

From: [Hiser, Matthew](#)
To: [Frankl, Istvan](#)
Cc: [Tregoning, Robert](#); [Purtscher, Patrick](#)
Subject: Harvesting Announcement Email
Date: Thursday, February 23, 2017 9:26:00 AM
Attachments: [Ex-Plant Materials Harvesting Workshop.pptx](#)
[Harvesting Workshop Agenda.docx](#)

Note to requester: Attachments
are immediately following.

Email to send to following RES and NRR BCs regarding workshop. Please take a look and provide any comments or feedback today if possible, so Steve can send email.

Send to:

RES/DE/CIB – Raj Iyengar
RES/DE/ICEEB – Ian Jung
RES/DE/SGSEB – Dogan Seber
NRR/DLR/RARB – Dennis Morey
NRR/DLR/RASB – Brian Wittick
NRR/DLR/RSRG – Steve Bloom
NRR/DE/EPNB – Dave Alley
NRR/DE/EVIB – Dave Rudland
NRR/DE/EEEE – Jake Zimmerman

Dear RES and NRR BCs:

RES is hosting a workshop on ex-plant materials harvesting at NRC headquarters on March 7-8, 2017. The scope includes any materials that could benefit from harvesting, including metallic, electrical, and concrete components. I have attached the 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 research organizations in Japan, Europe, and Canada. Unfortunately, there is limited space available for NRC staff in the room. We have reached out to selected staff in RES and NRR to participate in the room to ensure we can fully support the workshop topics. A webinar will be available to allow additional NRC staff to observe and participate:

<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.

Sincerely,

Steve Frankl

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

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

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 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

Ex-Plant Materials Harvesting Workshop Agenda

Tuesday, March 7

Session	Time	Organization	Speaker	Presentation Title
Intro	8:00	NRC		Welcome and Introduction to Workshop
1	8:15 – 8:45	EPRI	Sherry Bernhoft	
		DOE	Rich Reister	
		NRC	Robert Tregoning	NRC Perspective on Motivation for Harvesting
		GRS	Uwe Jendrich	
		CRIEPI	Taku Arai	
	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	
	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 – 2:15	NRC	Matthew Hiser	Sources of Materials: Past NRC Harvesting and U.S. Decommissioning Plants
	2:15 – 2:30	EPRI	Al Ahluwalia	
	2:30 – 2:45	DOE/ORNL	Tom Rosseel	
	2:45 – 3:00	DOE/INL	John Jackson	NSUF Material Sample Library
	3:00 – 3:15	Energy Solutions	Gerry van Noordennen	
	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	
	4:00 – 4:15	CNSC	Daniel Tello	
	4:15 – 5:00	DISCUSSION		

Wednesday, March 8

Session	Time	Organization	Speaker	Presentation Title
4	8:00 – 8:30	EPRI	Jean Smith	
	8:30 – 9:00	DOE	Tom Rosseel	
	9:00 – 9:30	NRC	Matthew Hiser	NRC Perspective on Harvesting Experience and Lessons Learned
	9:30 – 10:00	CRIEPI	Taku Arai	
	10:00 – 10:15	BREAK		
	10:15 - 10:45	Energy Solutions	Gerry van Noordennen	
	10:45 - 11:15	Dominion	Bill Zipp	
	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		

From: [Obodoako, Aloysius](#)
To: [Hiser, Matthew](#); [Hull, Amy](#); [Oberson, Greg](#); [Collins, Jay](#); [Litkett, Bernard](#); [Tregoning, Robert](#); [Poehler, Jeffrey](#)
Subject: FYI: 03/21/16 Meeting Summary: Harvesting of Ex-plant Materials
Date: Thursday, March 24, 2016 10:37:25 AM
Attachments: [Agenda Harvesting Project March 21, 2016.docx](#)
[Meeting Summary 3 21 16.docx](#)

Note to requester: Attachments
are immediately following.

Hey Guys,

The attached is a high level summary of our discussion on Monday. I'm sending this for information purposes and so that we are aligned. Let me know if it is inconsistent with your understanding.

Thanks,

Aloysius Obodoako, P.E.

Materials Engineer

U.S. Nuclear Regulatory Commission

RES/DE/CMB

Office location: TWFN-10B31

Office phone: (301)-415-2889

Email: Aloysius.Obodoako@nrc.gov

Strategic Approach for Obtaining Material and Components Aging Information to Support Reactor Operation Beyond 60 years

Agenda – NRC Task Group
1:30 pm, Monday, March 21, 2016
OWFN-09B02

- I. Task Group (NRR, RES, others)
 - Purpose:
 - provide input to determine gaps for operation beyond 60
 - key areas:
 - RPV at high fluence
 - IAD of internals and other components
 - concrete
 - electrical cable
- II. PNNL Work
 - scoping Study
 - evaluate relevant plant material projected to be available for harvesting
 - develop database of lowest knowledge of degradation with availability at plants
 - develop demo prototype taxonomy
- III. Public Workshop, Tentative Summer 2016
 - purpose:
 - discuss industry experience from plant harvesting activities
 - discuss future planned activities
- IV. Develop Harvesting Plan
 - schedule of plant decommissioning
 - strategic approach to interview and schedule for harvesting of SSCs
 - system design
 - SSC and environments
 - materials
 - records
- V. Questions

03/21/16 Meeting Summary: Strategic Harvesting of Ex-plant Materials

Participants: Robert Tregoning, Roger Kalikian, Jeff Poehler, Greg Oberson, Aloysius Obodoako, Matthew Hiser

Greg suggested that research and test reactors should be considered for harvesting in addition to decommissioned plants. In particular, Savannah River and Hanford national labs were mentioned. In support of Greg's suggestion, Rob indicated that the scope should be broadened to include ex-plant materials, which would include harvesting from operating reactors. Aloysius stated that he will contact the decommissioning branch at the NRC to obtain decommissioning schedules to provide input to the harvesting plan. In addition, Aloysius indicated that he will contact the DORL PMs for the plants scheduled for decommissioning so that the licensees may be informed of the NRC's plan for harvesting. Jeff suggested that we review licensees FSARs to identify those SSCs and environments for possible inclusion for harvesting. Roger indicated that he is no longer in DLR and that another point of contact from DLR should be identified. Roger suggested that Seung Min be included as the point of contact for DLR. It was stated that EPRI should be brought in on the discussion in regards to harvesting to facilitate interactions with licensees' of decommissioned plants. The group agreed that having a public workshop on harvesting of ex-plant materials around the summer timeframe is a good idea. It was suggested that DOE, industry, and international counterparts be invited to the workshop.

