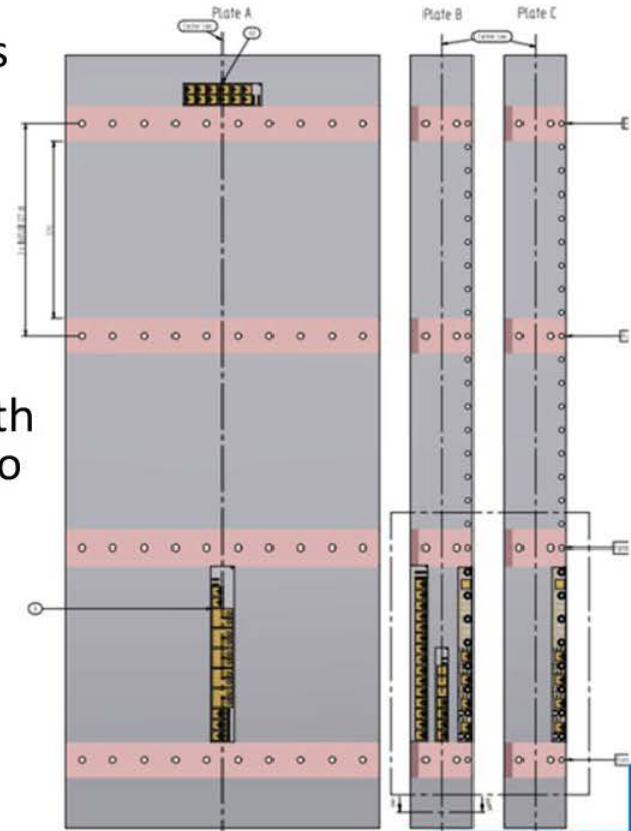
Neutron Absorbers from Zion



- **Materials Harvested:**
 - Select Boral® NAM panels from Regions 1 and 2 of the Zion SFP
- **Scope:**
 - Visual and microstructural examinations (incl. areal density)
 - Corrosion testing
- **Purpose:**
 - Identify degradation mechanisms and estimate degradation rate
 - Confirm results of in-situ areal density measurements
 - Provide confirmatory data to support regulatory decision-making
- **Timeline:**
 - Initial discussions in 2014, harvesting in 2015, testing in 2015-2016
- **Coordination:**
 - EPRI, ZionSolutions, SRNL

Zorita Internals Research Project (ZIRP)

- **Materials Harvested:**
 - Baffle plate and core barrel weld materials
- **Scope:**
 - Mechanical testing (tensile, CGR, FT)
 - Microstructural characterization (void swelling)
- **Purpose:**
 - High-fluence (up to 50 dpa) IAD effects with representative LWR exposure conditions to
 - Support regulatory decision-making associated with SLR
- **Timeline:**
 - Initial discussions in 2006, harvesting in 2013, testing ongoing through 2016
- **Coordination:**
 - EPRI, international consortium, Studsvik, Halden



Concrete from Zorita (Plan)



- **Materials Harvested:**
 - Concrete from structures that are in close proximity to RPV
- **Scope:**
 - Mechanical testing (compressive, tensile, modulus of elasticity)
 - Microstructural characterization
 - Physical change
- **Purpose:**
 - High fluence in combination with temperature and humidity that are representative of LWR environmental effects on structural and shielding performance
 - Supports regulatory decision-making associated with SLR
- **Timeline:**
 - Initial discussions in 2014, harvesting in 2015, testing 2016-2018
- **Coordination:**
 - NRC , ENRESA and CSN

Cables: Zion and Crystal River



- **Materials Harvested:**
 - Low and Medium Voltage Cables
- **Scope:**
 - Condition monitoring to assess cable performance under normal operating conditions (accelerated aging) and accident conditions
- **Purpose:**
 - Cable degradation due to normal operating environment and accident conditions
 - Supports regulatory decision-making associated with SLR
- **Timeline:**
 - Initial discussions in 2012; Cable samples harvested from Zion in 2013
 - Plan is to harvest additional samples from Crystal River and Zion in 2015
 - Testing expected to be completed in 2017
- **Coordination:**
 - ORNL, Zion Solutions, NIST, EPRI

From: Tregoning, Robert
Sent: Tue, 17 Jan 2017 08:04:02 -0500
To: Hiser, Matthew; Purtscher, Patrick
Subject: RE: Hi Matt. I understand that there will be a 2 day harvesting workshop the week before the RIC? If so can you send me a scheduler for the workshop?

Agreed....

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Hiser, Matthew
Sent: Tuesday, January 17, 2017 7:25 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: FW: Hi Matt. I understand that there will be a 2 day harvesting workshop the week before the RIC? If so can you send me a scheduler for the workshop?

Got this from Bernie Litkett in DLR last week. We probably need to talk about how to communicate this workshop within NRC...

Thanks!
Matt

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Litkett, Bernard
Sent: Thursday, January 12, 2017 2:30 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Hi Matt. I understand that there will be a 2 day harvesting workshop the week before the RIC? If so can you send me a scheduler for the workshop?

*Bernard Litkett
NRR/DLR/RSRG
Project Manager*

0-11C5
301-415-3657
Bernard.Litkett@nrc.gov

From: Litkett, Bernard
Sent: Wed, 18 Jan 2017 12:07:24 -0500
To: Hiser, Matthew
Subject: RE: Hi Matt. I understand that there will be a 2 day harvesting workshop the week before the RIC? If so can you send me a scheduler for the workshop?

Hi Matt,

Thank you for the announcement and draft agenda.

Bernie

From: Hiser, Matthew
Sent: Wednesday, January 18, 2017 11:54 AM
To: Litkett, Bernard <Bernard.Litkett@nrc.gov>
Subject: RE: Hi Matt. I understand that there will be a 2 day harvesting workshop the week before the RIC? If so can you send me a scheduler for the workshop?

Hi Bernie,

I don't have a scheduler set up, but I have attached the workshop announcement and draft agenda.

Thanks!
Matt

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Litkett, Bernard
Sent: Thursday, January 12, 2017 2:30 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Hi Matt. I understand that there will be a 2 day harvesting workshop the week before the RIC? If so can you send me a scheduler for the workshop?

Bernard Litkett
NRR/DLR/RSRG
Project Manager
0-11C5
301-415-3657
Bernard.Litkett@nrc.gov

From: Hiser, Matthew
Sent: Wed, 8 Mar 2017 17:36:27 +0000
To: Hull, Amy
Subject: RE: I made new folder, click here G:\DE\CMB\Harvesting Workshop Presentationsall Harvesting presentations at this link...

That sounds good... thanks Amy!

From: Hull, Amy
Sent: Wednesday, March 08, 2017 12:20 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: FW: I made new folder, click here G:\DE\CMB\Harvesting Workshop Presentationsall Harvesting presentations at this link...
Importance: High

I created a folder in Gdrive so more easily readable. Click here <G:\DE\CMB\Harvesting Workshop Presentations> What do you think? Should we have a folder in the LTO part of the CMB Sharepoint? (I can do this as my marginal contribution to your lovely work....)

To: Bloom, Steven <Steven.Bloom@nrc.gov>; Wittick, Brian <Brian.Wittick@nrc.gov>; Morey, Dennis <Dennis.Morey@nrc.gov>; Alley, David <David.Alley@nrc.gov>; Rudland, David <David.Rudland@nrc.gov>; Zimmerman, Jacob <Jacob.Zimmerman@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>; Jung, Ian <Ian.Jung@nrc.gov>; Seber, Dogan <Dogan.Seber@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Pires, Jose <Jose.Pires@nrc.gov>; Berrios, Ilka <Ilka.Berrios@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: Announcement of Ex-Plant Materials Harvesting Workshop

Dear Colleagues:

RES is hosting a workshop on ex-plant materials harvesting at NRC headquarters on March 7-8, 2017. The scope includes metallic, electrical, and concrete materials or components that could benefit from harvesting. I have attached the draft agenda and workshop introduction slides that cover meeting logistics, motivation, approach, expected outcome, and session expectations.

This workshop includes about two dozen external participants, including representatives from DOE and EPRI as well as international organizations from Japan, Europe, and Canada.

A webinar will be available to allow NRC staff to observe and participate in the workshop:

<https://attendee.gotowebinar.com/register/6076202901971284226> .

If you have any questions or need additional information about the workshop, please contact myself or Matt Hiser on my staff.

Thanks,

Steve

From: Frankl, Istvan
Sent: Wed, 4 Oct 2017 12:45:38 -0600
To: Hiser, Matthew
Cc: Hull, Amy; Moyer, Carol
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Matt,

BCs always need to review/concur on packages that are sent to management for approval. My initial confirms that I did part.

(b)(6) [REDACTED] mentioned that the poster is not listed on the PLiM agenda. Is this OK?

Thanks,

Steve

-----Original Message-----

From: Hiser, Matthew
Sent: Wednesday, October 04, 2017 2:32 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Hi Steve,

No, we are not withdrawing the poster. My email was meant to ask you to clarify with Brian/NRR that we also have a poster.

In terms of the 390, I didn't realize you needed to initial. Chris Regan signed off on the 390 this morning and I sent it to Graphics for printing.

Thanks!
Matt

From: Frankl, Istvan
Sent: Wednesday, October 4, 2017 1:08 PM
To: Hiser, Matthew
Cc: Hull, Amy; Moyer, Carol
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

I am not aware of the poster withdrawal.

As a matter of fact I was awaiting to review/initial Form 360 for the poster.

Thanks,

Steve

From: Hiser, Matthew
Sent: Wednesday, October 04, 2017 12:07 PM

To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Hull, Amy <Amy.Hull@nrc.gov>
Subject: FW: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Hi Steve,

Can you clarify that we also have a poster presentation at the conference?

Thanks!
Matt

Matthew Hiser
Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research Division of Engineering | Corrosion
and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62 Matthew.Hiser@nrc.gov<mailto:Matthew.Hiser@nrc.gov>

From: Hull, Amy
Sent: Wednesday, October 04, 2017 12:05 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov<mailto:Matthew.Hiser@nrc.gov>>
Subject: FW: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Did you withdraw?

Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants M. Hisera, P. Purtschera,
P. Ramuhallib, A. B. Hulla, R. Tregoninga, and C. E. Moyera

From: Hiser, Allen
Sent: Wednesday, October 04, 2017 11:51 AM
To: Thomas, Brian <Brian.Thomas@nrc.gov<mailto:Brian.Thomas@nrc.gov>>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov<mailto:Carol.Moyer@nrc.gov>>; Frankl, Istvan
<Istvan.Frankl@nrc.gov<mailto:Istvan.Frankl@nrc.gov>>; Hull, Amy
<Amy.Hull@nrc.gov<mailto:Amy.Hull@nrc.gov>>; Iyengar, Raj
<Raj.Iyengar@nrc.gov<mailto:Raj.Iyengar@nrc.gov>>; Tregoning, Robert
<Robert.Tregoning@nrc.gov<mailto:Robert.Tregoning@nrc.gov>>; Regan, Christopher
<Christopher.Regan@nrc.gov<mailto:Christopher.Regan@nrc.gov>>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Dear Brian,

I just want to clarify that the only paper for PLiM is this one:

Regulatory Research on the Aging Management of Structures, Systems and Components in Nuclear Power Plants
Supporting License Renewal C.E. MOYER, A.B. HULL, M. Sircar, J. Philip, J. E. Pires, D. D. Murdock, T. Koshi

Also, my last day in the office is October 12, so hopefully I will be able to have time that day or earlier to discuss
the presentation material with the originators.

Allen

From: Thomas, Brian
Sent: Friday, September 29, 2017 1:35 PM
To: Hiser, Allen <Allen.Hiser@nrc.gov<mailto:Allen.Hiser@nrc.gov>>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov<mailto:Carol.Moyer@nrc.gov>>; Frankl, Istvan
<Istvan.Frankl@nrc.gov<mailto:Istvan.Frankl@nrc.gov>>; Hull, Amy

<Amy.Hull@nrc.govmailto: Amy.Hull@nrc.gov>>; Iyengar, Raj
<Raj.Iyengar@nrc.govmailto: Raj.Iyengar@nrc.gov>>; Tregoning, Robert
<Robert.Tregoning@nrc.govmailto: Robert.Tregoning@nrc.gov>>; Freeman, Eric
<Eric.Freeman@nrc.govmailto: Eric.Freeman@nrc.gov>>; Wilson, George
<George.Wilson@nrc.govmailto: George.Wilson@nrc.gov>>; Regan, Christopher
<Christopher.Regan@nrc.govmailto: Christopher.Regan@nrc.gov>>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

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Let's talk about how we see things unfolding.

Thanks. Have a good weekend!

Brian

From: Hull, Amy
Sent: Friday, September 29, 2017 10:15 AM
To: Thomas, Brian <Brian.Thomas@nrc.govmailto: Brian.Thomas@nrc.gov>>
Cc: Moyer, Carol <Carol.Moyer@nrc.govmailto: Carol.Moyer@nrc.gov>>; Frankl, Istvan
<Istvan.Frankl@nrc.govmailto: Istvan.Frankl@nrc.gov>>
Subject: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Brian,

(b)(6)

Carol is I have been working on both presentations and they are both in pretty good shape and soon coming to you to sign off on. I recommend that we let NRR make the presentations for RES; many people in RES/DE already have much time invested in writing the papers, and preparing both the oral and poster presentations. We are in the 'home stretch' of this work, and it would be unfortunate to withdraw our presentations.

Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants M. Hisera, P. Purtschera, P. Ramuhallib, A. B. Hulla, R. Tregoninga, and C. E. Moyer

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<Raj.Iyengar@nrc.gov<mailto:Raj.Iyengar@nrc.gov>>
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Cc: Wilson, George <George.Wilson@nrc.gov<mailto:George.Wilson@nrc.gov>>; Thomas, Brian <Brian.Thomas@nrc.gov<mailto:Brian.Thomas@nrc.gov>>
Subject: Fwd: [External_Sender] CN-246_PLiM conference - pending designation

Eric,

Any assistance is appreciated.

Thanks,
Allen

----- Original Message -----

From: "KHAELSS, Martina" <M.Khaelss@iaea.org<mailto:M.Khaelss@iaea.org>>
Date: Mon, September 25, 2017 9:33 AM +0200
To: bruce.hallbert@inl.gov<mailto:bruce.hallbert@inl.gov>, "Hiser, Allen" <Allen.Hiser@nrc.gov<mailto:Allen.Hiser@nrc.gov>>, leonardk@ornl.gov<mailto:leonardk@ornl.gov>, ronaldo.szilard@inl.gov<mailto:ronaldo.szilard@inl.gov>, "Thomas, Brian" <Brian.Thomas@nrc.gov<mailto:Brian.Thomas@nrc.gov>>, john.wagner@inl.gov<mailto:john.wagner@inl.gov>, "Wilson, George" <George.Wilson@nrc.gov<mailto:George.Wilson@nrc.gov>>
Subject: [External_Sender] CN-246_PLiM conference - pending designation
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Thus, we have not yet been able to send you the final confirmation, logistical details & login to the local web site providing access to hotel, meal, gala dinner, tour bookings.

Above will be provided as soon as your official designation has been received.

Kind regards

Ms Martina KHAELSS | Conference Service Assistant | Conference Services Section | Division of Conference and Document Services | Department of Management | International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria | Email:m.khaelss@iaea.org | T: (+43-1) 2600-21315 | M:

(b)(6) F: (+43-1) 2600-7-21315 |

(b)(6)

[cid:image001.png@01D33D11.EAD82AD0]<<http://www.iaea.org/>>

Follow us on www.iaea.org<<http://www.iaea.org>> [cid:image002.png@01D1C55A.5FE7F2A0]
<<http://www.facebook.com/iaeaorg>> [cid:image003.png@01D1C55A.5FE7F2A0]
<<http://www.youtube.com/user/IAEAVideo>> [cid:image004.png@01D1C55A.5FE7F2A0]
<<http://twitter.com/iaeaorg>> [cid:image005.png@01D1C55A.5FE7F2A0]
<http://www.flickr.com/photos/iaea_imagebank/> [cid:image006.png@01D1C55A.5FE7F2A0]
<<http://www.linkedin.com/company/iaea>>

PLiM conference web site<<http://www-pub.iaea.org/iaemeetings/50811/Fourth-International-Conference-on-Nuclear-Power-Plant-Life-Management>>

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From: Hull, Amy
Sent: Wed, 4 Oct 2017 12:06:51 -0400
To: Hiser, Matthew
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Good for you !!

From: Hiser, Matthew
Sent: Wednesday, October 04, 2017 12:06 PM
To: Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Hi Amy,

No, in fact it was just concurred on by Chris Regan and I was about to send an email to Graphics to get the poster printed.

Thanks!
Matt

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Hull, Amy
Sent: Wednesday, October 04, 2017 12:05 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: FW: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Did you withdraw?

HARVESTING OF AGED MATERIALS FROM OPERATING AND DECOMMISSIONING
NUCLEAR POWER PLANTS
M. HISER^A, P. PURTSCHER^A, P. RAMUHALI^B, A. B. HULL^A, R. TREGONING^A, AND C. E.
MOYER^A

From: Hiser, Allen
Sent: Wednesday, October 04, 2017 11:51 AM
To: Thomas, Brian <Brian.Thomas@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>; Tregoning, Robert

<Robert.Tregoning@nrc.gov>; Regan, Christopher <Christopher.Regan@nrc.gov>

Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

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Components in Nuclear Power Plants Supporting License Renewal
C.E. MOYER, A.B. HULL, M. Sircar, J. Philip, J. E. Pires, D. D. Murdock, T. Koshi

Also, my last day in the office is October 12, so hopefully I will be able to have time that day or earlier to discuss the presentation material with the originators.