Note: see associated meeting agenda for more context.

From: Hull, Amy
Sent: Monday, May 23, 2016 6:54 AM
To: Hiser, Matthew; Frankl, Istvan; Purtscher, Patrick; Tregoning, Robert
Subject: great time, thanks!: Strategic Harvesting Project

This time looks great for me. Thanks.

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

From: Hiser, Matthew
Sent: Friday, May 20, 2016 3:48 PM
To: Frankl, Istvan; Purtscher, Patrick; Tregoning, Robert; Hull, Amy
Subject: Strategic Harvesting Project
When: Tuesday, May 24, 2016 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: T10D40

Just spoke with Amy and Pat, we all agreed to push to next week so everyone can participate (Amy cannot do today). I will send out an update on the status of the work at PNNL in advance of this meeting.

Purpose

- Determine staff roles in harvesting project
- Discuss path forward for harvesting project

UPDATE – Current Status

- PNNL is working on developing a harvesting plan as well as analyzing harvesting needs for a few example degradation mechanisms: PWSCC, CASS, cable aging
 - This Task 1 deliverable should be finalized by early 2017
- Matt reached out to the decommissioning BC in NMSS for info on planned decommissioning schedules
 - Response was that besides Zion, most plants are not planning to decommission for a long time
- Next step should probably be a public workshop to bring in external stakeholders/partners to discuss a strategic approach to harvesting:
 - DOE, EPRI, utilities, international

Subject: Harvesting Coordination
Location: 10th floor huddle

Start: Tue 07/10/2018 11:00 AM
End: Tue 07/10/2018 12:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Hiser, Matthew
Required Attendees: Tregoning, Robert; Audrain, Margaret; Purtscher, Patrick

Pushing time back per conflict for Pat

Subject: Harvesting
Location: HQ-TWFN-10A73-8p

Start: Mon 08/20/2018 3:00 PM
End: Mon 08/20/2018 3:30 PM
Show Time As: Tentative

Note to requester: The attached email
in this record is immediately following.

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Hiser, Matthew
Required Attendees: Miller, Kenneth A; Sircar, Madhumita
Resources: HQ-TWFN-10A73-8p

Hi Kenn and Mita,

Can we meet early next week to discuss the harvesting prioritization and getting your input for electrical and concrete?

Thanks!
Matt



FW: Materials
Harvesting

From: [Hiser, Matthew](#)
To: [Miller, Kenneth A](#); [Sircar, Madhumita](#)
Cc: [Purtscher, Patrick](#); [Audrain, Margaret](#)
Subject: FW: Materials Harvesting
Date: Friday, August 03, 2018 3:55:25 PM
Attachments: [Harvesting Needs Prioritization 8-3-18.xlsx](#)

Note to requester: The attachment is immediately following. This email and its attachment was also released in full in interim response #3.

Hi Kenn and Mita,

I just wanted to follow up from this meeting/email back in May on harvesting priorities. I have attached a template of the prioritization of harvesting needs in the metals area. Can you follow that template to provide input for the electrical and concrete technical areas?

Please let me (or Meg or Pat on cc) know if you have any questions.

Thanks!
Matt

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

From: Hiser, Matthew
Sent: Wednesday, May 16, 2018 10:36 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>; Sircar, Madhumita <Madhumita.Sircar@nrc.gov>; Pires, Jose <Jose.Pires@nrc.gov>; Koshy, Thomas <Thomas.Koshy@nrc.gov>; Murdock, Darrell <Darrell.Murdock@nrc.gov>; Philip, Jacob <Jacob.Philip@nrc.gov>
Cc: Miller, Kenneth A <KennethA.Miller@nrc.gov>; Christensen, Jason <Jason.Christensen@nrc.gov>
Subject: RE: Materials Harvesting

Thanks everyone for attending the meeting this morning. I appreciate the update on activities for electrical and concrete and have attached the documents that were printed out this morning.

Action Items for Metals, Concrete, and Electrical

1. Use prioritization criteria to prioritize data needs for harvesting in each area.
2. Catalog any previously harvested materials that may be available at labs.
3. Identify relevant information from license renewal documents for decommissioning plants

Thanks!
Matt

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

From: Hiser, Matthew
Sent: Monday, May 07, 2018 3:56 PM
To: Hiser, Matthew; Purtscher, Patrick; Tregoning, Robert; Audrain, Margaret; Sircar, Madhumita; Pires, Jose; Koshy, Thomas; Murdock, Darrell; Philip, Jacob
Cc: Miller, Kenneth A; Christensen, Jason
Subject: Materials Harvesting
When: Wednesday, May 16, 2018 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: T10D40

Rescheduling for hopefully a better time for everyone.

We'd like to meet with electrical and concrete research staff to discuss the latest status of the materials harvesting

activities under Task 2 of UNR NRR-2017-006.