Allen

From: Thomas, Brian

Sent: Friday, September 29, 2017 1:35 PM

To: Hiser, Allen <Allen.Hiser@nrc.gov>

Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy

<Amy.Hull@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>; Tregoning, Robert

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(b)(6)

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MOYER^A

REGULATORY RESEARCH ON THE AGING MANAGEMENT OF STRUCTURES,
SYSTEMS AND COMPONENTS IN NUCLEAR POWER PLANTS SUPPORTING
LICENSE RENEWAL

C.E. MOYER, A.B. HULL, M. SIRCAR, J. PHILIP, J. E. PIRES, D. D. MURDOCK, T.
KOSHI

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Cc: Wilson, George <George.Wilson@nrc.gov>; Thomas, Brian <Brian.Thomas@nrc.gov>
Subject: Fwd: [External_Sender] CN-246_PLiM conference - pending designation

Eric,

Any assistance is appreciated.

Thanks,
Allen

----- Original Message -----

From: "KHAELSS, Martina" <M.Khaelss@iaea.org>

Date: Mon, September 25, 2017 9:33 AM +0200

To: bruce.hallbert@inl.gov, "Hiser, Allen" <Allen.Hiser@nrc.gov>, leonardk@ornl.gov,
ronaldo.szilard@inl.gov, "Thomas, Brian" <Brian.Thomas@nrc.gov>, john.wagner@inl.gov,
"Wilson, George" <George.Wilson@nrc.gov>

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Kind regards

Ms Martina KHAELSS | Conference Service Assistant |

Conference Services Section | Division of Conference and Document Services | Department of Management |

International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria |

Email: m.khaelss@iaea.org | T: (+43-1) 2600-21315 | M: F: (+43-1) 2600-7-21315 |

(b)(6)



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From: Moyer, Carol
Sent: Thu, 5 Oct 2017 09:55:29 -0400
To: Frankl, Istvan
Cc: Hull, Amy; Tregoning, Robert; Hiser, Matthew
Subject: Re: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Steve,

I'm sorry, I do not understand why the harvesting paper is not listed. As far as I know, we submitted the abstract appropriately, and it was accepted.

Rob has made inquiries by email, and I hope that the confusion can be cleared up that way.

Carol

From: Frankl, Istvan
Sent: Wednesday, October 4, 2017 1:55 PM
To: Moyer, Carol
Cc: Hull, Amy
Subject: FW: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Carol,

What is the status with the poster missing from the agenda at PLiM?

Please reply ASAP.

Thanks,

Steve

From: Hiser, Allen
Sent: Wednesday, October 04, 2017 1:52 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

I do not see the poster on the agenda for PLiM.

Allen

From: Tregoning, Robert
Sent: Wednesday, October 04, 2017 1:49 PM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Allen:

I forgot to add that we also have a poster on material harvesting for PLiM that (b)(6) is putting together, so we have to add this to the list of topics to cover.

Cheers,

Rob

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Tregoning, Robert
Sent: Wednesday, October 04, 2017 1:41 PM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Allen:

This is the only RES paper for PLiM. Once you have the paper and slides, I would expect that only a brief meeting will be necessary on this to make sure that we are in alignment on key messages and we can answer any questions that you have. The other thing that we'd like you at PLiM is represent us at a side-bar meeting on IFRAM. We will therefore need to get you up-to-speed on the efforts of IFRAM, the players at the side bar, and the objectives that we are trying to accomplish during that meeting. This effort may require more time to get you up to speed. I estimate that we will need between 1 – 2 hours to cover both topics, depending on the questions that you have and the level of discussion depth.

Your schedule is challenging. Can you identify a few windows between now and 10/12 when we can meet to discuss both PLiM and the IFRAM side-bar meeting?

Cheers,

Rob

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738

ph: 301-415-2324
fax: 301-415-6671

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To: Hiser, Allen <Allen.Hiser@nrc.gov>; Freeman, Eric <Eric.Freeman@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Regan, Christopher <Christopher.Regan@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>
Subject: RE: PLiM Conference

Allen,

Thank you for the offer. The idea crossed my mind. If you can do that it would go a long way towards satisfying expectations our international partners. I will check in with Steve and Carol and get back with you on your offer.

Brian

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Sent: Friday, September 29, 2017 8:57 AM

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Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Vera, Graciela <Graciela.Vera@nrc.gov>; Cole, Cassandra <Cassandra.Cole@nrc.gov>; Regan, Christopher <Christopher.Regan@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>

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What is the status of the RES presentation & paper?

If needed, I can make the presentation for RES.

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Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Vera, Graciela <Graciela.Vera@nrc.gov>; Cole, Cassandra <Cassandra.Cole@nrc.gov>; Regan, Christopher <Christopher.Regan@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>

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Sent: Monday, September 25, 2017 5:18 AM
To: Freeman, Eric <Eric.Freeman@nrc.gov>
Cc: Wilson, George <George.Wilson@nrc.gov>; Thomas, Brian <Brian.Thomas@nrc.gov>
Subject: Fwd: [External_Sender] CN-246_PLiM conference - pending designation

Eric,

Any assistance is appreciated.

Thanks,
Allen

----- Original Message -----

From: "KHAELSS, Martina" <M.Khaelss@iaea.org>
Date: Mon, September 25, 2017 9:33 AM +0200
To: bruce.hallbert@inl.gov, "Hiser, Allen" <Allen.Hiser@nrc.gov>, leonardk@ornl.gov,
ronaldo.szilard@inl.gov, "Thomas, Brian" <Brian.Thomas@nrc.gov>, john.wagner@inl.gov,
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Subject: [External_Sender] CN-246_PLiM conference - pending designation

RE: Fourth International Conference on Nuclear Power Plant Life Management (PLiM), 23-27 October 2017, Lyon, France

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Conference Services Section | Division of Conference and Document Services | Department of Management |
International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria |
Email: m.khaelss@iaea.org | T: (+43-1) 2600-21315 | M: | F: (+43-1) 2600-7-21315 |

(b)(6)



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[PLiM conference web site](#)

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From: Thomas, Brian
Sent: Fri, 29 Sep 2017 09:43:34 -0600
To: Frankl, Istvan; Hull, Amy
Cc: Moyer, Carol; Hiser, Matthew
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Steve,

Thanks for getting back to me. I fully support having Allen make the presentations. I recognize the great work of many in preparing the research input for the conference and agree wholeheartedly that it's the way to go. What is the title/theme of the presentation and when will it be ready?

Once I get that I will engage him further.

Brian

From: Frankl, Istvan
Sent: Friday, September 29, 2017 10:38 AM
To: Hull, Amy <Amy.Hull@nrc.gov>; Thomas, Brian <Brian.Thomas@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference
Importance: High

Brian,

I strongly recommend that if possible, AI make the RES presentations (one talk and one poster).

As described by Amy below a lot of effort has been invested in this activity, and as discussed earlier, it is very important to share the perspectives of regulatory research with our international partners.

Thanks,

Steve

From: Hull, Amy
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Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: I recommend we go forward with NRR presenting our work.....: PLiM Conference

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(b)(6)

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HARVESTING OF AGED MATERIALS FROM OPERATING AND DECOMMISSIONING NUCLEAR POWER PLANTS

M. HISER^A, P. PURTSCHER^A, P. RAMUHALLI^B, A. B. HULL^A, R. TREGONING^A, AND C. E. MOYER^A

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C.E. MOYER, A.B. HULL, M. SIRCAR, J. PHILIP, J. E. PIRES, D. D. MURDOCK, T. KOSHI

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Eric,

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Allen

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From: "KHAELSS, Martina" <M.Khaelss@iaea.org>

Date: Mon, September 25, 2017 9:33 AM +0200

To: bruce.hallbert@inl.gov, "Hiser, Allen" <Allen.Hiser@nrc.gov>, leonardk@ornl.gov,
ronaldo.szilard@inl.gov, "Thomas, Brian" <Brian.Thomas@nrc.gov>, john.wagner@inl.gov,
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Conference Services Section | Division of Conference and Document Services | Department of Management |

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(b)(6)



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[PLiM conference web site](#)

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From: Tregoning, Robert
Sent: Thu, 5 Oct 2017 09:41:14 -0600
To: Moyer, Carol; Hiser, Matthew
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

I've heard nothing back yet from Sherry or Robert. I'm going to give Sherry a call this afternoon if I can reach her....

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Moyer, Carol
Sent: Thursday, October 05, 2017 10:09 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: Re: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Matt,

If you look on the PLiM website: <http://www-pub.iaea.org/iaeameetings/50811/Fourth-International-Conference-on-Nuclear-Power-Plant-Life-Management> there is a "biodata form" link. There was an email that said presenters needed to complete that form, or they could not be included in the program. I took that to apply to speakers, not to submitted posters. If that was wrong, I apologize! The due date for that form was the end of Sept., and it was at that decision point that Brian decided not to participate. Anyway, perhaps they were looking for that same info from you, as an author, despite there being no presentation to go with it?? I do not have all of my PLiM info with me this week. Again, I hope that Rob's email inquiries are more successful on your behalf.

Carol

From: Moyer, Carol
Sent: Thursday, October 5, 2017 9:55 AM
To: Frankl, Istvan
Cc: Hull, Amy; Tregoning, Robert; Hiser, Matthew
Subject: Re: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Steve,

I'm sorry, I do not understand why the harvesting paper is not listed. As far as I know, we submitted the abstract appropriately, and it was accepted.

Rob has made inquiries by email, and I hope that the confusion can be cleared up that way.

Carol

From: Frankl, Istvan
Sent: Wednesday, October 4, 2017 1:55 PM
To: Moyer, Carol
Cc: Hull, Amy
Subject: FW: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Carol,

What is the status with the poster missing from the agenda at PLiM?

Please reply ASAP.

Thanks,

Steve

From: Hiser, Allen
Sent: Wednesday, October 04, 2017 1:52 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

I do not see the poster on the agenda for PLiM.

Allen

From: Tregoning, Robert
Sent: Wednesday, October 04, 2017 1:49 PM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Allen:

I forgot to add that we also have a poster on material harvesting for PLiM that (b)(6) is putting together, so we have to add this to the list of topics to cover.

Cheers,

Rob

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
Two White Flint North, M/S T-10 A36
11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

From: Tregoning, Robert
Sent: Wednesday, October 04, 2017 1:41 PM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Allen:

This is the only RES paper for PLiM. Once you have the paper and slides, I would expect that only a brief meeting will be necessary on this to make sure that we are in alignment on key messages and we can answer any questions that you have. The other thing that we'd like you at PLiM is represent us at a side-bar meeting on IFRAM. We will therefore need to get you up-to-speed on the efforts of IFRAM, the players at the side bar, and the objectives that we are trying to accomplish during that meeting. This effort may require more time to get you up to speed. I estimate that we will need between 1 – 2 hours to cover both topics, depending on the questions that you have and the level of discussion depth.

Your schedule is challenging. Can you identify a few windows between now and 10/12 when we can meet to discuss both PLiM and the IFRAM side-bar meeting?

Cheers,

Rob

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fax: 301-415-6671

From: Hiser, Allen
Sent: Wednesday, October 04, 2017 11:51 AM
To: Thomas, Brian <Brian.Thomas@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Regan, Christopher <Christopher.Regan@nrc.gov>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Dear Brian,

I just want to clarify that the only paper for PLiM is this one:

Regulatory Research on the Aging Management of Structures, Systems and Components in Nuclear Power Plants Supporting License Renewal
C.E. MOYER, A.B. HULL, M. Sircar, J. Philip, J. E. Pires, D. D. Murdock, T. Koshi

Also, my last day in the office is October 12, so hopefully I will be able to have time that day or earlier to discuss the presentation material with the originators.

Allen

From: Thomas, Brian
Sent: Friday, September 29, 2017 1:35 PM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Freeman, Eric <Eric.Freeman@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>; Regan, Christopher <Christopher.Regan@nrc.gov>
Subject: RE: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Allen,

As promised, I have checked-in with Steve Frankl and Amy Hull, and we agree that since we (a number of folks have contributed) have made significant progress in preparing the research presentation, we would be happy to accept your offer. We are in the 'home stretch' for completing the work, and it should be ready, in draft, within the next week. Once we get all the material, we can consider what aspects of it you can deliver based on the agenda and how the research sessions align or not align with your sessions.

Let's talk about how we see things unfolding.

Thanks. Have a good weekend!

Brian

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(b)(6)
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C.E. MOYER, A.B. HULL, M. SIRCAR, J. PHILIP, J. E. PIRES, D. D. MURDOCK, T.
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Thanks,
Amy

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LWRS Program Perspective

Session 2: Technical Data Needs for Harvesting

LWRS - MAaD Pathway Research Staff

**Ex-Plant Materials Harvesting Workshop
Nuclear Regulatory Commission
Rockville, MD
March 7th, 2017**



Light Water Reactor Sustainability R&D Program



Harvesting of reactor materials provides validation of experimental and theoretical research of the LWRS – MAaD Pathway

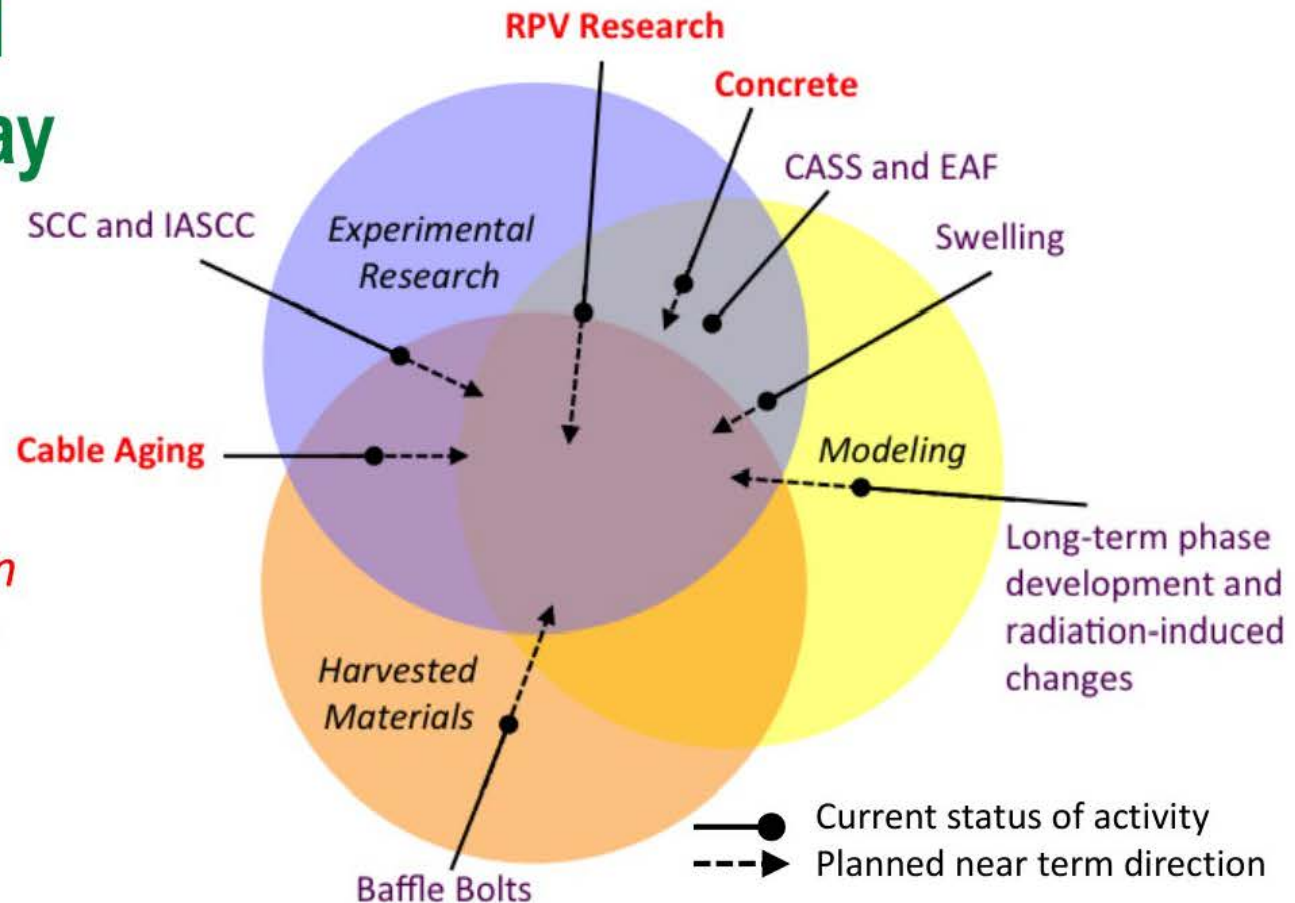


The vision of the DOE Light Water Reactor Sustainability (LWRS) Program is to enable existing power plants to safely provide clean and affordable electricity beyond current license periods.

The goals of Materials Aging and Degradation (MAaD) Pathway in the LWRS program is to develop the fundamental scientific basis to understand, predict and measure changes in materials as they age in reactor environments. The MAaD Pathway seeks to apply that knowledge in developing new methods for monitoring, materials and technologies that enhance plant performance and safety.