The four topics we'd like to update you on / discuss in this meeting are:

- 1.CMB staff development of prioritization criteria for harvesting needs and lessons learned from exercising them for metals
- 2.CMB staff effort to development inventory of previously harvested materials already available at lab facilities
- 3.Latest status of harvesting plans for electrical and concrete components
- 4.Pulling relevant information from license renewal documents for decommissioning plants

Criteria Title	Description	Scoring Guidance
Criticalness of Technical Gap Addressed	Harvesting to address critical gaps should be prioritized over less essential technical gaps	<p>H = high risk significance / little to no available data MH = Medium-high risk significance / limited data available M = Moderate risk significance / some data available ML = low to moderate risk significance / sufficient data available for regulatory decisions L = Low risk significance / large amount of data available</p> <p>H = High MH = Medium-high M = Medium ML = Medium-low L = Low</p>
Importance of Harvested Materials over Laboratory Aging	Key considerations are the ease of laboratory replication of aging mechanism and unique field aspects of the aging mechanism. Degradation mechanisms that are harder to replicate with simulated aging conditions would be of higher priority for harvesting. For example, simultaneous thermal and irradiation conditions are difficult to replicate outside of the plant environment. Alternatively, accelerated aging may not be feasible for a mechanism sensitive to dose rate. These two degradation mechanisms may be best evaluated using harvested materials. For unique field aspects, legacy materials (e.g., fabrication methods, composition) that are no longer available, but may play an important role in a potential degradation mechanism, would have a higher priority than harvesting materials that can be obtained from other sources with representative properties.	<p>H = Nearly impossible to replicate service environment / critically important to use harvested materials MH = Challenging to replicate service environment / important to use harvested materials M = Possible with some limitations to replicate service environment / moderately important to use harvested materials ML = Not challenging to replicate service environment / less important to use harvested materials L = Very easy to replicate service environment / not important to use harvested materials</p> <p>H = All plants MH = All PWRs M = All BWRs or most PWRs ML = ~10-15 plants L = <5 plants</p>
Applicability to US Operating Fleet	There is greater value in developing knowledge to address an issue that may be applicable to a larger number of plants compared to one that may only affect a relatively small number of plants.	<p>H = No or very limited inspection methods available / low confidence in AMPs MH = Limited inspection methods available / low-to-moderate confidence in AMPs M = Some inspection methods available / moderate confidence in AMPs ML = Good inspection methods available / medium-high confidence in AMPs L = Effective, well-accepted inspection methods exist / high confidence in AMPs</p>
Regulatory Considerations Related to Inspections and AMPs	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 component. The less confidence that NRC staff has in the effectiveness of the relevant AMP, the higher priority for harvesting.	<p>H = Highly irradiated (>5 dpa) MH = Lightly irradiated / contaminated M = Minimal contamination or high effort unirradiated ML = Unirradiated, moderate effort expected L = Unirradiated, low effort expected</p>
Harvesting cost and complexity	Activities with higher costs and complexity are less attractive than similar activities with lower costs and that are simpler to execute. For example, harvesting unirradiated concrete or electrical cables is less expensive and less complex than harvesting from the RPV internals or the RPV.	
Timeliness of results	The ability of a potential harvesting program to provide timely results to support either a technical or regulatory need is important. Having high confidence that results will be timely increases the priority.	
Availability of materials for harvesting	The availability of materials to harvest for a particular data need is clearly essential and increases the priority.	

	Basic Info		Technical Criteria								Cost / Complexity		Project Specific			
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs				Score Average	Basis for Technical Priority	Timeliness of results	Availability of materials for harvesting
METALS			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
High fluence reactor internals	Void swelling, mechanical properties, IASCC	Likely extent of void swelling in PWRs during extended operation and impact on cracking	M	Fills data gap for extended plant operation	MH	Laboratory replication very difficult to impossible to achieve fluences with representative irradiation conditions	MH	Applicable to high-fluence components in most PWRs	MH	EPRI performing R&D on NDE for void swelling; MRP 227 uses primarily visual testing, which could detect void swelling once fairly significant	3.75	Significance of void swelling at higher fluences is uncertain, and inspections may detect onset of significant degradation	VH	Very high cost for highly irradiated internals		TBD
Thermally aged unirradiated CASS	Fracture toughness and microstructure	Fracture toughness data in real conditions to compare to accelerated aging data	MH	Validate accelerated aging data	H	Purpose of work would be to provide real-world validation of accelerated aging in lab testing	M	Most applicable to a subset of PWRs	H	No ISI method available to measure loss of FT	4.25	Would greatly increase confidence in large set of accelerated aging data with testing of unirradiated materials	M	Moderate cost for contaminated, but not irradiated, primary stem components		
Moderate fluence (1-2 dpa) CASS	Fracture toughness and microstructure	Fracture toughness data near limit requiring further evaluation	ML	Confirm regulatory position	MH	May be possible, but difficult to replicate long-term aging and irradiation effects	M	Most applicable to a subset of PWRs	H	No ISI method available to measure loss of FT	3.5	Would increase confidence in regulatory position	H	High cost for irradiated components		
Metallic components with known flaws	NDE and destructive examination	Determine whether SCC mitigation methods are effective at preventing SCC; effectiveness of NDE at detection and sizing	MH	Validate NDE and mitigation method effectiveness	MH	Purpose of work would be to provide real-world validation of lab testing	H	Applicable to all plants	ML	Purpose of this work is to assess inspection and mitigation method effectiveness	3.75	Increase confidence in NDE and mitigation methods	M	Moderate cost for contaminated, but not irradiated, primary stem components		
Metallic components with limiting fatigue life	NDE and destructive examination	Determine whether fatigue flaws are present in high usage locations	MH	Validate fatigue life methodologies	ML	Purpose of work would be to provide real-world validation of lab testing	H	Applicable to all plants	ML	Fatigue calculations inform sampling inspections of limiting fatigue locations	3.25	Increase confidence in fatigue life calculations	M	Moderate cost for contaminated, but not irradiated, primary stem components		

[illegible]

[illegible]

From: [Hiser, Matthew](#)
To: [Purtscher, Patrick](#)
Subject: FW: strawman harvesting workshop agenda
Date: Wednesday, December 07, 2016 9:37:00 AM
Attachments: [Workshop Agenda 12-1-16.docx](#)
[NRC Harvesting Workshop Announcement.docx](#)

Note to requester: Attachments are immediately following.

I don't think you were on this email...

From: Tregoning, Robert

Sent: Thursday, December 01, 2016 3:26 PM

To: Bernhoft, Sherry [sbernhoft@epri.com] (sbernhoft@epri.com) <sbernhoft@epri.com>;
richard.reister@nuclear.energy.gov

Cc: Iyengar, Raj <Raj.Iyengar@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Hull, Amy
<Amy.Hull@nrc.gov>

Subject: strawman harvesting workshop agenda

Sherry/Rich:

As promised, we've put together an announcement and a draft agenda for the harvesting workshop on March 7th and 8th. I'd like you both to take a look at the agenda prior to our call next week so that we can discuss the draft agenda during the call. Our proposal is that we agree on the topics and organizations for the talks and then explicitly solicit presenters from those organizations. We'd like to finalize the agenda prior to the holidays if possible so that we can start contacting presenters. Please let me know if you have any questions prior to our call next week.

As always, thanks for your help with this.

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

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 8:10 – 8:45
 - Perspective on Harvesting Lessons Learned / Prior Experience
- DOE 8:45 – 9:20
 - Perspective on Harvesting Lessons Learned / Prior Experience
- NRC 9:20 – 9:50
 - Perspective on Harvesting Lessons Learned / Prior Experience

BREAK 9:50 – 10:05

- International (Japan?) 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
- DOE/industry 12:55 – 1:20
 - Perspective on harvesting data needs
- International 1:20 – 1:45
 - Perspective on harvesting data needs
- International 1:45 – 2:10
 - Perspective on harvesting data needs

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
- International (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 – (DOE/EPRI – joint?) 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: Future Harvesting Program Planning

- PNNL / NRC 12:45 – 1:15
 - Technical information needed for informed harvesting decisions
- EPRI/NEI 1:15 – 1:45
 - Perspective on future harvesting efforts
- NRC 1:45 – 2:15
 - Perspective on future harvesting efforts
- International (France?) 2:15 – 2:45
 - Perspective on future harvesting efforts
- DISCUSSION 2:45 – 4:00
 - Potential harvesting partnerships
 - RPV, internals, piping, concrete, cables
 - US, international opportunities

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: [Tregoning, Robert](#)
To: [Bernhoft, Sherry \[sbernhoft@epri.com\]](#) ([sbernhoft@epri.com](#)); [Dyle, Robin](#)
Subject: FW: Harvesting Workshop
Date: Tuesday, December 20, 2016 6:47:00 AM
Attachments: [Harvesting Workshop Announcement.docx](#)
[Workshop Agenda 12-12-16.docx](#)

Note to requester: Attachments are immediately following.

Sherry:

As requested, here are the announcement and agenda again.

Cheers,

Rob

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

From: Tregoning, Robert
Sent: Thursday, December 15, 2016 3:54 PM
To: Bernhoft, Sherry [[sbernhoft@epri.com](#)] ([sbernhoft@epri.com](#)) <[sbernhoft@epri.com](#)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](#)>
Cc: Hiser, Matthew <[Matthew.Hiser@nrc.gov](#)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](#)>; 'Dyle, Robin' <[rdyle@epri.com](#)>
Subject: Harvesting Workshop

Sherry/Rich:

I wanted to thank you again for the discussion that we had last week on the harvesting workshop agenda. I think it was productive and I appreciate the perspective you both brought. I've attached an announcement for the workshop that we're planning to use to solicit participants. Also, we've revised the agenda substantially based on the feedback you both provided. I think it captures the issues you had and I personally think that this is a better model to follow for the workshop.

I'd like to ask you both for two things prior to leaving for the holidays.

1. Could you provide me with any additional changes to the workshop agenda that you recommend? Just mark-up and send back the attached agenda. I'll consolidate and address any remaining suggestions from you both.
2. Could you provide me with a POC for coordinating each of the 5 workshop sessions? The idea is for the POCs to work together for planning each session.
Here are the POCs from the NRC:
 - a. Session 1 – Rob Tregoning

- b. Session 2 – Matt Hiser
- c. Session 3 – Pat Purtscher
- d. Session 4 – Matt Hiser
- e. Session 5 – Rob Tregoning

We're hoping to get the planning teams in place before Christmas so that we can hit the ground running in early January to line up all the speakers.

Thanks again for your help. If I don't talk to you beforehand, I hope both you and your families have a Happy Holidays and a Prosperous New Year.

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

Ex-Plant Materials Harvesting Workshop

Location: NRC Headquarters in Rockville, MD, USA

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:

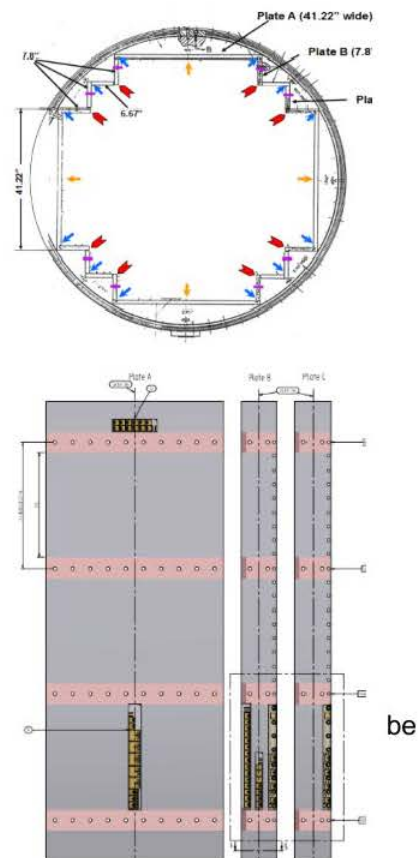
- For NRC staff and interested stakeholders to have greater awareness and knowledge of the benefits and challenges associated with ex-plant harvesting.
- Facilitate contacts and communication to enable specific cooperative ex-plant harvesting programs to be initiated.

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

Workshop will consist of solicited presentations followed by discussion periods. If interested in attending or learning more about the workshop, please reach out to the contacts below.