Materials Aging and Degradation Pathway Methodology

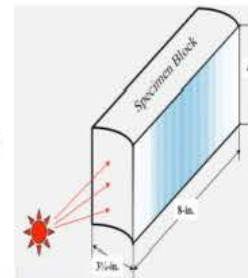
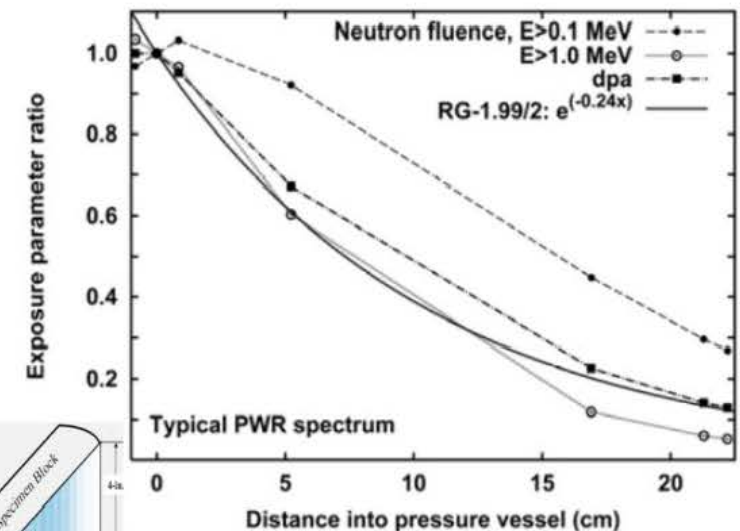
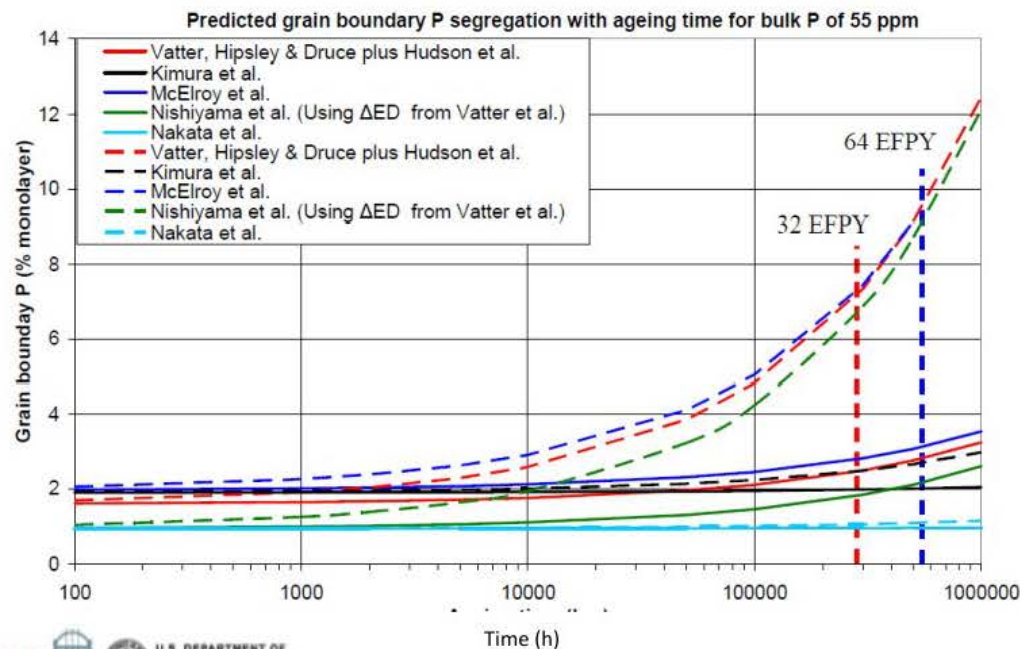
Addressing scientific gaps in knowledge of extended life predictions, requires a multidirectional approach.



- Individual tasks within the pathway provide contributions to the overall pathway goal through high quality scientific measurement of materials performance to understand the active modes and mechanism of degradation.

Research needs to be addressed through harvesting RPV material.....

- Improvement in statistics regarding material variability to reduce uncertainties within the current framework and for applications of the Master Curve methodology.
- Validation of modeling predictions.
- Effects of long-term thermal / irradiation exposures (effects of grain boundary segregation of P for example).
- Effects of flux and fluence attenuation through the RPV wall on fracture toughness at specific depths in the wall (eg. 3/4-thickness)
- Effects of irradiation / post-irradiation annealing / re-irradiation on propensity for temper embrittlement, especially of weld heat-affected zones.

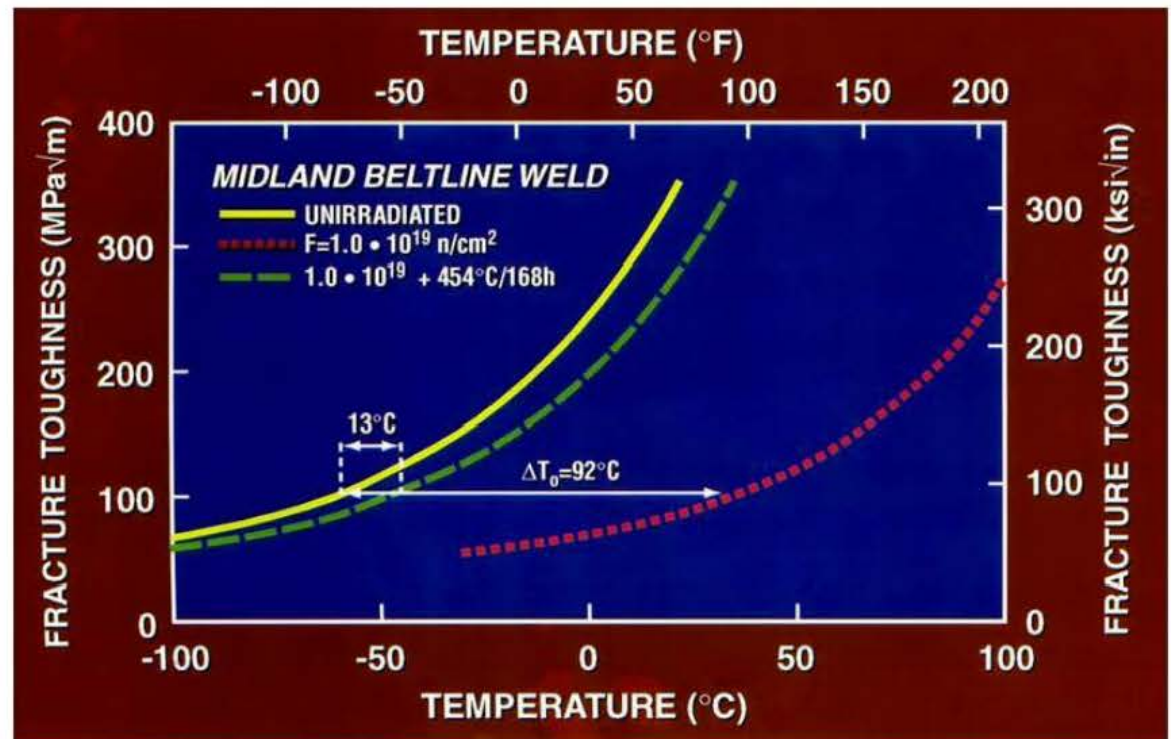
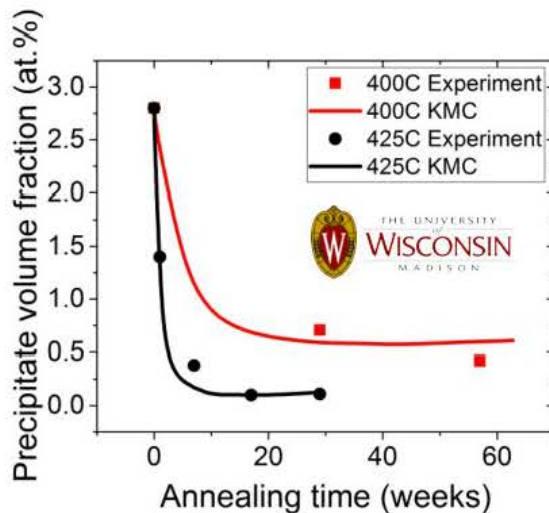


Research plans for harvested Zion RPV

Tom Rosseel will provide more detail on the history, progress and plans of the Zion Unit-1 RPV sections that the LWRS program has harvested.

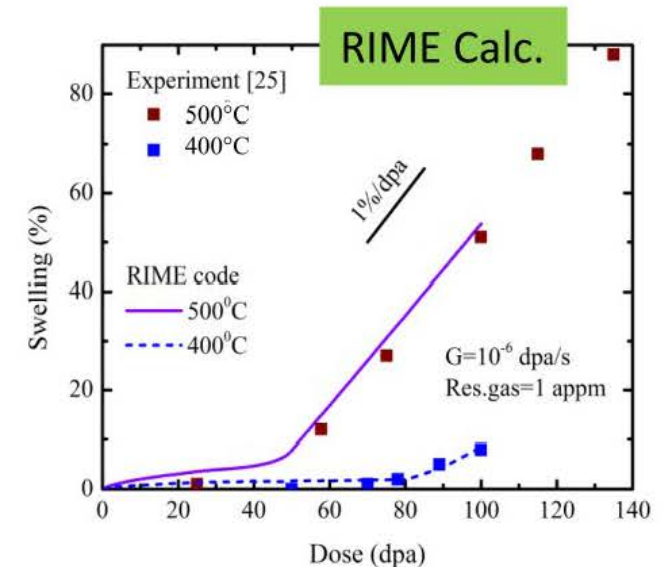
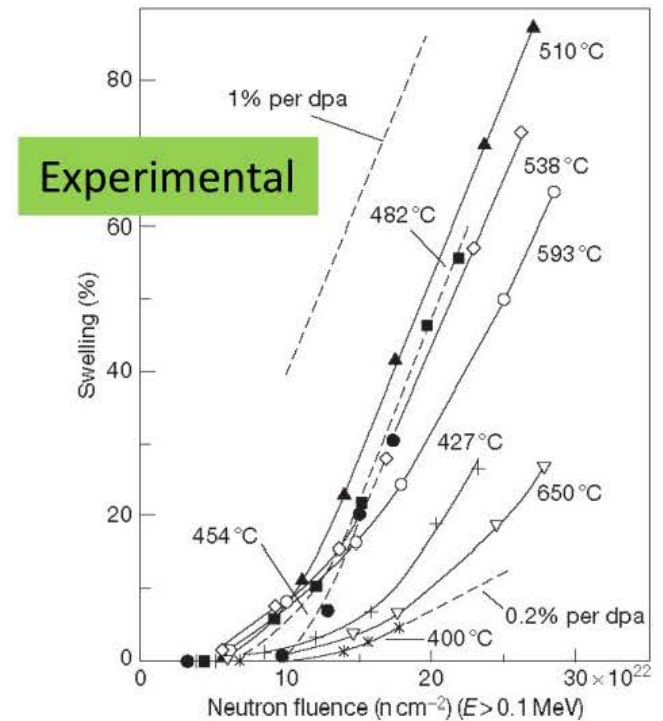
- Comparison of harvested material to surveillance, computer models and high flux reactor experiment data.
- Determination of variations in base metal and weldment: influence of attenuation, compositional variations, microstructure and property changes.
- Specimen size effects: bias of the pre-cracked Charpy specimen, and testing of m-CT specimen
- Mitigation techniques - annealing / re-irradiation
- Re-irradiation of materials through fast flux irradiations to higher doses

KMC vs. Annealed MnNiSi Alloys (no Cu)



Evaluation of radiation-induced swelling under LWR relevant conditions.....

- Early data was based on sodium cooled FBR data, and was typically bounded by the 350 – 650°C range of the test reactor capabilities.
- Caution must be used in analyzing swelling data due to differences in flux and neutron energy spectrum between test data and LWR conditions.
- Swelling levels of at least a few percent are likely to occur in high dose stainless steel LWR core components.
- Previous modelling predictions / calculations did not effectively analyze the void nucleation regime.
- Researchers (Golubov, Barashev and Stoller) sponsored by the LWRS program have developed a **Radiation-Induced Microstructure Evolution (RIME) code** for damage accumulation in LWR materials, that take into account for the first time:
 - Cascade defect production, including production of 1-D migrating defect clusters
 - A physical based model for void nucleation accounting for residual gas and He generation during irradiation.

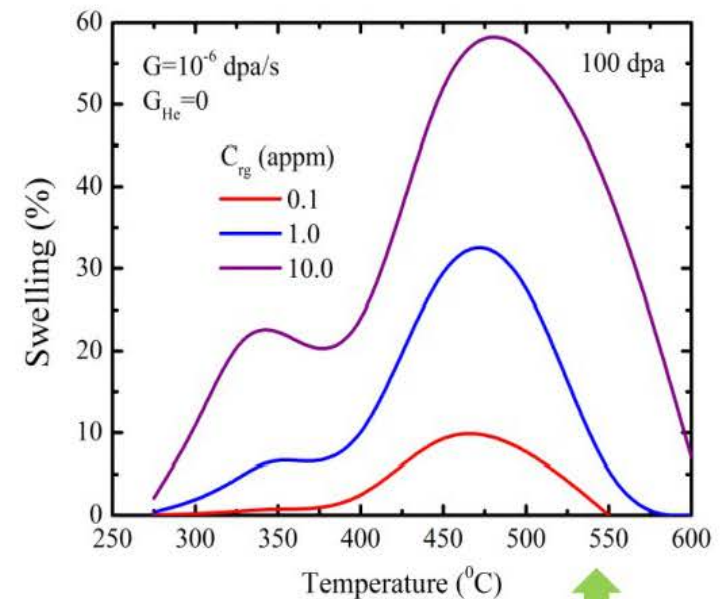


RIME Code Model for Swelling

The RIME code is based on a numerical solution of kinetic equations for gas filled voids, interstitial and vacancy loops taking into account:

- Generation of 3-D migrating point defects and 1-D migrating interstitial clusters
- Annealing defects during cooling down phase of cascades
- Cascade generation of interstitial and vacancy loops
- He generation by fast neutrons and due to ^{59}Ni transmutation
- Existence of residual gas taking part in void nucleation in addition to that of He atoms
- Annealing of dislocations due to their climb
- Transformation of the interstitial dislocation loops into the dislocation network
- Change in spatial distribution of voids with dose increase from random to spatially correlated with dislocations

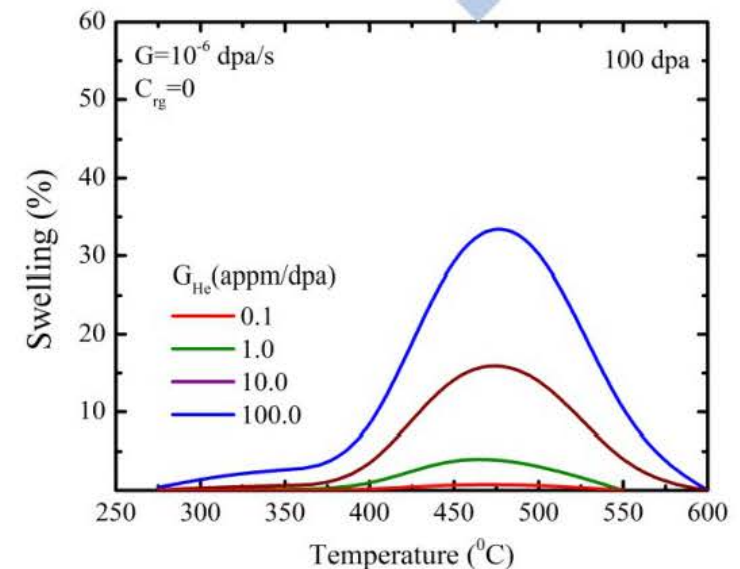
For the first time it is shown that residual gas may effect void nucleation much stronger than that of He generation during irradiation



Assuming:

No He production

No residual He

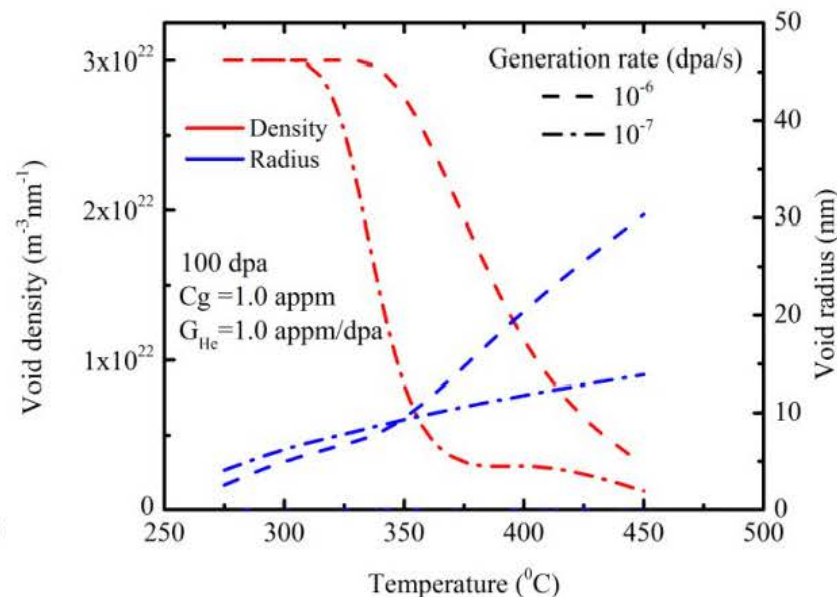
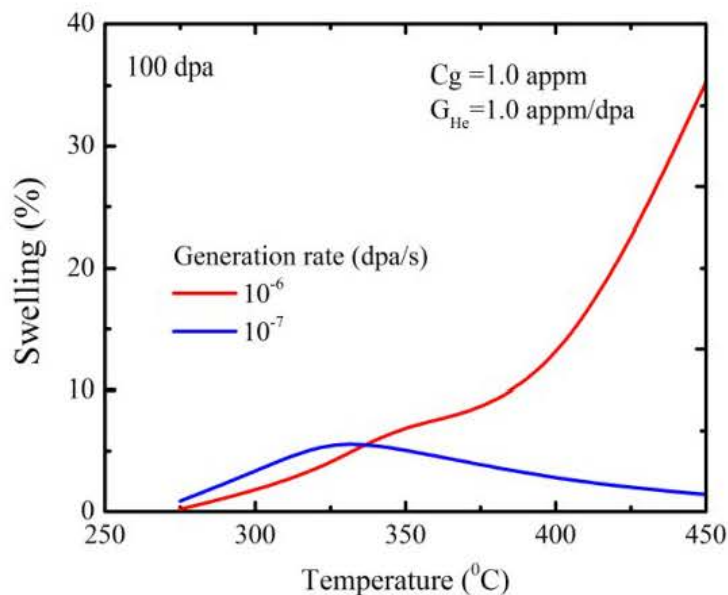
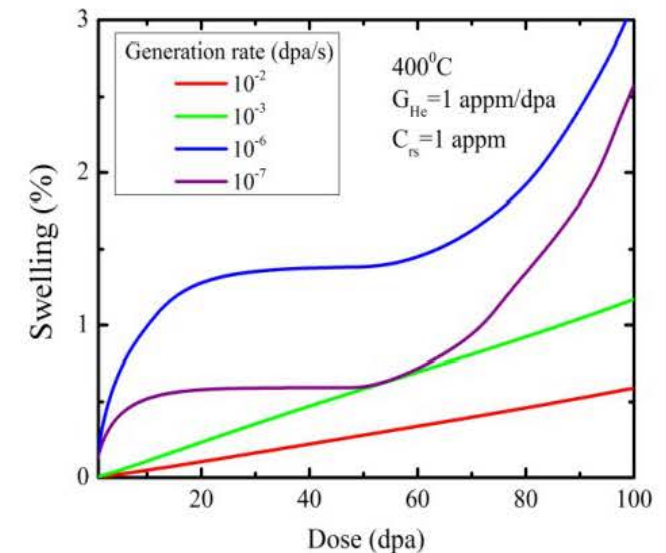


Utilizing LWR relevant data in validating swelling model

Objective: To predict in-core swelling, while knowing limitations of experimental data collected under ion or fast reactor irradiation experiments.

Solution: Continue developing the comprehensive microstructural-based model (RIME code) for swelling under LWR conditions.

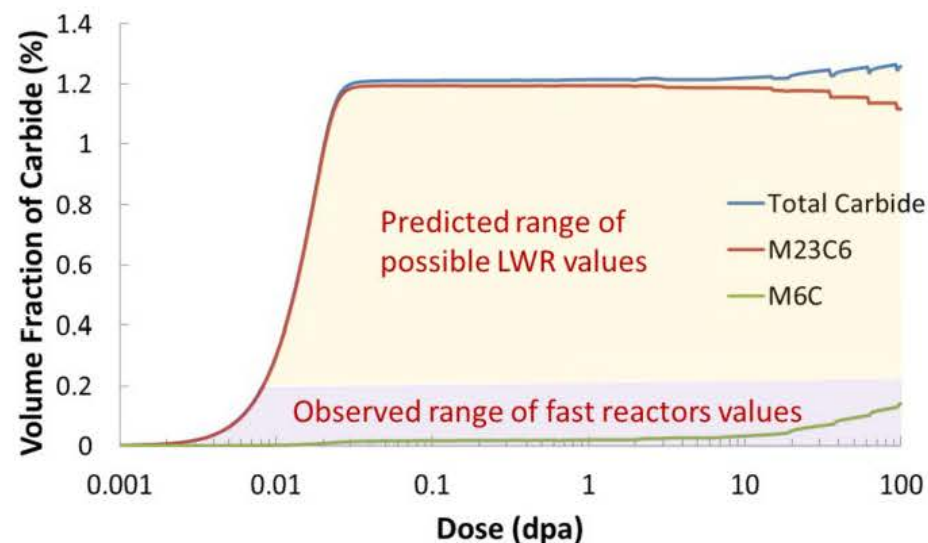
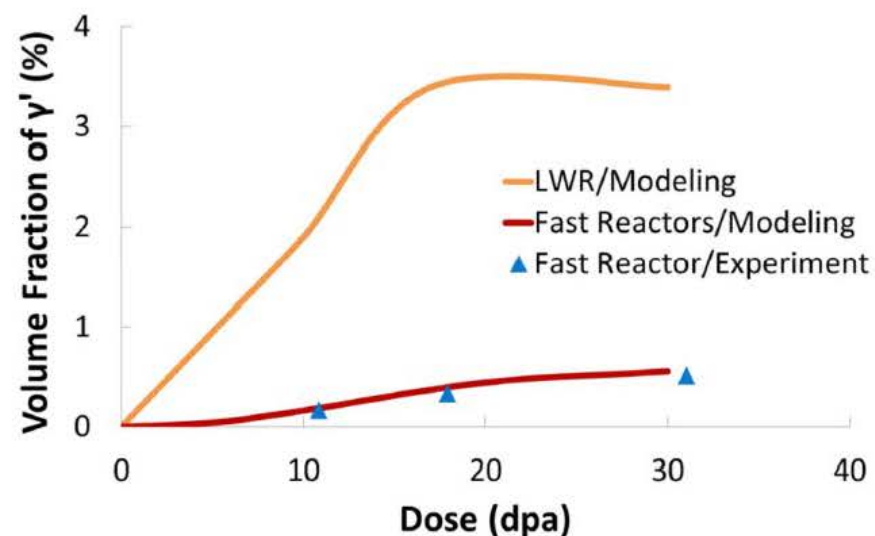
While correlation of model data to higher flux experimental reactor data has been demonstrated, validation of models to LWR exposure is needed through harvested materials.



Void density is strongly dependent on defect generation rates (among other variables)

Phase stability and radiation induced segregation under LWR conditions

- Radiation-induced precipitation (RIP) and segregation (RIS) effects are well known, but differences can emerge between fast reactor data and actual LWR conditions.
- Difference between fast reactor and LWR exposure can influence other effects. For example - the emergence of γ' is coincident with void formation due to the depletion of Si from the matrix.
- Models predict a much higher fraction of carbides present under LWR conditions. At high flux, radiation enhanced dissolution of the carbides may occur.



Computational model validation

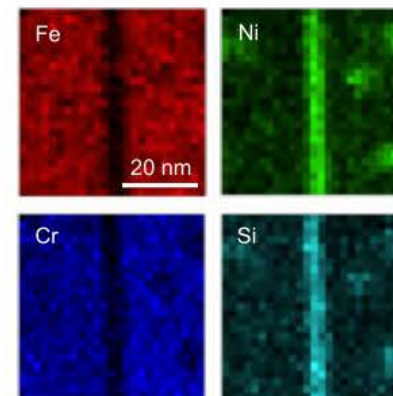
LWRS Program Task Objective

- Development and validation of computational tools to model phase transformation, precipitation and segregation under combined thermal and radiation environment for stainless steel core internals under LWRS conditions.

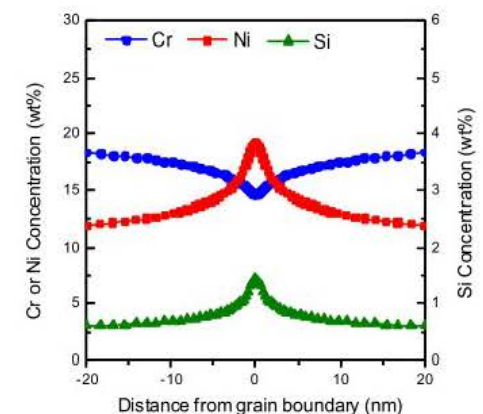
Models Developed

- Thermodynamic and mobility database for Fe-based alloys used in nuclear reactors.
- Separate computational models for irradiation and thermal effects on solute segregation.
- Computational model for thermal effect on precipitation
- Integrated computational models for irradiation and thermal effect on precipitation

Radiation induced segregation on high angle grain boundaries in 47 dpa, 320 °C irradiated 304 steel



Experimental composition map

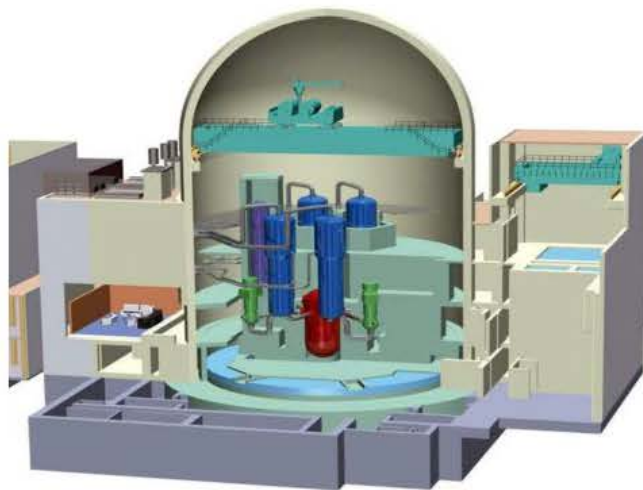


Modeled

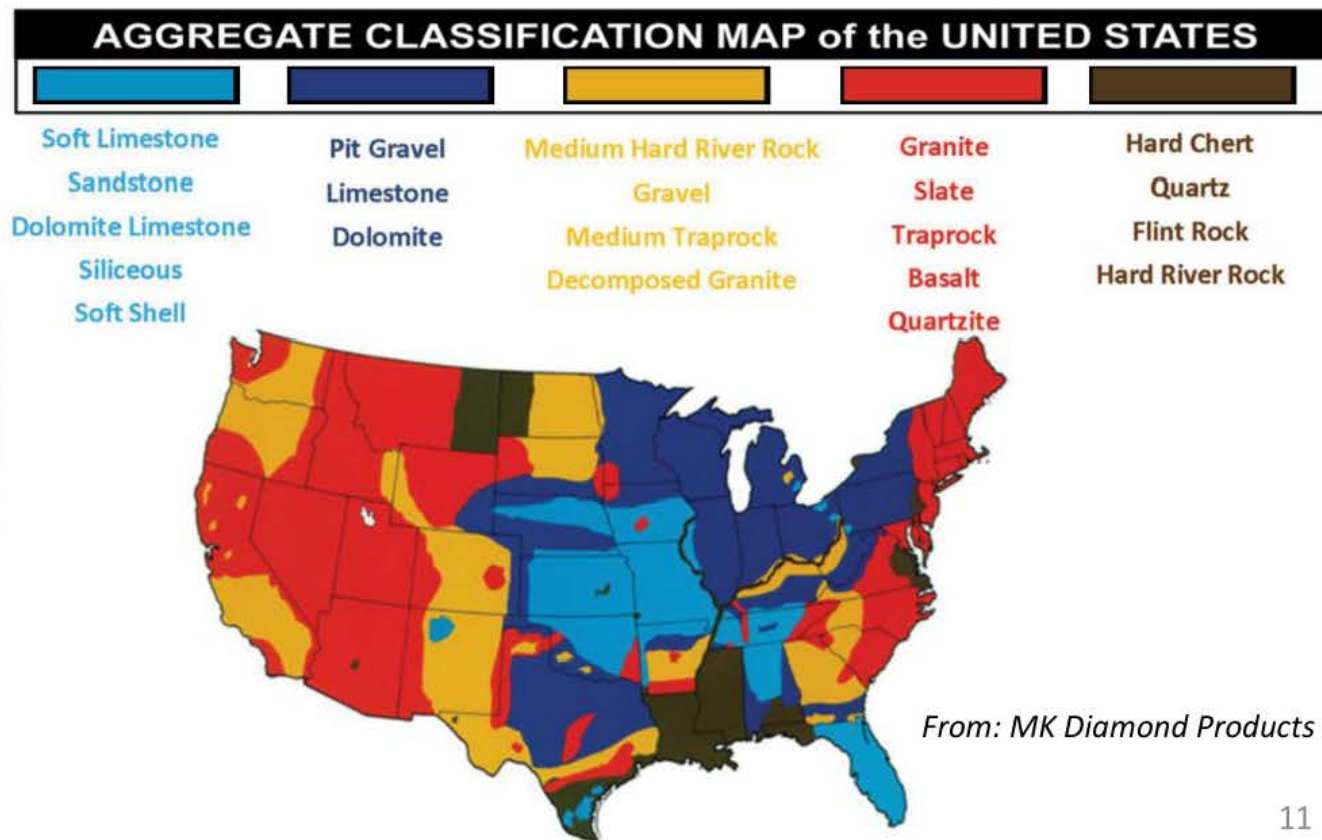
While models have demonstrated good agreement with high flux experimental reactor data, there is a need for microstructural information on material harvested from LWR internals.

Challenges of evaluating concrete structures

- Largest structural material used in reactor
- A locally sourced material
- Concrete mixture: Silicate-bearing aggregates seem more prone to RIVE than calcareous aggregate.
- Inner concrete barrier structure in PWR's may see up to 7×10^{19} n/cm² (E>0.1 MeV) - some loss in mechanical properties expected.
- Evaluation of safety performance and margins in accident scenarios.



Source: U.S. Nuclear Regulatory Commission



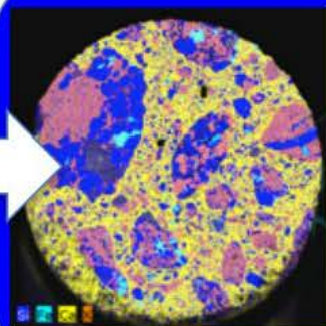
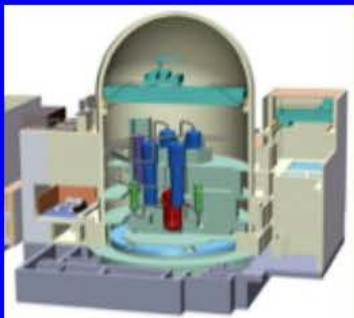
From: MK Diamond Products

Importance of harvested concrete

- Harvesting provides a unique opportunity for evaluating the research needs of concrete:
 - Increase knowledge of irradiated concrete as previous literature data that is not comprehensive, with irradiation conditions not well established, or significantly different than that expected in LWR's.
 - Multiple dependent variables acting on concrete that may be difficult to experimentally test: neutron irradiation, gamma irradiation, temperature, water content, aggregate chemistry, stress / creep and cumulative effects of age.
- Materials harvested from plants can provide a unique opportunity to examine the influence of all the impacting variables on specific aggregate type. Sampling from various parts of the plant to isolate out different variable effects.
- Information gained will be important for the development of computer models to determine the changes concrete has undergone and its performance, expected aged lifetime and capability under accident scenarios.
- From knowing the performance of concrete structures over their lifetime can new plants be designed more economically?

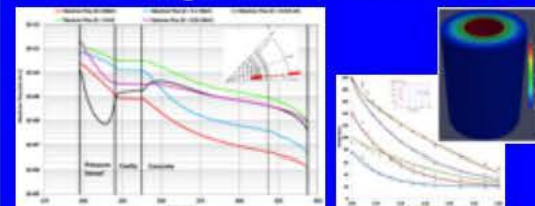
Concrete Strategy

Harvested Materials



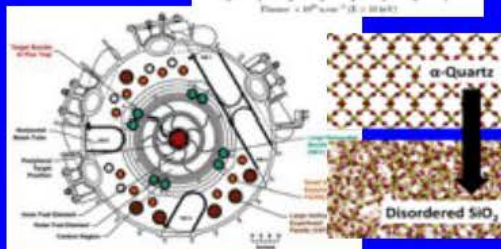
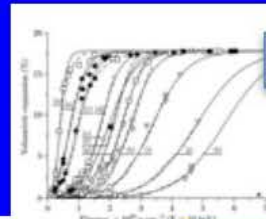
Evaluation of plant specific concrete aggregates: phase, composition, size

Modeling of attenuation, temperature and moisture through concrete shield



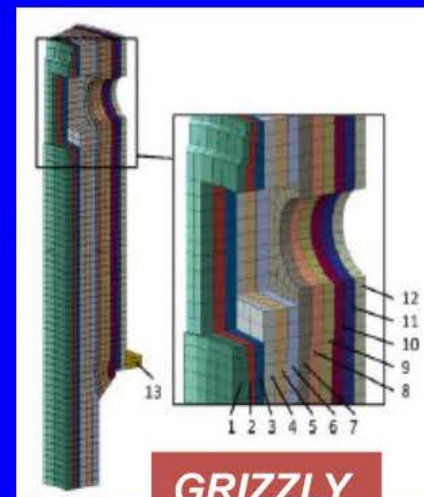
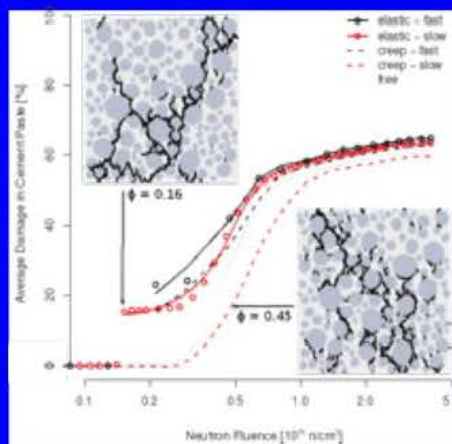
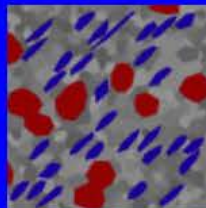
IMAC Database
(irradiated minerals/aggregate/concrete)

Structural simulation of long-term plant performance



Experimental studies on RIVE and ASR

Irradiation and ASR affected concrete performance modeling



GRIZZLY

Understanding the role of environment on cable degradation toward the development of improved cable aging models

Cable formulations used by manufacturers during initial installation at plants may not be the same as those currently produced.