Contacts: Robert Tregoning, Robert.Tregoning@nrc.gov
Matthew Hiser, Matthew.Hiser@nrc.gov
Patrick Purtscher, Patrick.Purtscher@nrc.gov



Draft Agenda – March 7-8, 2017 Harvesting Workshop

Tuesday, March 7, 2017

Introduction

- Overview of workshop purpose and objectives 8:00 – 8:15
 - NRC

Session 1: Motivation for Harvesting 8:15 – 9:45

- Why our organization is interested in harvesting (short, 5-10 min presentations)
 - EPRI
 - DOE
 - NRC
 - MAI or JRC
 - JNRA
- PANEL DISCUSSION with prepared questions

BREAK 9:45 - 10:00

Session 2: Technical data needs best addressed by harvesting 10:00 – 12:00

- Overview of data needs best addressed by harvesting
 - NRC/PNNL
- Perspective on detailed data needs from harvesting
 - DOE
 - EPRI
 - MAI or JRC

LUNCH 12:00 – 1:00

- Perspective on harvesting data needs 1:00 – 2:15
 - JNRA
- DISCUSSION

BREAK 2:15 – 2:30

Session 3: Sources of Materials 2:30 – 5:30

- Available materials from decommissioning plants and past harvesting programs
 - NRC
- Available materials from operating reactors and past harvesting programs
 - EPRI
- Available materials at DOE labs from past harvesting programs
 - DOE (ORNL?)
- International sources of materials
 - IAEA?
- DISCUSSION

Wednesday, March 8, 2017

Session 4: Harvesting Experience: Lessons learned and practical aspects 8:00 – 12:00

- Perspective on Harvesting Lessons Learned / Prior Experience
 - EPRI
 - DOE
 - NRC
- Decommissioning process vs. harvesting: schedule, site-specific, timing for different components
 - US decommissioning company (Energy Solutions)
- Decommissioning and harvesting plans and experience
 - International decommissioning company (Germany?)
- Owner perspective on harvesting and decommissioning
 - US utility (Dominion/Kewaunee, other?)
- DISCUSSION

LUNCH 12:00 – 1:00

Session 5: Future Harvesting Program Planning 1:00 – 4:00

- Technical information needed for informed harvesting decisions
 - NRC/PNNL
- DISCUSSION of Next Steps / Actions
- Perspective on future harvesting planning
 - EPRI
 - NRC
 - DOE
 - MAI or JRC
 - JNRA
- PANEL DISCUSSION with prepared questions

Subject: FW: Talk about harvesting material
Location: Dave's office

Start: Thu 8/25/2016 10:30 AM
End: Thu 8/25/2016 11:00 AM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Hardies, Robert

If you're available...

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

From: Hardies, Robert
Sent: Thursday, August 18, 2016 9:32 AM
To: Hardies, Robert; Hiser, Matthew; Rudland, David
Subject: Talk about harvesting material
When: Thursday, August 25, 2016 10:30 AM-11:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Dave's office

Let's have a little chat about the program to harvest materials from vessels.

From: Tregoning, Robert
Sent: Wednesday, January 4, 2017 2:38 PM
To: Hiser, Matthew; Purtscher, Patrick
Subject: FW: test samples

Guys:

Let's make sure that this initial list is captured somehow so that we don't forget about it.

Thanks,

Rob

From: Koshy, Thomas
Sent: Wednesday, January 04, 2017 1:23 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Jung, Ian <Ian.Jung@nrc.gov>
Subject: test samples

Robert

I heard that you are creating a master list for harvesting specimens from shut down plants for future research efforts. I would suggest the following for electrical

Power cables energized and energized in normal operation
Cables from in containment applications

1E MOVs from harsh and mild environments

1E Air operated valves

4160 1E breakers

1E Molded case breakers 480V, 250V DC, 125 VDC,
1E Relays from mild environment GE – HFA, Agastat timing relays, any from Westinghouse, Potter Brumfield, Stuthers Dunn etc.,



Thomas Koshy,
Email: Thomas.Koshy@nrc.gov
Tel: Number: 301-415-2154
Room no: TWFN-10B48
MS TWFN-10A36
Instrumentation, Controls & Electrical Engineering Branch

Subject: Harvesting and IASCC Code Case
Location: HQ-TWFN-10A73-8p

Start: Mon 5/7/2018 9:00 AM
End: Mon 5/7/2018 10:00 AM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Hiser, Matthew
Required Attendees Tregoning, Robert; Purtscher, Patrick
Resources: HQ-TWFN-10A73-8p

I'll be back in RES on Monday, so I'm trying to ramp back up on my normal job.

(b)(6)

It looks like Meg is [REDACTED] so I thought I'd try to catch up with you guys on where things stand with harvesting as well as the IASCC code case.

Note to requester: Attachments are immediately following this email record.

From: Hull, Amy
Sent: Thu, 8 Mar 2018 17:21:00 +0000
To: Burke, John;Herrity, Thomas;Harris, Brian;Tregoning, Robert;Purtscher, Patrick;Audrain, Margaret
Cc: Moyer, Carol;Frankl, Istvan;Hiser, Matthew
Subject: AM and Harvesting, Posters 15 & 7: RIC EPOSTERS AND DIGITAL PRESENTER GUIDANCE - NEXT STEPS
Attachments: ePOSTERS AND PRESENTATIONS Numbered, Poster Layout RIC 2018_3-1-18.pdf, 2018 RIC poster Schedule.abh cm.abh.jb.rt.ma.pp.Bren.TH.BH.xlsx, draft AM Poster Feedback 2018 Questionnaire.doc, draft RIC AM-RMC drop-by visitors.docx
Importance: High

We have scheduling completed for staffing (see attached). For additive manufacturing poster staffing, I have the following suggestions for consideration to help us get information about what industry is doing –

- (1) Have along your business cards and try to get a business card from your visitor (if you need extra card stock, I have some in my workspace)
- (2) Engage your visitor with topics on the draft questionnaire and try to complete for each visitor (attached draft)
- (3) I will make extra small copies of the poster for visitor to take along if interested
- (4) If nothing else, please try to get the name and affiliation of visitor (attached draft).

If you have comments on the attached drafts or other suggestions on how to make the most of our time next week, please let us know.