Method / Approach

- Coordinated, accelerated aging of **harvested** insulation/ jacket materials representative of current NPP systems
- Electrical, chemical, and mechanical characterization to address knowledge gaps in cable aging factors (EMDA vol 5)
- Improved predictive models of remaining useful life.
- Collaborations with NRC and EPRI.

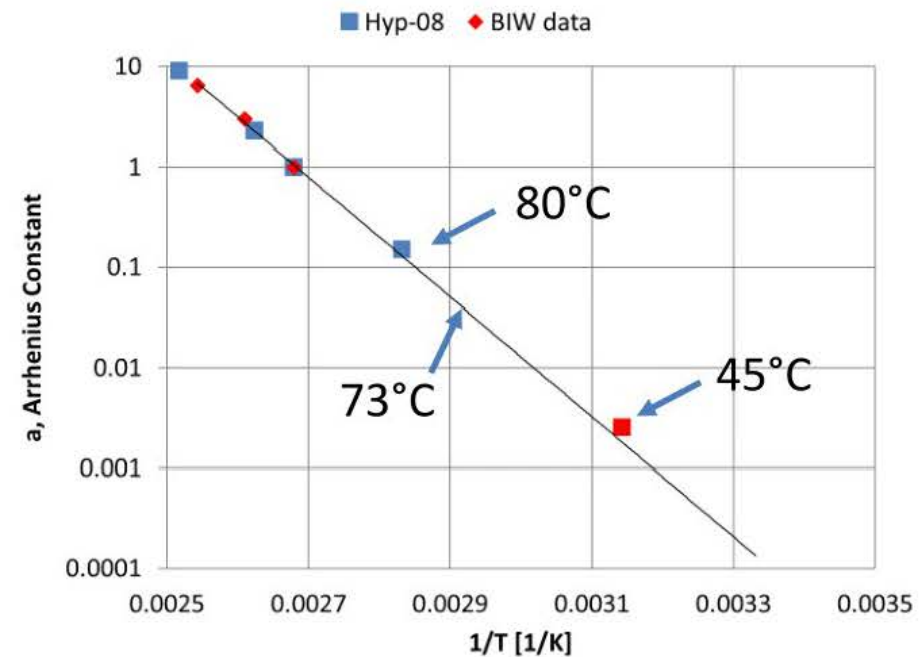
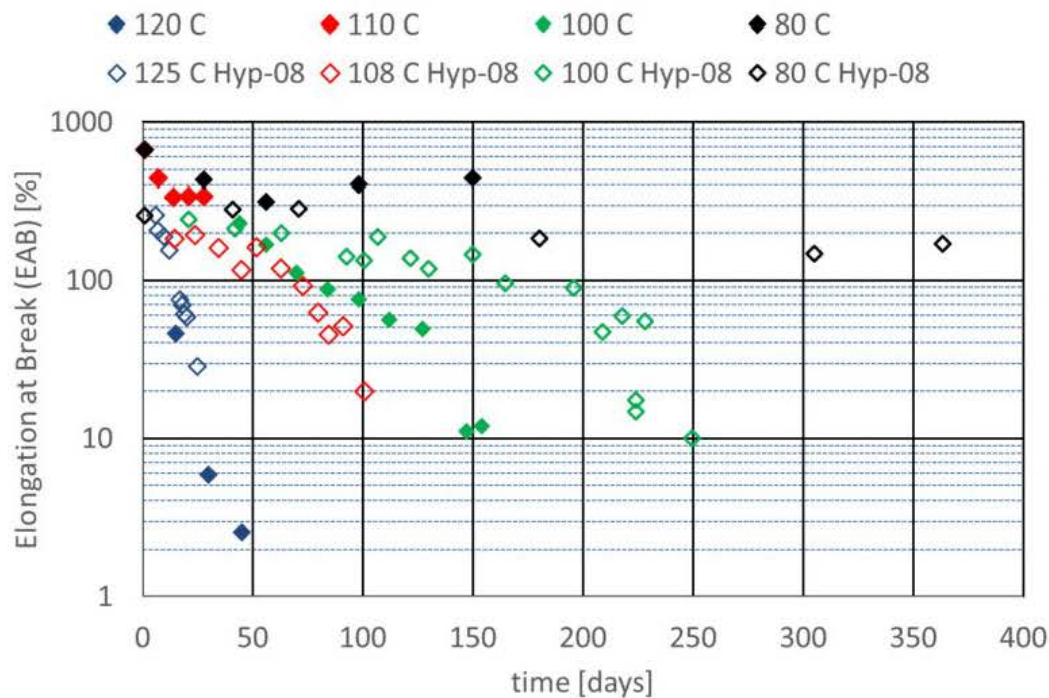
Current Tests

- Aging vs. environment (temp/dose rate/total dose) for EPR & XLPE
- Aging vs. composition for high priority materials
 - Harvested cables from Zion-unit 1 and 2, and Crystal River-unit 3
 - Most common cables: Rockbestos, Brand-Rex, Okonite, Kerite, BIW
- Evaluation of NDE techniques and modeling



Accelerated thermal aging utilized to determine changes in harvested cables

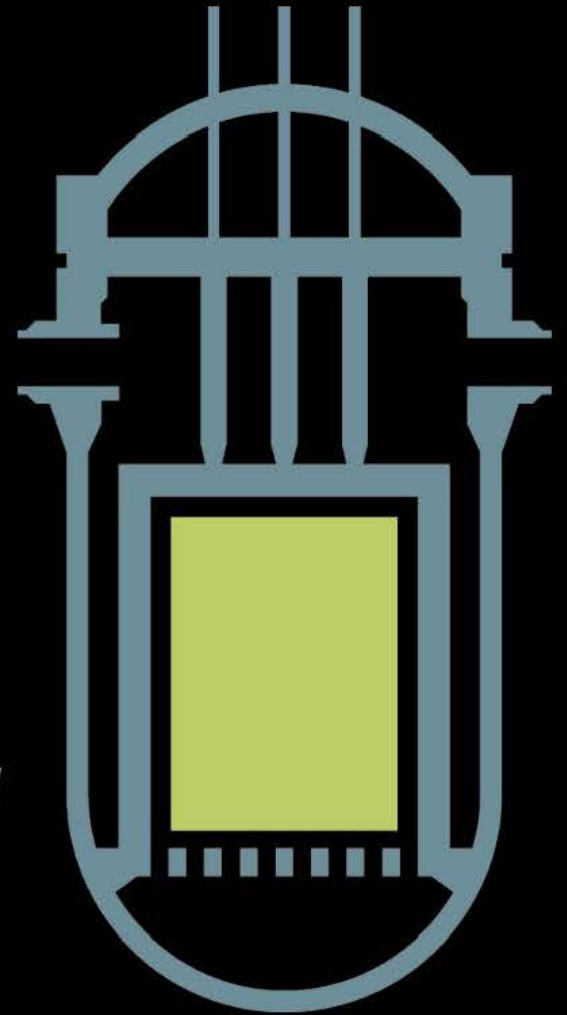
- BIW Control Rod Cable
 - Harvested from NPP plant after for 30 years
 - Hypalon (CSPE) jacket & EPR insulation
- Compared to SCRAPS data base (Hyp-08)
- However Arrhenius analysis showed little change in projected cable lifetime



Discussion?

LWRS

Light Water Reactor Sustainability



Non-Proprietary Version

**Adequacy of Online
NobleChem™
FE-SEM Analysis of
Platinum Particles Deposited
on Plant Artifacts**

Joe Kopcash
Senior Engineer, GEH

**BWRVIP Presentation to NRC
Rockville, MD
September 21, 2017**



Note to requester: This document is also publicly available
in ADAMS at ML17240A176.

Overview of the Presentation

FE-SEM Analysis

- Plant Artifacts
 - Tie Rod Latch
 - Jet Pump Auxiliary Wedge
 - Bottom Head Drain Line ECP Probes
 - Fuel Channel Fastener (One Fuel Cycle)
- Pt Particle Size and Pt Particle Densities
- Conclusions

Pt Particle Comparison

A real world example to show the challenge and power of the FE-SEM technique for nano-particle measurement:

- A 10 nm Pt particle on a 25 mm² sample area
- A golf ball (Pt particle) on 100,000 football fields (Area of FE-SEM sample)!
- 100,000 football fields is 110,000 acres

FE-SEM Technique for Sample Analysis

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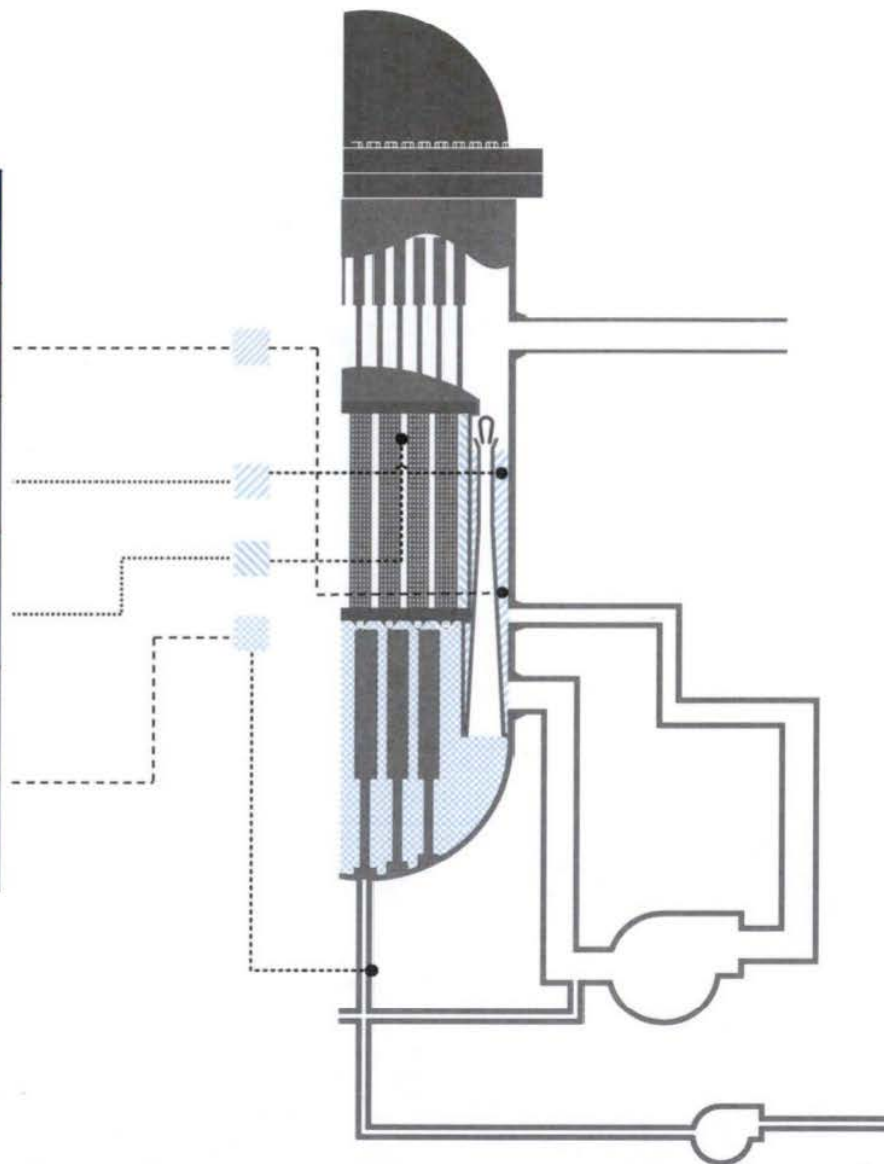
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Plant Artifact Locations

<u>Artifact</u>	<u>Plant Type</u>
Tie Rod Latch	BWR 2
Jet Pump Auxiliary Wedge	BWR 5
Fuel Channel Fastener	BWR 4
Pt ECP, BHDL	BWR 4
Fe ECP, BHDL	BWR 4



Plant Artifact Information

<u>Plant Type</u>	<u>RPV Component</u>	<u>Annual OLNC Applications</u>	<u>Pt Loading ($\mu\text{g}/\text{cm}^2$)</u>
BWR2-A	Tie Rod Latch	7	7.1 – 23.8
BWR5-C	Jet Pump Auxiliary Wedge (X-750)	5	0.5
	Jet Pump Auxiliary Wedge (316L SS)	5	2.1
BWR4-B	Bottom Head Drain Line Pt ECP Probe	1 + 4*	0.4
	Bottom Head Drain Line Iron/Iron Oxide ECP Probe	1 + 4*	0.3
BWR4-A	Fuel Channel Fastener	2	0.5

*- One NMCA application and four OLNC applications

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Tie Rod Latch – Information

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Tie Rod Latch – Oxide Layer

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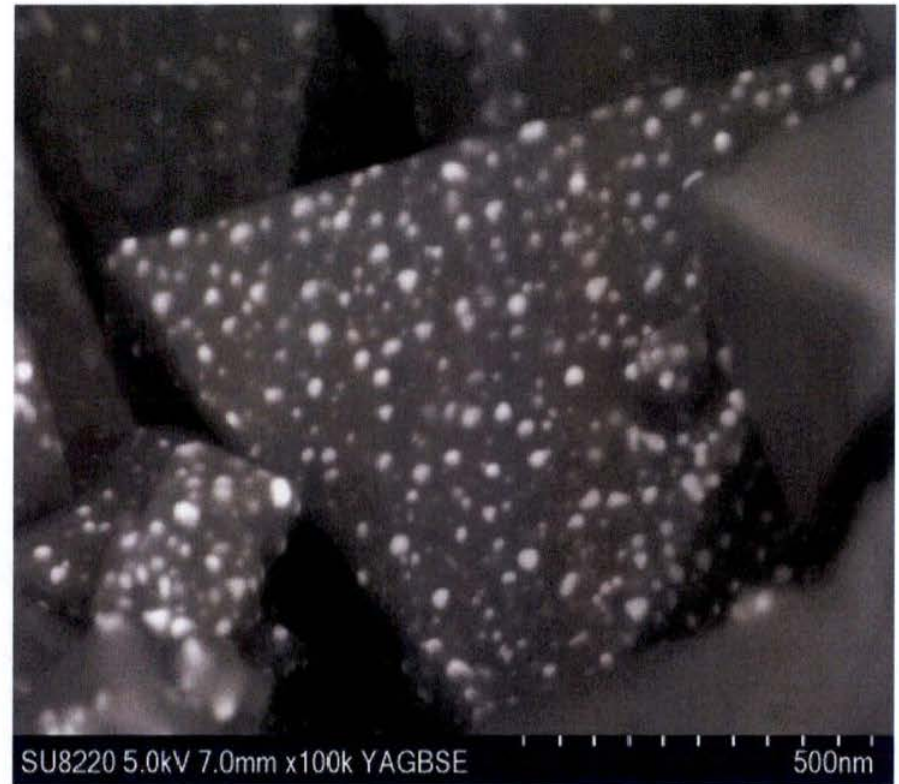
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Tie Rod Latch – 100K Magnification



Position #2 – Inner Surface 100k



Position #3 – Inner Surface 100k

- Large distribution of Pt particles on the oxide layer
- New oxide growth after the last OLNC application shows no Pt deposited on oxide crystal

Tie Rod Latch

Observations

- The location of the latch within the downcomer region which is the first area exposed to Pt particles after entering the feedwater system may account for the substantial amount of platinum deposited on the oxide surface
- While larger platinum particles were observed (10nm – 50nm), the majority of platinum particles were in the < 10nm range
- High amount of crud on the X-750 oxide layer
- Not all crystals of the oxide layer had platinum deposition
- Platinum loading values were the highest measured on artifacts exposed to only OLNC

Jet Pump Auxiliary Wedge – Information

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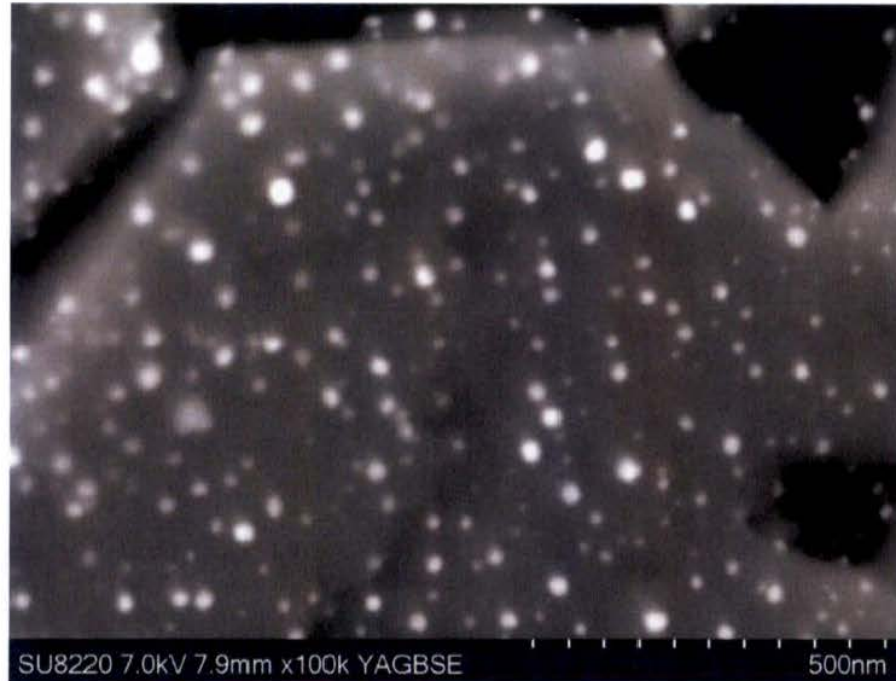
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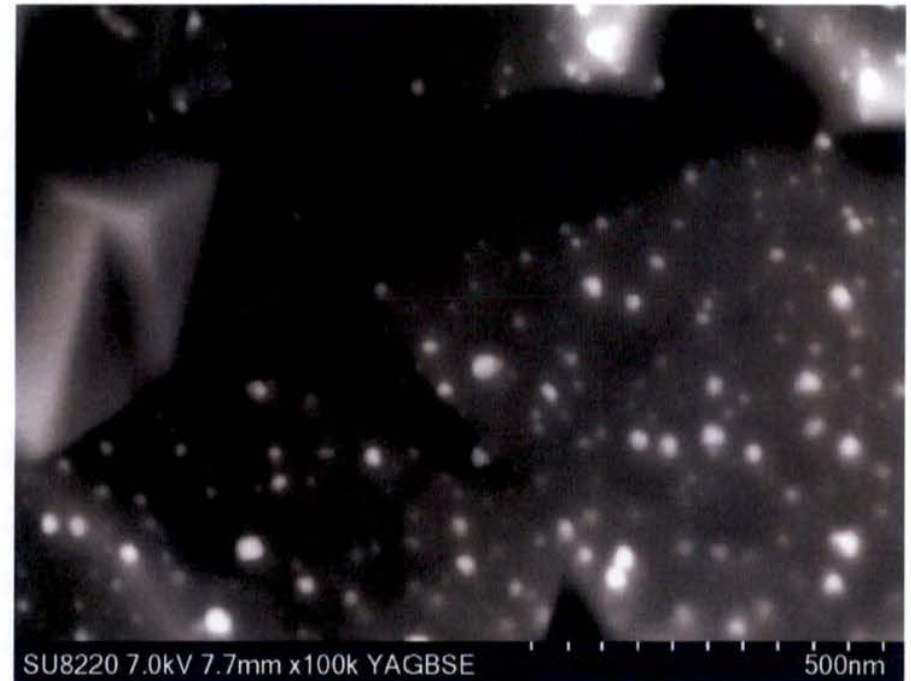
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Jet Pump Aux. Wedge – 316L SS Oxide Layer

Inner and Outer Surface Samples, 100k magnification



Sample #4, Inner Surface

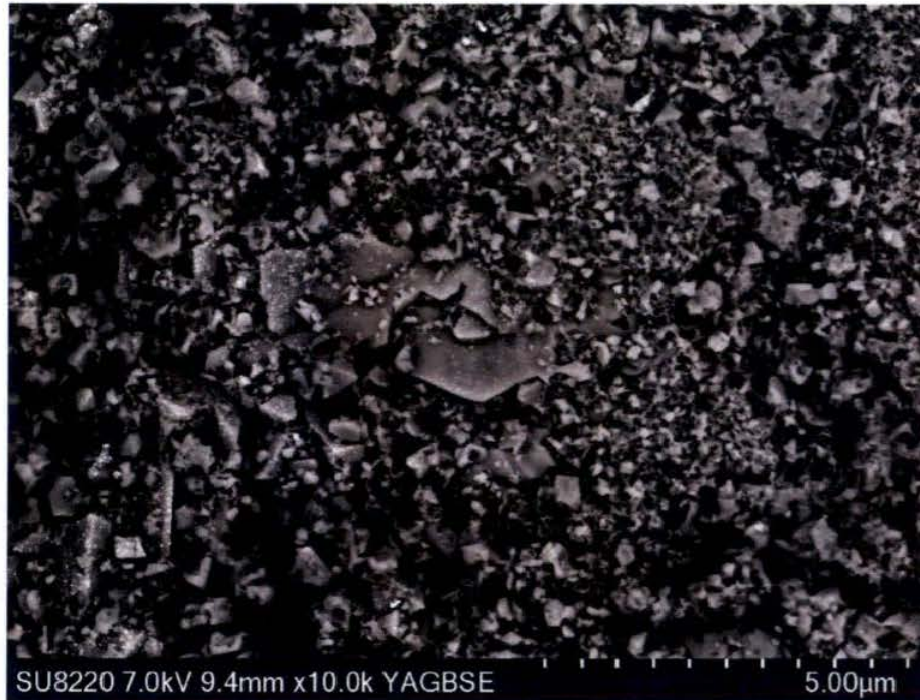


Sample #7, Outer Surface

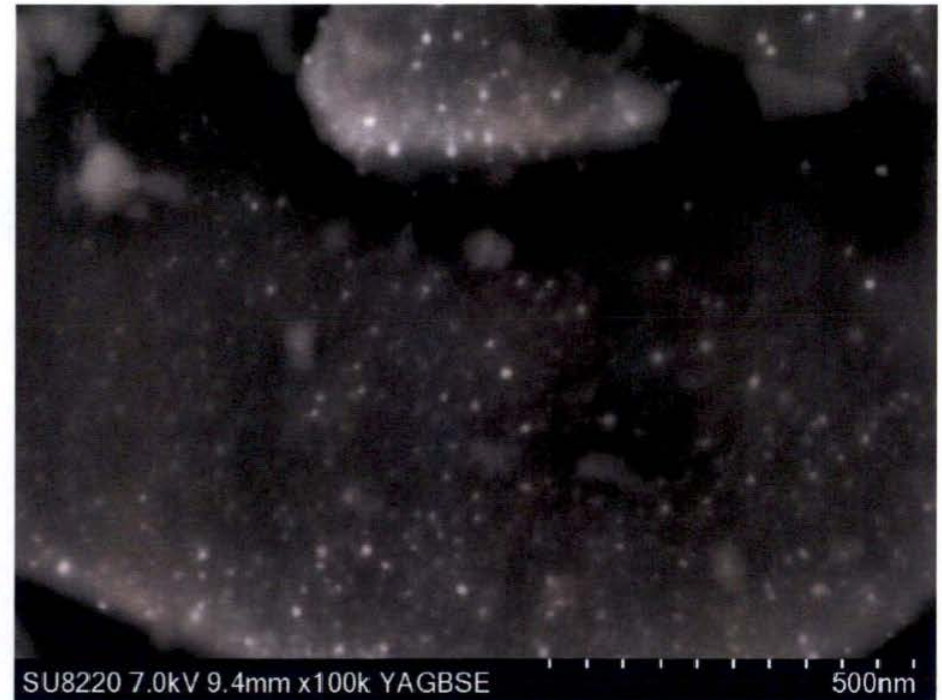
- Platinum particles vary in size but the majority were < 20 nm
- Not all crystals had platinum deposition

Auxiliary Wedge – X-750 Oxide Layer

X-750 Samples



Sample #2, X-750, 10k Magnification



Sample #2, X-750, 100k Magnification

- Large amounts of crud covering the oxide layer
- Majority of crud particles had no visible platinum deposition
- Crud may be obscuring additional platinum particles from the SEM

Jet Pump Auxiliary Wedge

Observations

- The location of the auxiliary wedge within the downcomer region which is the first area exposed to Pt particles after entering the feedwater system may account for the substantial amount of platinum deposited on the oxide surface
- The higher platinum loading values with 316L SS vs. X-750 correlates with the exposure to reactor water
- The majority of platinum particles were in the $< 20\text{nm}$ range, while some larger platinum particles were observed
- X-750 had large amount of crud on the surface possibly due to location
- Similar X-750 oxide surfaces were observed in the tie rod latch

BHDL ECP Electrodes – Information

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BHDL ECP Electrodes – Sampling

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Platinum electrode 304L stainless steel body was sectioned into four pieces

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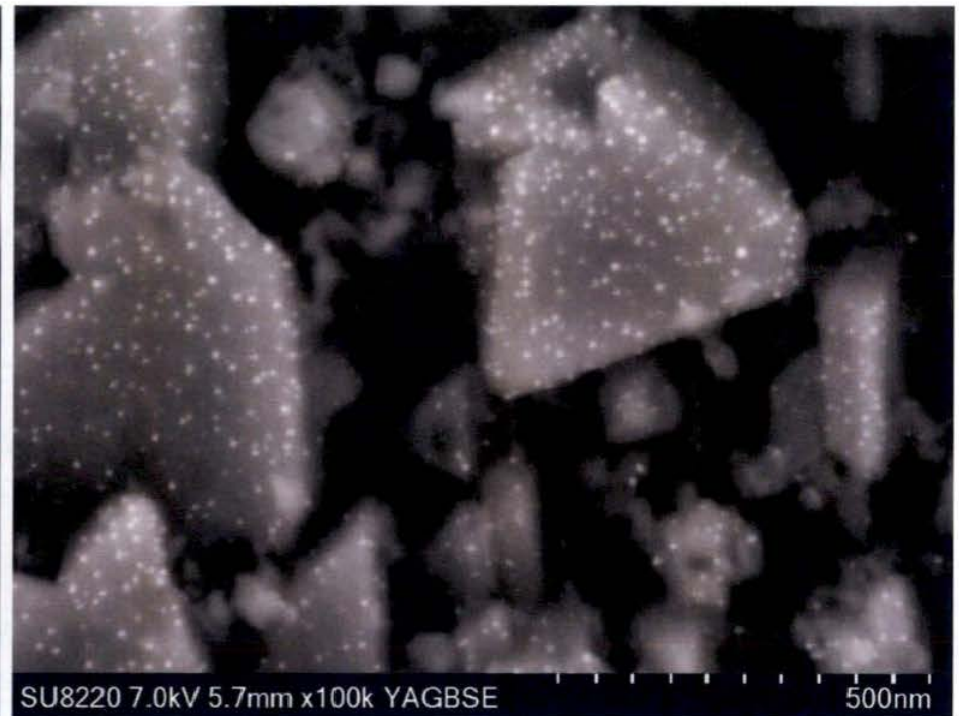
Iron electrode 304L stainless steel housing was sectioned into three pieces

BHDL ECP Electrodes – 100k Magnification

304L Stainless Steel Body



Pt ECP, SS Body, 100k



Fe ECP, SS Housing, 100k

- Pt particles were deposited on crud and oxide crystals of Pt ECP
- Pt particle deposition on Fe ECP indicates crevice deposition due to the configuration of the probe within the guide tube

BHDL ECP Electrodes

Observations

- Pt deposition was observed on both types of ECP probes
- Majority of the oxide layer was covered in crud
- Pt deposition mainly occurred on the oxide crystals
- In some areas, Pt particles are likely covered by crud that was deposited after the last OLNC application
- Pt deposition on iron ECP probe indicates crevice deposition
- Durability of NobleChem™ – Pt and Rh particles were detected

Fuel Channel Fastener - Information

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Fuel Channel Fastener – Core Location

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Fuel Channel Fastener – Oxide Layer

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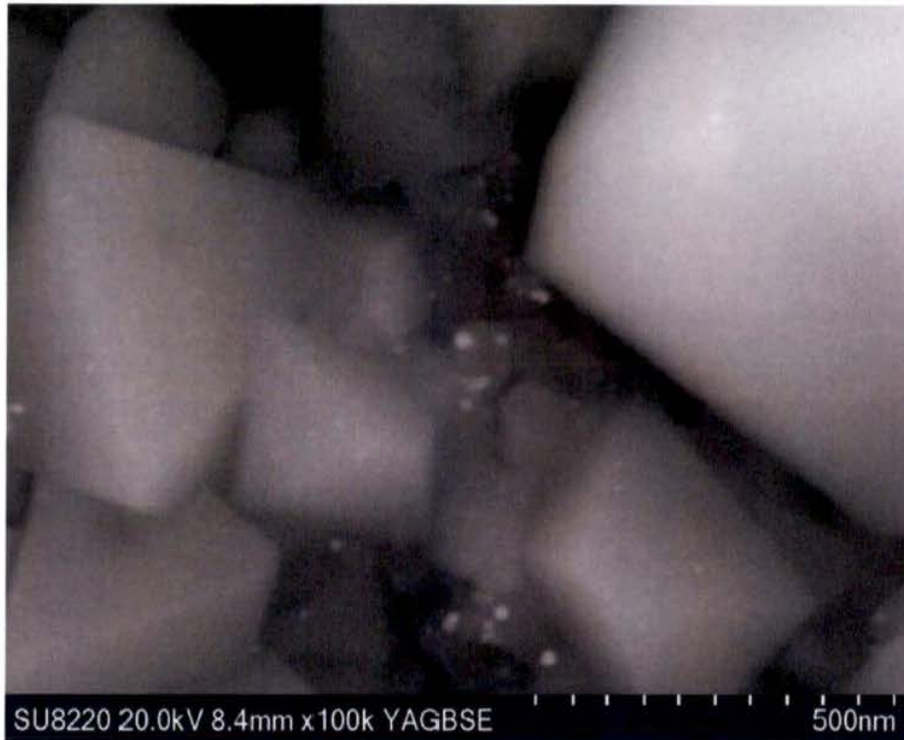
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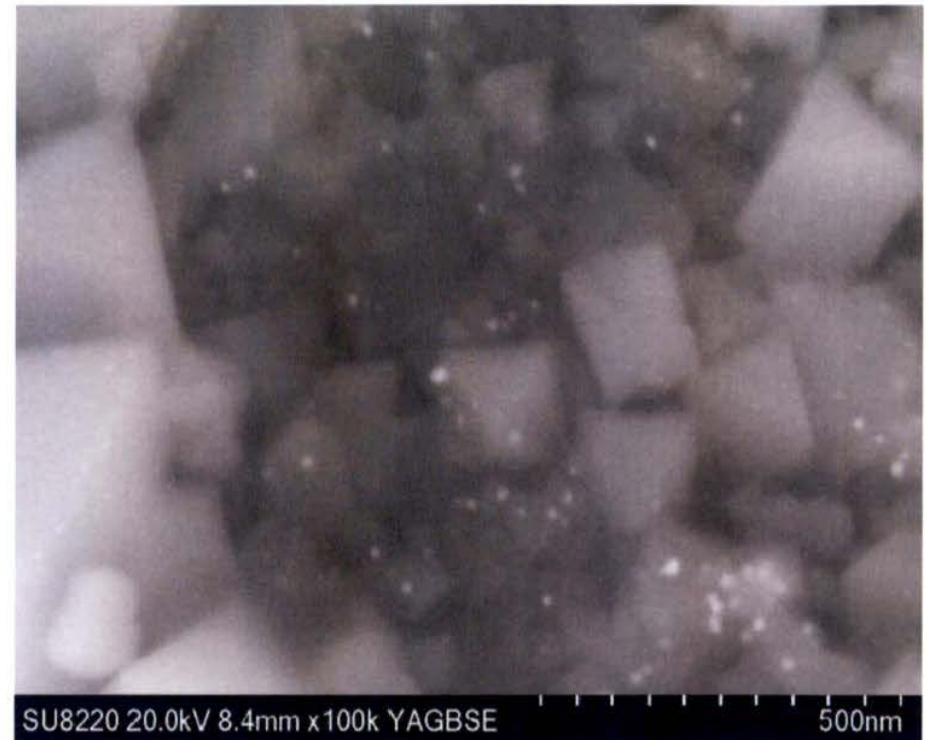
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Fuel Channel Fastener – 100k Magnification



Position #2 – Oxide Layer, 100k, SS



Position #4 – Oxide Layer, 100K, SS

- Pt deposition occurring deep within the oxide layer of the SS surface
- Pt particles on large crystals are slightly obscured due to sample orientation within the FE-SEM

Fuel Channel Fastener

Observations

- Multiple layers of oxide on the surface (deep crevices)
- Pt particles could not be observed on some surfaces, indicating Pt particles are buried within oxide layers (new oxide growth)
- Least amount of crud deposited on the oxide surface compared with the rest of the artifacts analyzed
- Not all Pt is depositing within the core once it enters the reactor vessel
- Platinum is depositing on surfaces of reactor vessel internals

Pt Particle Size and Particle Density of Artifacts

<u>Plant Type</u>	<u>RPV Component</u>	<u>Material Type</u>	<u>Annual OLNC Applications</u>	<u>Average Pt Particle Size (nm)</u>	<u>100k Average (Particle/μm^2)</u>	<u>250k Average (Particle/μm^2)</u>
BWR2-A	Tie Rod Latch	X-750	7	13 – 14	623	692
BWR5-C	Jet Pump Auxiliary Wedge	X-750	5	13	285	322
	Jet Pump Auxiliary Wedge	316L SS	5	18 – 19	199	221
BWR4-B	BHDL Pt ECP Probe	304L SS	1 + 4*	11 – 12	170	434
	BHDL Iron/Iron Oxide ECP Probe	304L SS	1 + 4*	11 – 13	253	371
BWR4-A	Fuel Channel Fastener	SS	2	11 - 18	118	379

*- One NMCA application and four OLNC applications

Pt Particle Size and Particle Density of Artifacts

Observations

- Pt particle sizes are directly in line with OLNC laboratory data (2 – 15 nm)
- Out of the four artifacts analyzed, the tie rod latch had the highest Pt particle densities after its exposure to seven OLNC applications
- Auxiliary Wedge particle densities had a 1.5X difference between X-750 and 316L SS
- Both ECP probes showed similar Pt particle densities even with the Iron/Iron oxide ECP probe section covered by the guide tube

Pt Characterization of Plant Artifacts

Conclusions

- With the information presented in the previous presentation regarding the conservative nature of MMS coupons, retrieving reactor internal artifacts is a more accurate representation of how Pt is being distributed on the oxide surfaces during OLNC applications
- All four types of artifacts showed deposition of nanometer sized Pt particles
- Non-homogenous Pt deposition except for tie rod latch
- Reactor internal artifacts are well suited to understanding Pt particle sizes, homogeneity of Pt deposition, and Pt particle density



Together...Shaping the Future of Electricity

From: [Tregoning, Robert](#)
To: [Tregoning, Robert](#)
Subject: FW: IAEA PLiM Hiser 10-18-2017 rlt
Date: Thursday, October 19, 2017 5:04:32 PM
Attachments: [IAEA PLiM Hiser 10-18-2017 rlt.docx](#)

Note to requester: Attachment is immediately following.