Thanks for your participation in this,
Amy

From: Warren, Brenett
Sent: Monday, March 05, 2018 1:55 PM
To: Bridge, Joanna <Joanna.Bridge@nrc.gov>; Mendiola, Mary <Mary.Mendiola@nrc.gov>; Zuberi, Sardar <Sardar.Zuberi@nrc.gov>; Dembek, Stephen <Stephen.Dembek@nrc.gov>; Yadav, Priya <Priya.Yadav@nrc.gov>; Kenny, Caylee <Caylee.Kenny@nrc.gov>; Sturzebecher, Karl <Karl.Sturzebecher@nrc.gov>; Bernardo, Robert <Robert.Bernardo@nrc.gov>; Wilson, Joshua <Joshua.Wilson@nrc.gov>; Hall, Victor <Victor.Hall@nrc.gov>; Couret, Ivonne <Ivonne.Couret@nrc.gov>; West, Stephanie <Stephanie.West@nrc.gov>; Savoy, Joanne <Joanne.Savoy@nrc.gov>; King, Shannon <Shannon.King@nrc.gov>; Ralph, Melissa <Melissa.Ralph@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Steger, Christine <Christine.Steger@nrc.gov>; Armstrong, Kenneth <Kenneth.Armstrong@nrc.gov>; Gifford, Ian <Ian.Gifford@nrc.gov>; Smith, Todd <Todd.Smith@nrc.gov>; Howells, Christopher <Christopher.Howells@nrc.gov>; Orf, Tracy <Tracy.Orf@nrc.gov>; Cruz, Holly <Holly.Cruz@nrc.gov>; Morey, Dennis <Dennis.Morey@nrc.gov>; Oberson, Greg <Greg.Oberson@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Bowman, Gregory <Gregory.Bowman@nrc.gov>

Cc: RICMST Resource <RICMST.Resource@nrc.gov>; Kipfer, Lorna <Lorna.Kipfer@nrc.gov>

Subject: RIC EPOSTERS AND DIGITAL PRESENTER GUIDANCE - NEXT STEPS

Importance: High

Good Afternoon Poster Presenters,

We are 1 week from RIC 2018 and I want to provide you with a few details to assist:

EPOSTER AND DIGITAL PRESENTATION SCHEDULE

- ePoster and Digital Presenters should be present at the RIC. Although your poster may be set on a continuous run/feed there should be a person present to discuss the poster and to field questions from the attendee viewing the slide presentation March 13 – 15, 2018.
- Refer to Program Agenda on the RIC website at <https://ric.nrc.gov/agenda> for the full schedule of the RIC. Recommended times for visual presence should be during the following:

Tuesday:

7:30 a.m. – 8:30 a.m.	Meet and Greet – Networking Opportunity
8:30 a.m. – 10:00 a.m.	Opening Sessions
10:00 a.m. – 10:30 a.m.	Networking Break
10:30 a.m. 12:00 p.m.	Commission Plenary
12:00 p.m. – 1:30 p.m.	Lunch Break
3:00 p.m. - 3:30 p.m.	Networking Breaks

Wednesday:

7:30 a.m. – 8:30 a.m.	Meet and Greet – Networking Opportunity
10:00 a.m. – 10:30 a.m.	Networking Break
12:00 p.m. – 1:30 p.m.	Lunch Break
3:00 p.m. - 3:30 p.m.	Networking Breaks

Thursday:

7:30 a.m. – 8:30 a.m.	Meet and Greet – Networking Opportunity
10:00 a.m. – 10:30 a.m.	Networking Break

LAPTOP SETUP AND TESTING WITH OCIO TECH

- Arrive at the Bethesda North Marriott Hotel and Conference Center on **Monday, March 12, 2018 between 9:00 a.m. and 11:00 a.m.**
 - Test laptop/monitor connection
 - Verify loaded presentation shows accurately on monitor
- There will be a NRC technician from OCIO to complete the install of laptops with interactive (multi page slides). Single slide presenters (ePoster) may view their presentation at that time as well.

FLOORPLAN FOR EPOSTER AND DIGITAL PRESENTATIONS

- The preliminary floorplan is attached for your reference. If for any reason the floorplan should change, you will be notified.
- Ensure accuracy when referring to your poster, refer to the attached ePoster and Digital Presentation by number. Note, the posters were previously renumbered however, some presenters continued to use the old numbers. Please use the following numbered posters and titles.

SHIPPING MATERIALS

- If you plan to include materials for your ePoster and Digital Presentation with the bulk shipment from the NRC to the Marriott, it is imperative that you have all of the items properly labeled and taken to the Reprographics OP1-B3500 common area - labeled RIC shipping by **close of business Thursday, March 8, 2018**.
- All materials must be packed, properly labeled and in the designated Reprographics pick up location by close of business March 8, 2018. Provide on the shipping label and also to RICMST.Resource@nrc.gov:
 - The total number of boxes
 - Include your name
 - Include title of your ePoster and Digital Presentation
- We do ask that you **limit the amount of materials** you will bring due to reduced space in the Marriott foyer area.
- Affix a completed **shipping label to each box**. The materials received will be included on the manifest report for tracking purposes.
- Return shipping will occur on March 15 at 1:00 pm. If you wish to have any materials returned to the NRC prior to your departure from the Marriott, please affix a returnTo ensure accurate return please affix a label with your name and mailstop. All unmarked materials left in the Marriott foyer unmarked will be discarded.

Thank you,

Brenett (Bren) U. Warren

Program Specialist
Office of Nuclear Reactor Regulation
NRR/DMPS/RISB
Location: O13D5
301-415-3114
Brenett.Warren@nrc.gov



Follow us on Twitter @nrcgov_ric

Note to requester: This is the "ePOSTERS AND PRESENTATIONS Numbered" attachment to Amy Hull's 3/8/2018 email, and its attachment is immediately following this page.

From: NRCDigitalSender@nrc.gov
Sent: Mon, 5 Mar 2018 11:23:25 -0500
To: Warren, Brenett
Subject: ePOSTERS AND PRESENTATIONS Numbered
Attachments: image2018-03-05-162325.pdf

This document was digitally sent to you using Dell Digital Sending device.