From: Tregoning, Robert
Sent: Thursday, October 19, 2017 5:04 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: IAEA PLiM Hiser 10-18-2017 rlt

Allen:

Attached are my suggested revisions. I had to do this quickly, so please clean up any grammatical errors that I've made. Let me know if you want to discuss any of my suggestions.

Cheers,

Rob

Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

M. Hiser^a, P. Purtscher^a, P. Ramuhalli^b, A. B. Hull^a, R. Tregoning^a

^aU. S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Division of Engineering
Washington, DC

^bPacific Northwest National Laboratory
Richland, WA, USA

Abstract. Recent developments, including strong interest in extended plant operation and plans to shut down a number of nuclear power plants (NPPs), provide opportunities for harvesting components that were aged in representative light water reactor (LWR) environments. Technical issues associated with extended plant operation, such as reactor pressure vessel (RPV) embrittlement, irradiation-assisted degradation of reactor internals and primary components, concrete structures and containment degradation, and electrical cable aging, may be used to focus harvesting efforts on high-priority issues. Harvesting can provide highly representative aged materials for research and may be the only practical source of representative aged materials in some cases. Harvesting ~~is can be~~ expensive and time-consuming, which makes it essential to focus on ~~those~~ technical needs ~~of with the highest importance and seek leveraging and cooperation among with~~ multiple organizations whenever possible ~~to optimally leverage resources~~. NRC is interested in engaging with other organizations to prioritize data needs for harvesting, identify areas of common interest, and develop a database for sources of materials for harvesting.

1. Background

Recent developments in the nuclear industry include stronger interest in extended plant operation and plans to shut down a number of nuclear power plants (NPPs). In the U.S., there is strong interest in extending NPP lifespans through subsequent license renewal (SLR) from 60 to 80 years [1]. ~~Further research may be required to understand age-related degradation throughout the SLR period to help ensure that aging management programs are adequate. Extended plant operation and SLR raise a number of technical issues that may require further research to understand aging mechanisms.~~ U.S. utilities and the U.S. Nuclear Regulatory Commission (NRC) ~~have are~~ focused on the aging of systems, structures, and components ~~and in particular four key SLR issues~~ **technical areas**: reactor pressure vessel (RPV) embrittlement, irradiation-assisted degradation of reactor internals and primary components, concrete structures and containment degradation, and electrical cable aging [2]. ~~Meanwhile, in~~ recent years, a number of NPPs, both in the U.S. and internationally, have shut down or announced plans to shut down for various reasons, including economic, political, and technical challenges. Unlike in the past when there were very few ~~decommissioning plants shutting down~~, these ~~new developments plant shutdowns~~ provide opportunities for harvesting components that were aged in representative light water reactor (LWR) environments. ~~In a third related development~~ **Additionally**, ~~economic challenges and limited budgets have restricted the resources available to support new research, including harvesting programs can be costly and complex.~~ Given these ~~constrained budget environment~~ **constraints**, aligning interests and leveraging with other organizations is important to allow maximum benefit and value for future research programs.

2. NRC Experience with Harvesting

NRC has significant experience with harvesting plant components and performing research on harvested materials to address technical issues. This experience includes a range of components from plants in various stages of operation both in the U.S. and internationally.

Some of the harvesting projects that the NRC has participated ~~in-include~~ in have studied the following materials or components:

- RPV materials from the decommissioned Gundremmingen plant ~~in-Germany~~ to study fluence rate effects on RPV embrittlement [3],
- Cast austenitic stainless steel (CASS) materials from the decommissioned Shippingport reactor ~~in-the-U.S.~~ to study CASS thermal embrittlement [4],
- RPV materials from the unfinished or never-operated Shoreham and Midland plants to improve understanding of flaw distributions for RPV embrittlement concerns [5-6],
- RPV head control rod drive mechanism penetrations from the operating North Anna and Davis-Besse plants ~~in-the-U.S.~~ to study primary water stress corrosion cracking (PWSCC) of nickel alloys and the effectiveness of non-destructive evaluation (NDE) methods [8-12],
- Reactor coolant system (RCS) piping nozzle weld materials from the operating V.C. Summer plant ~~in-the-U.S.~~ to study PWSCC of nickel alloys [11-12],
- Reactor internals materials from the decommissioned Jose Cabrera (known as Zorita) plant ~~in-Spain~~ to study high-fluence irradiation effects on stainless steel alloys [13],
- Aluminum-based neutron-absorbing materials from the decommissioned Zion plant ~~in-the-U.S.~~ to study degradation in the spent fuel pool environment [14],
- Electrical cables from the decommissioned Zion and Crystal River plants ~~in-the-U.S.~~ to investigate cable degradation [15],
- Electrical bus ducts from the decommissioned Zion plant ~~in-the-U.S.~~ to study high-energy arc faults in electrical enclosures [16].

~~NRC is also aware of other harvesting efforts without NRC participation led by the Electric Power Research Institute (EPRI), the U.S. Department of Energy (DOE) and other research organizations.~~

Commented [TR1]: We just said the list above were examples. Of course there have been other efforts.....

As ~~described-illustrated by these programs~~ above, NRC's experience is that harvesting has contributed significantly to improved understanding of important technical issues for nuclear safety. For RPV materials, harvesting has increased knowledge of embrittlement mechanisms and the underlying flaw distributions in the RPV to allow reduction in unnecessary conservatism ~~as appropriate~~. For nickel alloys, harvesting has improved understanding of ~~the PWSCC and the development of acceptable inspection intervals~~ mechanism, while also increasing confidence in the ability of NDE methods to detect and characterize flaws. Finally, recent work on electrical enclosures has helped to identify a potential new safety issue associated with high-energy arc faults in electrical components containing aluminum [17].

3. NRC Perspective and Lessons Learned from Harvesting ~~Experience~~ Activities

From NRC's perspective ~~and experience, the primary-a principal~~ role of harvesting is to ~~provide confirmation of~~ confirm other research results from simulated aging conditions. In many situations, accelerated aging through higher flux test reactor irradiations or elevated temperatures can be used to generate significant data to understand aging effects in a more cost-effective manner. Limited harvesting efforts of materials from highly representative service environments can help ~~provide data to confirm the adequacy of the knowledge gained from accelerated aging studies, and thus increase the confidence in the broader database from accelerated aging studies~~ knowledge base.

~~NRC's experience with harvesting has provided a number of technical and logistical lessons learned. However, in certain situations, H~~ harvesting can provide highly representative aged

~~materials for research and~~ may be the only practical source of representative aged materials ~~in some cases~~. For example, achieving high fluence levels with representative irradiation conditions through accelerated aging ~~other means~~ can be very challenging. Additionally, it is also essential to gain as much information as possible regarding the materials and environment (temperature, fluence, irradiation conditions, chemistry, humidity, etc.) in advance before committing to a specific harvesting project so that the implications of the results from evaluating the materials can be properly understood.

~~In terms of logistics lessons learned~~ Pragmatically, harvesting ~~is can be~~ expensive, complex, and time-consuming; therefore, focusing on technical needs of high importance ~~is key to will help~~ ensure good value. Likewise, leveraging and cooperation among multiple organizations helps to mitigate cost challenges. ~~A final logistical lesson has been that it is~~ also quite challenging to transport irradiated materials, particularly internationally, so minimizing or ~~avoiding such~~ transportation such materials in harvesting programs is highly recommended.

4. NRC Activities on Harvesting

~~The primary focus of NRC is potentially interested in harvesting materials to assess 's harvesting interests age-related degradation in are on the four key technical areas issues identified for SLR previously: reactor pressure vessel (RPV) embrittlement, irradiation-assisted degradation of reactor internals and primary components, concrete structures and containment degradation, and electrical cable aging [2]. As described in Section 2 above, NRC has previously pursued harvesting for similar materials to address these technical issues. The focus is to understand the impact of~~ However, increasing operating time with extended plant operation on material behavior, including leads to new technical gaps in understanding the effects of material behavior at higher fluences and longer exposures to aging conditions.

NRC has recently undertaken an effort, with the assistance of Pacific Northwest National Laboratory (PNNL), to develop a strategic approach for harvesting aged materials from NPPs. ~~Due to limited opportunities, p~~ Past harvesting efforts ~~activities have been narrowly focused on the relatively few opportunities to get materials from decommissioning plants, reactive to individual plants shutting down and beginning decommissioning.~~ Given the expected availability of materials from numerous plants and ~~anticipated identified~~ research needs to better understand aging out to 80 years of operation, the NRC is ~~pursuing developing~~ a more proactive approach to prioritize the data needs best addressed by harvesting and identify the best sources of materials to address high-priority data needs for regulatory research.

5. Prioritization of Data Needs Best Addressed by Harvesting

The first step in this strategic approach is to prioritize data needs for harvesting. A data need describes a particular degradation scenario (i.e., combination of material and environment) and should be defined with as much detail as appropriate in terms of the material (e.g., alloy, composition, ~~etc.~~) and environment (e.g., temperature, fluence, chemistry, ~~etc.~~).

A number of criteria ~~may be are being~~ considered ~~when for~~ prioritizing the harvesting data needs ~~for harvesting~~, including:

- Applicability of harvested material for addressing critical gaps
 - Harvesting ~~for critical to address critical~~ gaps should be prioritized over less essential technical gaps
- Ease of laboratory replication of the degradation scenario

- ~~Other degradation scenarios/mechanisms that are harder to may be more easily replicated/replicate under in simulated aging conditions and of lower higher priority for harvesting.~~ For example, simultaneous thermal and irradiation conditions are difficult to replicate outside of the plant environment. ~~Alternatively, or~~ accelerated aging may not be feasible for a mechanism sensitive to dose rate. These two degradation mechanisms may be best evaluated using harvested materials. ~~Other degradation scenarios may be more easily replicated in simulated aging conditions and of lower priority for harvesting.~~
- Unique field aspects of degradation
 - For example, legacy materials (e.g., fabrication methods, composition, etc.) that are no longer available, but may play an important role in a potential degradation mechanism scenario, would have a higher priority than harvesting materials that could increase the priority of harvesting can be obtained from other sources.
- Fleet-wide vs. plant-specific applicability of data
 - There is greater value in addressing/developing knowledge to address an issue that may be applicable to a larger number of plants compared to one that may only supports/affect a relatively small number of plants.
- Harvesting cost and complexity
 - ~~Activities with higher This costs and complexity consideration may increase the priority-~~ are less attractive than similar activities with lower costs and that are simpler to execute. ~~of lower cost needs and decrease the priority of higher cost needs, such as highly irradiated materials.~~ For example, harvesting unirradiated concrete or electrical cables is less expensive and less complex than harvesting from the reactor internals or RPV. ~~This cost and complexity consideration may increase the priority of lower cost needs and decrease the priority of higher cost needs, such as highly irradiated materials.~~
- Availability of reliable inspection methods for the degradation scenario
 - If mature inspection methods exist and are easy to apply to monitor degradation, harvesting may be less valuable. If inspection methods do not exist, harvesting may be essential to ensure confidence in the assessment of age-related degradation in that particular that the aging will not challenge a safety function for the component.
- Timeliness of the expected research results relative to the objective
 - The ability of a potential harvesting program to provide timely results in time to support either a technical or regulatory need meet the objective of the work is important. Having high confidence that results will be timely ~~to address the need~~ increases the priority.
- Availability of materials for harvesting

Commented [TR2]: I'm beginning to think that instead of inspection methods we should focus on effective AMPs. This is broader than just can you inspect it; it goes to how confident are you in the AMP. FAC is a good example of an area that we don't think we need to harvest to assess.

Commented [TR3]: While obvious, do you want a subbullet here since you have them elsewhere?

The above potential criteria provide a systematic approach ~~for to~~ prioritizing harvesting data needs ~~for harvesting~~. Different organizations may uniquely weigh ~~and consider each of these~~

criteria differently ~~based on their interests and perspectives~~, but ~~the each~~ criteria is likely relevant to some degree for any organization ~~are intended to be comprehensive~~. NRC is interested in engaging with other organizations to ~~further refine these criteria, use them to prioritize data needs for harvesting, and ultimately identify areas of common interest that may provide optimal harvesting opportunities.~~

6. Database of Sources of Materials for Harvesting

~~Another activity~~ The NRC is ~~pursuing is the potential development also~~ developing of a database ~~for that identifies~~ sources of materials for harvesting. ~~This database, which could will~~ include both previously harvested materials and those ~~which may be~~ available for future harvesting. This database ~~would allow will~~ be used to ~~align for aligning of the~~ high-priority ~~harvesting data~~ needs to the available ~~sources of~~ materials. As with the ~~data harvesting needs prioritization~~ effort, the level of detail for the sources of materials database should be appropriate for the factors influencing decision-making. NRC is interested in engaging with other organizations to develop a database ~~for that identifies~~ sources of materials for harvesting.

7. Conclusions

NRC's experience is that harvesting can yield highly representative and valuable ~~data on knowledge about~~ materials aging. ~~However, but~~ these efforts may be expensive and challenging. Having a clearly defined objective and early engagement with other stakeholders, including the ~~licensee of decommissioning plant NPP from which where~~ harvesting will take place, ~~are key to are necessary to ensure project~~ success. As specific harvesting opportunities are identified through this strategic approach, the NRC ~~will develop strategies for pursuing these opportunities. The NRC also welcomes collaboration from opportunities for cooperation and leveraging resources with other interested research organizations both in developing the proactive harvesting strategy and in pursuing harvesting opportunities of mutual interest.~~

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Note to requester: Attachment is immediately following.

From: [Hiser, Matthew](#)
To: [Ramuhalli, Pradeep \(Pradeep.Ramuhalli@pnnl.gov\)](mailto:Ramuhalli, Pradeep (Pradeep.Ramuhalli@pnnl.gov))
Subject: FW: Synopsis on Harvesting for IAEA PLiM
Date: Monday, May 22, 2017 3:18:00 PM
Attachments: [Harvesting IAEA PLiM 2 page synopsis.docx](#)

Hi Pradeep,
In the last couple days, we've decided to throw in an abstract at PLiM on harvesting. Please take a look at what I attached and provide any feedback.
If you're planning to attend PLiM, I think it'd be best for you to give the talk. If not, another staff in our office, Carol Moyer, will be attending and can give the presentation.
Thanks!
Matt

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

From: Hiser, Matthew
Sent: Monday, May 22, 2017 2:47 PM
To: Hull, Amy ; Tregoning, Robert ; Purtscher, Patrick ; Moyer, Carol
Cc: Frankl, Istvan
Subject: Synopsis on Harvesting for IAEA PLiM

I have attached a draft 2 page synopsis on harvesting for the IAEA PLiM conference. The plan will be for Carol to give the presentation at the conference, but we need to submit the abstract by this week if possible (deadline was last Friday).
If possible, please take a look and provide comments or edits to the abstract by Wednesday to support submission this week.

Thanks!

Matt

Matthew Hiser

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
Phone: 301-415-2454 | Office: TWFN 10D62
Matthew.Hiser@nrc.gov

Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Matthew Hiser, Patrick Purtscher, Pradeep Ramuhalli, Amy Hull, Robert Tregoning, and Carol Moyer

In the U.S. and global nuclear industry, two recent developments include strong interest in extended plant operation and a number of nuclear power plants (NPPs) shutting down. In the U.S., there is strong interest in extending NPP lifespans through subsequent license renewal (SLR) from 60 to 80 years. Extended plant operation and SLR raise a number of technical issues that may require further research to understand aging mechanisms. U.S. utilities and the NRC have focused on aging in four key areas: the reactor pressure vessel (RPV), RPV internals and piping, concrete, and electrical components. Meanwhile, in recent years, a number of nuclear plants, both in the U.S. and internationally, have shut down or announced plans to shut down. Unlike in the past when there were very few plants shutting down, these new developments provide opportunities for harvesting components that were aged in representative light water reactor (LWR) environments. In a related development, economic challenges for the nuclear industry and limited budgets have restricted the resources available to support new research, including harvesting programs. Given this constrained budget environment, aligning interests and leveraging with other organizations is important to allow maximum benefit and value for future research programs.

NRC has recently undertaken an effort, with the assistance of Pacific Northwest National Lab (PNNL), to develop a strategic approach to harvesting of aged materials from NPPs. Due to limited opportunities, past harvesting efforts have been reactive to individual plants shutting down and beginning decommissioning. Given the expected availability of materials from numerous plants, NRC is pursuing a more proactive approach to prioritize the data needs best addressed by harvesting and identify the best source of materials to address those high-priority data needs.

The first step in this strategic approach to harvesting is to prioritize data needs for harvesting. A data need describes a particular material-environment combination and should be defined as detailed as appropriate in terms of the material (alloy, composition, etc.) and environment (temperature, fluence, chemistry, etc.). A number of criteria may be considered when prioritizing data needs for harvesting, including:

- Applicability of harvested material for addressing critical gaps
 - Prioritize harvesting for critical gaps over less essential data needs.
- Ease of laboratory replication of the environment-material combination
 - For example, simultaneous thermal and irradiation conditions may be difficult to replicate or a mechanism sensitive to dose rate may not be good for accelerated aging.
- Unique field aspects of degradation
 - For example, unusual operating experience or legacy materials (fabrication methods, composition, etc.) that may no longer be available.
- Fleet-wide vs. plant-specific applicability of data

- There is generally greater value in addressing an issue applicable to a larger number of plants.
- Availability of reliable in-service inspection (ISI) techniques for the material / component
 - If inspection methods are mature and easy to apply to monitor and track degradation, perhaps the effort of research with harvested materials is not needed.
- Availability of material for harvesting
 - The necessary materials / components must be available to be harvested.
- Harvesting cost and complexity
 - For example, harvesting unirradiated concrete or electrical cables should be less expensive and less complex than harvesting from the reactor internals or RPV.
- Timeliness of the expected research results relative to the objective.