EPOSTERS AND DIGITAL PRESENTATIONS

LOCATED IN THE GRAND BALLROOM FOYER—MAIN LEVEL

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>#1 Accident Sequence Precursor Program - Results, Trends, and Insights
<i>Sponsored by the Office of Nuclear Regulatory Research</i></p> <p>#2 Advanced Evacuation Simulations and Application to Emergency Preparedness
<i>Sponsored by the Office of Nuclear Security and Incident Response and the Office of Nuclear Regulatory Research</i></p> <p>#3 Application of the changes to NUREG/BR-0058 to the Regulatory Analysis of the Decommissioning of Power Reactors Rulemaking
<i>Sponsored by the Office of Nuclear Material Safety and Safeguards</i></p> <p>#4 Digital Dashboard for Operating Reactor Licensing Actions
<i>Sponsored by the Office of Nuclear Reactor Regulation</i></p> <p>#5 Enhancements to LIC-500, Topical Report Process
<i>Sponsored by the Office of Nuclear Reactor Regulation</i></p> <p>#6 Fun Facts on International Exports Programs
<i>Sponsored by the Office of International Programs</i></p> <p>#7 Harvesting of Aged Materials from Nuclear Power Plants
<i>Sponsored by the Office of Nuclear Regulatory Research</i></p> <p>#8 Knowledge Management
<i>Sponsored by the Office of the Chief Human Capital Officer</i></p> | <p>#9 Leveraging Cooperative Research Agreements to Improve NRC Safety Codes
<i>Sponsored by the Office of Nuclear Regulatory Research</i></p> <p>#10 Non-Reactor Decommissioning: Unexpected Fee Billing Implications
<i>Sponsored by the Office of Nuclear Material Safety and Safeguards and the Office of the Chief Financial Officer</i></p> <p>#11 Preserving the Lessons Learned from Fukushima
<i>Sponsored by the Office of Nuclear Reactor Regulation</i></p> <p>#12 Progression of Construction and Oversight Activities at Vogtle Units 3 and 4
<i>Sponsored by the Office of New Reactors</i></p> <p>#13 Public Communication - Learn about the Public Affairs Program at the NRC
<i>Sponsored by the Office of Public Affairs</i></p> <p>#14 Reactor Oversight Process Framework and Initiatives
<i>Sponsored by the Office of Nuclear Reactor Regulation</i></p> <p>#15 Review of Additive Manufacturing of Metallic Parts via Direct Metal Laser Melting
<i>Sponsored by the Office of Nuclear Regulatory Research</i></p> <p>#16 Web-based ADAMS - Providing Public Access to the NRC's Official Agency Document Repository
<i>Sponsored by the Office Information Officer</i></p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

EPOSTERS AND DIGITAL PRESENTATIONS

LOCATED IN THE GRAND BALLROOM FOYER—MAIN LEVEL

- #17 What You Need to Know About the Supplemental Proposed Rulemaking for 10 CFR Part 61, "Licensing Requirements Land Disposal of Radioactive Waste"

Sponsored by the Office of Nuclear Material Safety and Safeguards

- #18 xLPR Version 2 Code Brings State-of-the-art Probabilistic Analysis Capabilities to Nuclear Power Plant Piping

Sponsored by the Office of Nuclear Regulatory Research

The content and views in these presentations are those of the presenters and do not necessarily represent the views of the NRC.

Stairs to Lower Level
Conference Center
Entrance

Elevator to
Lower Level

Restrooms

Upper Level Conference Center Diagram Bethesda North Marriott Hotel & Conference Center

Note to requester: This page, and the next page, is the "Poster Layout RIC 2018_3-1-18" attachment in Amy Hull's 3/8/2018 email.

Service Area

Overflow Monitor

Foyer

Salon A

Salon F

Salon B

Salon D

Salon E

Salon G

Foyer

Salon C

Salon H

Escalators to
Lower Level
Conference

13 13

91 91

14 12

11

10

9

8

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1

18

17

15

Overflow Monitor

NRC
Information
Desk

Doors to Hotel Main Lobby
Meritage Restaurant,
On The Rocks Bar
& Coffee Shop

Restrooms

Overflow Monitor

Stairs to
Lower Level

2018 RIC ePoster and Digital
Presentations

Outside Veranda

Note: Final ePoster Layout Subject to Change Based Upon Space Requirements and Display Placement!

Technical Poster and Tabletop Presentations

- (16) Covered cocktail squares or rounds in front of each Display Monitor, (1) Chair in front of each, #s 1, 4,5,7-12, 1, 17 and 18; (2) chairs for #'s 2,3,6,13,15, 16
- (2) 6 foot skirted tables in front of Display #13 and 16 with 2 chairs
- (7) Laptops to be provided by BAV (Poster/tabletop #'s: 2, 6, 13 (2), 14, 16, and 18)
- (2) 27" Monitors to be supplied by BAV (ePoster/tabletop #'s: (2) for #16)
- (17) 46" Monitors to be supplied by BAV (all ePosters except #16)
- (16) USB Media Players to be supplies by BAV
- (18) Electricity Required for ALL
- (6) Internet requests for poster/tabletops #'s: 6, 13 (2), 14, 16 (2)
- (1) 6 foot skirted table with 1 chair for **NRC Information Desk** (first table on Salon H side of foyer)
- (5) Easels for poster/tabletops #'s: NRC Information Desk; NEA, IAEA, and OECD Tables (lower level), and NMSS/FCIX

Poster staffing - 2018 RIC - March 13-15, 2018

	Tuesday		Wednesday		Thursday			
	Adv. Mfg.	Harvesting	Adv. Mfg.	Harvesting	Adv. Mfg.	Harvesting		
7:30 AM	Carol	Amy	Amy	Carol	Rob	Amy		
8:00 AM	Carol	Amy	Amy	Carol	Rob	Amy		
8:30 AM	Carol	Meg						
9:00 AM	Carol	Meg						
9:30 AM	Amy	Meg						
10:00 AM	John	Pat	Tom	Meg	Amy	Pat		
10:30 AM	Brian	Pat						
11:00 AM	Brian	Pat						
11:30 AM	Amy	Pat						
12:00 PM	Amy	Pat	Carol	Meg	volunteer	Adv. Mfg. 1/2 hr sessions	Harvesting 1/2 hr sessions	
12:30 PM	Amy	Pat	Carol	Meg	Carol M.	7	3	
1:00 PM	John	Pat	Carol	Rob	Amy H.	10	4	
1:30 PM					J. Burke	2		
2:00 PM					Thom Herrity	2		
2:30 PM					Matt Hiser			
3:00 PM	Amy	Carol	Tom	Meg	Meg Audrain		7	
3:30 PM					Pat Purtscher		8	
4:00 PM					R. Tregoning	2	1	
4:30 PM					B. Harris	2		
5:00 PM	Amy		Amy		total	25	23	
5:30 PM					total 1/2 hr sessions needed	25	23	

Note to requester: This is the "2018 RIC poster schedule" attachment in Amy Hull's 3/8/2018 email.