These potential criteria provide a systematic approach to prioritize data needs for harvesting. Different organizations may weigh and consider each of these criteria differently based on their interests and perspective, but each criteria is likely relevant to some degree for any organization. NRC is interested in engaging with other organizations to prioritize data needs for harvesting and identify areas of common interest.

Another activity NRC is pursuing is the potential development of a database for sources of materials for harvesting, which could include both previously harvested materials and those available for future harvesting. This database would allow for aligning of high-priority data needs to the available sources of materials. As with the data needs effort, the level of detail for the sources of materials database should be appropriate for the important factors for decision-making. NRC is interested in engaging with other organizations to develop a database for sources of materials for harvesting.

NRC's experience is that harvesting can yield highly representative and valuable data on materials aging, but these efforts may be expensive and challenging. Having a clearly defined objective and early engagement with the plant from which harvesting will take place are keys to success. As specific harvesting opportunities are identified through this strategic approach to harvesting, NRC welcomes opportunities for cooperation and leveraging with other interested research organizations.

From: [Moyer, Carol](#)
To: [KRIVANEK, Robert](#)
Cc: [Hiser, Matthew](#)
Subject: RE: RE: PLiM abstract on harvesting
Date: Thursday, July 20, 2017 8:15:12 AM
Attachments: [PLiM abstract on harvesting.msg](#)
[image001.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)
[image007.png](#)
[image008.png](#)

Note to requester: The .msg attachment (an email) is immediately following this email record. The .png attachments are icons of various social media platforms sent from IAEA.

Hello, Robert,

I did receive an email notification that this paper, "IAEA-CN-246-143," had been accepted for presentation at the meeting.

The abstract in question was a second one that I sent to you, focused on harvesting of specimens from decommissioning plants. The lead author is Matthew Hiser. My prior email is attached.

Please let us know whether we should be preparing a presentation for the harvesting work.

Thank you,

Carol

From: KRIVANEK, Robert [mailto:R.Krivanek@iaea.org]
Sent: Thursday, July 20, 2017 3:05 AM
To: Moyer, Carol <Carol.Moyer@nrc.gov>
Cc: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: [External_Sender] RE: PLiM abstract on harvesting

Dear Carol,

If you mean this one

	Regulatory Research on the Aging Management of Structures, Systems and Components in Nuclear Power	
143	Plants Supporting License Renewal	Mrs. MOYER, Carol

It was accepted by programme committee and will be in session 6-4.

Best regards,

Mr Robert KRIVANEK | Senior Safety Officer |
LTO Programme Manager

Operational Safety Section | Division of Nuclear Installation Safety | Department of Nuclear Safety and Security |
International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria |
Email: r.krivanek@iaea.org | T: (+43-1) 2600-22018 | F: (+43-1) 2600-26007 |

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From: Carol.Moyer@nrc.gov [mailto:Carol.Moyer@nrc.gov]
Sent: Wednesday, 19 July 2017 20:05
To: KRIVANEK, Robert <R.Krivanek@iaea.org>
Cc: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: PLiM abstract on harvesting

Hello, Mr. Krivanek,

We have not heard back about acceptance of the abstract on harvesting. Because I was not able to submit it through the online system, I did not receive an automated notice (one

way or the other), nor has Matthew Hiser, the lead author. Can you let us know where this stands, please?

Thank you,

Carol

From: Moyer, Carol

Sent: Thursday, May 25, 2017 6:19 PM

To: 'KRIVANEK, Robert' <R.Krivanek@iaea.org>

Cc: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>

Subject: PLiM abstract on harvesting

Dear Mr. Krivanek,

The US NRC would like to propose one more presentation for this autumn's PLiM conference, on harvesting of materials from operating and decommissioning power plants. I understand from Sherry Bernhoft that you already have an impressive number of abstracts, so I will understand if there is not room in the program for this one. Nevertheless, we would appreciate your consideration of this proposal.

Again, please let me know if you need any additional information. Many thanks,
Carol

Carol E. Moyer

Sr. Materials Engineer

Office of Nuclear Regulatory Research

RES/DE/CMB

carol.moyer@nrc.gov

301-415-2153

From: KRIVANEK, Robert [<mailto:R.Krivanek@iaea.org>]

Sent: Tuesday, May 23, 2017 2:41 AM

To: Moyer, Carol <Carol.Moyer@nrc.gov>

Subject: [External_Sender] RE: RE: CN246_PLiM_Abstract deadline extended to 19 May 2017

Dear Carol,

I will arrange it. Thank you.

Best regards,

Mr Robert KRIVANEK | Senior Safety Officer |

LTO Programme Manager

Operational Safety Section | Division of Nuclear Installation Safety | Department of Nuclear Safety and Security |

International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria |

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From: Carol.Moyer@nrc.gov [<mailto:Carol.Moyer@nrc.gov>]

Sent: Monday, 22 May 2017 20:44

To: KRIVANEK, Robert <R.Krivanek@iaea.org>

Subject: RE: RE: CN246_PLiM_Abstract deadline extended to 19 May 2017

Dear Mr. Krivanek,

Since the formal deadline for abstract submissions has passed, I am no longer able to access the Indico system through the PLiM website

(<https://conferences.iaea.org/indico/event/134/>). My abstract and Form B are attached.

Are you able to work with these documents? Is there anything else that you need me to do at this time?

Thanks again for your patience and assistance,
Carol

From: Moyer, Carol

Sent: Monday, May 22, 2017 10:59 AM

To: 'KRIVANEK, Robert' <R.Krivanek@iaea.org>

Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>

Subject: RE: RE: CN246_PLiM_Abstract deadline extended to 19 May 2017

Dear Mr. Krivanek,

My abstract is attached to this message, for your info. Separately, I will submit it through the Indico system. Please let me know if you need any other information at this stage.

Thank you,

Mrs. Carol Moyer

From: KRIVANEK, Robert [<mailto:R.Krivanek@iaea.org>]

Sent: Monday, May 22, 2017 2:56 AM

To: Moyer, Carol <Carol.Moyer@nrc.gov>

Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>

Subject: [External_Sender] RE: CN246_PLiM_Abstract deadline extended to 19 May 2017

Dear Mr Moyer,

It will be fine if you submit your abstracts this week.

We are looking forward to see a strong NRC delegation in Lyon.

Best regards,

Mr Robert KRIVANEK | Senior Safety Officer |

LTO Programme Manager

Operational Safety Section | Division of Nuclear Installation Safety | Department of Nuclear Safety and Security |

International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria |

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From: Carol.Moyer@nrc.gov [<mailto:Carol.Moyer@nrc.gov>]

Sent: Friday, 19 May 2017 23:19

To: KRIVANEK, Robert <R.Krivanek@iaea.org>

Cc: KANG, Ki-Sig <K.S.Kang@iaea.org>; Tregoning, Robert <Robert.Tregoning@nrc.gov>

Subject: RE: CN246_PLiM_Abstract deadline extended to 19 May 2017

Dear Mr. Krivanek,

The U.S. NRC intends to submit several abstracts for consideration for the PLiM conference in October. We have a short delay in completing one of our abstracts. I will be submitting it early next week, and I hope that you still will be able to consider it for the conference.

Thank you,

Carol Moyer

Carol E. Moyer

Sr. Materials Engineer

U.S. Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

MS: T-10A36

Washington, DC 20555-0001

carol.moyer@nrc.gov

301-415-2153

From: R.Krivanek@iaea.org [<mailto:R.Krivanek@iaea.org>]

Sent: Friday, April 21, 2017 8:44 AM

To: R.Krivanek@iaea.org

Subject: [External_Sender] CN246_PLiM_Abstract deadline extended to 19 May 2017

Dear all,

Please be informed that we extended the abstract submission deadline to 19 May 2017 and updated the conference accordingly.

Best regards,

Mr Robert KRIVANEK | Senior Safety Officer |

LTO Programme Manager

Operational Safety Section | Division of Nuclear Installation Safety | Department of Nuclear Safety and Security |

International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria |

Email: r.krivanek@iaea.org | T: (+43-1) 2600-22018 | F: (+43-1) 2600-26007 |

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From: Moyer, Carol
Sent: Thu, 25 May 2017 22:19:25 +0000
To: KRIVANEK, Robert
Cc: Hiser, Matthew;Tregoning, Robert;Frankl, Istvan
Subject: PLiM abstract on harvesting
Attachments: Harvesting IAEA PLim 2 page synopsis USNRC.docx

Note to requester: This email, and its attachment (which is immediately following), is the email attachment from the previous email, dated 7/20/17 from C. Moyer to M. Hiser.

Dear Mr. Krivanek,

The US NRC would like to propose one more presentation for this autumn's PLiM conference, on harvesting of materials from operating and decommissioning power plants. I understand from Sherry Bernhoft that you already have an impressive number of abstracts, so I will understand if there is not room in the program for this one. Nevertheless, we would appreciate your consideration of this proposal.

Again, please let me know if you need any additional information. Many thanks,

Carol

Carol E. Moyer
Sr. Materials Engineer
Office of Nuclear Regulatory Research
RES/DE/CMB
carol.moyer@nrc.gov
301-415-2153

From: KRIVANEK, Robert [mailto:R.Krivanek@iaea.org]
Sent: Tuesday, May 23, 2017 2:41 AM
To: Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: [External_Sender] RE: RE: CN246_PLiM_Abstract deadline extended to 19 May 2017

Dear Carol,

I will arrange it. Thank you.

Best regards,

Mr Robert KRIVANEK | Senior Safety Officer |
LTO Programme Manager
Operational Safety Section | Division of Nuclear Installation Safety | Department of Nuclear Safety and Security |
International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria |
Email: r.krivanek@iaea.org | T: (+43-1) 2600-22018 | F: (+43-1) 2600-26007 |



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From: Carol.Moyer@nrc.gov [<mailto:Carol.Moyer@nrc.gov>]

Sent: Monday, 22 May 2017 20:44

To: KRIVANEK, Robert <R.Krivanek@iaea.org>

Subject: RE: RE: CN246_PLiM_Abstract deadline extended to 19 May 2017

Dear Mr. Krivanek,

Since the formal deadline for abstract submissions has passed, I am no longer able to access the Indico system through the PLiM website (<https://conferences.iaea.org/indico/event/134/>). My abstract and Form B are attached.

Are you able to work with these documents? Is there anything else that you need me to do at this time?

Thanks again for your patience and assistance,
Carol

From: Moyer, Carol
Sent: Monday, May 22, 2017 10:59 AM
To: 'KRIVANEK, Robert' <R.Krivanek@iaea.org>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: RE: CN246_PLiM_Abtract deadline extended to 19 May 2017

Dear Mr. Krivanek,

My abstract is attached to this message, for your info. Separately, I will submit it through the Indico system. Please let me know if you need any other information at this stage.

Thank you,
Mrs. Carol Moyer

From: KRIVANEK, Robert [<mailto:R.Krivanek@iaea.org>]
Sent: Monday, May 22, 2017 2:56 AM
To: Moyer, Carol <Carol.Moyer@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: [External_Sender] RE: CN246_PLiM_Abtract deadline extended to 19 May 2017

Dear Mr Moyer,

It will be fine if you submit your abstracts this week.
We are looking forward to see a strong NRC delegation in Lyon.

Best regards,

Mr Robert KRIVANEK | Senior Safety Officer |
LTO Programme Manager
Operational Safety Section | Division of Nuclear Installation Safety | Department of Nuclear Safety and Security |
International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria |
Email: r.krivanek@iaea.org | T: (+43-1) 2600-22018 | F: (+43-1) 2600-26007 |



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From: Carol.Moyer@nrc.gov [<mailto:Carol.Moyer@nrc.gov>]

Sent: Friday, 19 May 2017 23:19

To: KRIVANEK, Robert <R.Krivanek@iaea.org>

Cc: KANG, Ki-Sig <K.S.Kang@iaea.org>; Tregoning, Robert <Robert.Tregoning@nrc.gov>

Subject: RE: CN246_PLiM_Abstract deadline extended to 19 May 2017

Dear Mr. Krivanek,

The U.S. NRC intends to submit several abstracts for consideration for the PLiM conference in October. We have a short delay in completing one of our abstracts. I will be submitting it early next week, and I hope that you still will be able to consider it for the conference.

Thank you,
Carol Moyer

*Carol E. Moyer
Sr. Materials Engineer
U.S. Nuclear Regulatory Commission*

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MS: T-10A36
Washington, DC 20555-0001
carol.moyer@nrc.gov
301-415-2153

From: R.Krivanek@iaea.org [<mailto:R.Krivanek@iaea.org>]
Sent: Friday, April 21, 2017 8:44 AM
To: R.Krivanek@iaea.org
Subject: [External_Sender] CN246_PLiM_Abstract deadline extended to 19 May 2017

Dear all,

Please be informed that we extended the abstract submission deadline to 19 May 2017 and updated the conference accordingly.

Best regards,

Mr Robert KRIVANEK | Senior Safety Officer |
LTO Programme Manager
Operational Safety Section | Division of Nuclear Installation Safety | Department of Nuclear Safety and Security |
International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria |
Email: r.krivanek@iaea.org | T: (+43-1) 2600-22018 | F: (+43-1) 2600-26007 |



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Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

M. Hiser^a, P. Purtscher^a, P. Ramuhalli^b, A. B. Hull^a, R. Tregoning^a, and C. E. Moyer^a

^aU.S. Nuclear Regulatory Commission (NRC), Washington, D.C., USA

^bPacific Northwest National Laboratory (PNNL), Richland, WA, USA

Recent developments in the nuclear industry include stronger interest in extended plant operation and plans to shut down a number of nuclear power plants (NPPs). In the U.S., there is strong interest in extending NPP lifespans through subsequent license renewal (SLR) from 60 to 80 years. Extended plant operation and SLR raise a number of technical issues that may require further research to understand aging mechanisms. U.S. utilities and the U.S. Nuclear Regulatory Commission (NRC) have focused on the aging of systems, structures, and components and in particular four key SLR issues: reactor pressure vessel (RPV) embrittlement, irradiation-assisted stress corrosion cracking of reactor internals, concrete structures and containment degradation, and electrical cable qualification and condition assessment. Meanwhile, in recent years, a number of NPPs, both in the U.S. and internationally, have shut down or announced plans to shut down for various reasons, including economic, political, and technical challenges. Unlike in the past when there were very few plants shutting down, these new developments provide opportunities for harvesting components that were aged in representative light water reactor (LWR) environments. In a third related development, economic challenges and limited budgets have restricted the resources available to support new research, including harvesting programs. Given this constrained budget environment, aligning interests and leveraging with other organizations is important to allow maximum benefit and value for future research programs.

NRC has recently undertaken an effort, with the assistance of Pacific Northwest National Lab (PNNL), to develop a strategic approach for harvesting aged materials from NPPs. Due to limited opportunities, past harvesting efforts have been reactive to individual plants shutting down and beginning decommissioning. Given the expected availability of materials from numerous plants and anticipated research needs to better understand aging out to 80 years of operation, the NRC is pursuing a more proactive approach to prioritize the data needs best addressed by harvesting and identify the best sources of materials to address high-priority data needs for regulatory research.

The first step in this strategic approach is to prioritize data needs for harvesting. A data need describes a particular degradation scenario (combination of material and environment) and should be defined with as much detail as appropriate in terms of the material (alloy, composition, etc.) and environment (temperature, fluence, chemistry, etc.).

A number of criteria may be considered when prioritizing the data needs for harvesting, including:

- Applicability of harvested material for addressing critical gaps
 - Harvesting for critical gaps prioritized over less essential technical gaps.

- Ease of laboratory replication of the degradation scenario
 - For example, simultaneous thermal and irradiation conditions are difficult to replicate or accelerated aging may not be feasible for a mechanism sensitive to dose rate.
- Unique field aspects of degradation
 - For example, unusual operating experience or legacy materials (fabrication methods, composition, etc.) no longer available.
- Fleet-wide vs. plant-specific applicability of data
 - Greater value in addressing an issue applicable to a larger number of plants.
- Harvesting cost and complexity
 - For example, harvesting unirradiated concrete or electrical cables less expensive and less complex than harvesting from the reactor internals or RPV.
- Availability of reliable in-service inspection (ISI) techniques for the material / component
 - If mature inspection methods exist and are easy to apply to monitor degradation, harvesting may be less valuable.
- Availability of materials for harvesting
- Timeliness of the expected research results relative to the objective.

The above potential criteria provide a systematic approach to prioritize data needs for harvesting. Different organizations may weigh and consider each of these criteria differently based on their interests and perspectives, but each criteria is likely relevant to some degree for any organization. NRC is interested in engaging with other organizations to prioritize data needs for harvesting and identify areas of common interest.

Another activity NRC is pursuing is the potential development of a database for sources of materials for harvesting, which could include both previously harvested materials and those available for future harvesting. This database would allow for aligning of high-priority data needs to the available sources of materials. As with the data needs effort, the level of detail for the sources of materials database should be appropriate for the factors influencing decision-making. NRC is interested in engaging with other organizations to develop a database for sources of materials for harvesting.

NRC's experience is that harvesting can yield highly representative and valuable data on materials aging, but these efforts may be expensive and challenging. Having a clearly defined objective and early engagement with other stakeholders, including the NPP from which harvesting will take place, are key to success. As specific harvesting opportunities are identified through this strategic approach, the NRC welcomes opportunities for cooperation and leveraging resources with other interested research organizations.