Note to requester:
This is the "draft
AM Poster
Feedback 2018
Questionnaire"
attachment in Amy
Hull's 3/8/2018
email.

POSTER 15: AM - REACTOR MATERIALS & COMPONENTS

VISITOR NAME/ORG: _____

BUSINESS CARD: ☐ YES ☐ NO EMAIL: _____

Do you have any personal experience with AM? Is your organization researching AM?
Please describe your interest in additive or advanced manufacturing:

1. Do you expect to implement AM in your company in the future? How so? When?

☐ Within 5 years ☐ 5-10 years ☐ sometime in future ☐ not likely

2. Please comment on the things that stand out in your mind.

3. What should NRC be doing differently to get ready for AM implementation? Would you like NRC to have another public meeting on AM? Other suggestions?

4. Please rate the topics on a scale from 1 to 5 (5 being highest) in terms of interest:

- AM standards & qualification []
- Industry activities []
- American AM activity in international context []
- Cyber security []
- Reverse engineering and reactor components []
- Effects of process and design parameters []
- Irradiation testing & effects on AM []
- Nondestructive evaluation of components fabricated using AM []
- Corrosion behavior of AM components []
- Other areas NRC should focus on?

Please provide any other comments or feedback that is important to NRC's review of AM for reactor materials and components.

Return to: NRC Staff at Poster 15 by Salon E
Name

By: March 15, 2018
Date



NRC Additive Manufacturing for Reactor Materials & Components (AM-RMC) RIC Poster # 15, March 13-15, 2018

Name	Organizational Affiliation	Email	Phone	Current AM-RMC Interest	Do you want to be on contact list?
1.					
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3.					
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17.					
18.					

Note to requester: This is the "draft RIC AM-RMC drop-by visitors" attachment in Amy Hull's 3/8/18 email.



**NRC Additive Manufacturing for Reactor Materials & Components (AM-RMC)
RIC Poster # 15, March 13-15, 2018**

Name	Organizational Affiliation	Email	Phone	Current AM-RMC Interest	Do you want to be on contact list?
19.					
20.					
21.					
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**NRC Additive Manufacturing for Reactor Materials & Components (AM-RMC)
RIC Poster # 15, March 13-15, 2018**

Name	Organizational Affiliation	Email	Phone	Current AM-RMC Interest	Do you want to be on contact list?
39.					
40.					
41.					
42.					
43.					
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55.					



**NRC Additive Manufacturing for Reactor Materials & Components (AM-RMC)
RIC Poster # 15, March 13-15, 2018**

Name	Organizational Affiliation	Email	Phone	Current AM-RMC Interest	Do you want to be on contact list?
56.					
57.					
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72.					



**NRC Additive Manufacturing for Reactor Materials & Components (AM-RMC)
RIC Poster # 15, March 13-15, 2018**

Name	Organizational Affiliation	Email	Phone	Current AM-RMC Interest	Do you want to be on contact list?
73.					
74.					
75.					
76.					
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**NRC Additive Manufacturing for Reactor Materials & Components (AM-RMC)
RIC Poster # 15, March 13-15, 2018**

Name	Organizational Affiliation	Email	Phone	Current AM-RMC Interest	Do you want to be on contact list?
90.					
91.					
92.					
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106.					



**NRC Additive Manufacturing for Reactor Materials & Components (AM-RMC)
RIC Poster # 15, March 13-15, 2018**

Name	Organizational Affiliation	Email	Phone	Current AM-RMC Interest	Do you want to be on contact list?
107.					
108.					
109.					
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121.					
122.					
123.					



**NRC Additive Manufacturing for Reactor Materials & Components (AM-RMC)
RIC Poster # 15, March 13-15, 2018**

Name	Organizational Affiliation	Email	Phone	Current AM-RMC Interest	Do you want to be on contact list?
124.					
125.					
126.					
127.					
128.					
129.					
130.					
131.					
132.					
133.					
134.					
135.					
136.					
137.					
138.					
139.					
140.					



NRC Additive Manufacturing for Reactor Materials & Components (AM-RMC)
RIC Poster # 15, March 13-15, 2018

Name	Organizational Affiliation	Email	Phone	Current AM-RMC Interest	Do you want to be on contact list?
141.					
142.					
143.					
144.					
145.					
146.					
147.					
148.					
149.					
150.					
151.					
152.					
153.					
154.					
155.					
156.					
157.					



**NRC Additive Manufacturing for Reactor Materials & Components (AM-RMC)
RIC Poster # 15, March 13-15, 2018**

Name	Organizational Affiliation	Email	Phone	Current AM-RMC Interest	Do you want to be on contact list?
158.					
159.					
160.					
161.					
162.					
163.					
164.					
165.					
166.					
167.					

From: Hiser, Matthew
Sent: Fri, 2 Sep 2016 13:12:06 +0000
To: Hardies, Robert
Subject: Ex-plant Harvesting

Hi Bob,

I wanted to see when you'd have time before you retire to "show me the ropes" on reaching out to plants planning to shut down for information on their components for harvesting.

I am gone next week but should be in the office from Sept. 12 through the rest of the month.
(b)(6)

Thanks!
Matt

From: Ramuhalli, Pradeep
Sent: Fri, 3 Feb 2017 06:35:32 +0000
To: Purtscher, Patrick
Cc: Hiser, Matthew
Subject: [External_Sender] Draft slides

Symantec Mail Security replaced Harvesting workshop slides draft.pptx with this text message.
The original file was a malformed file, therefore it cannot be scanned and was quarantined.

ID:HQPWMSMRS04::SYQ3370fc312
The email message was also quarantined.

Note to requester: Attachment is immediately following.

From: Ramuhalli, Pradeep
Sent: Fri, 13 Jan 2017 16:15:14 +0000
To: Purtscher, Patrick
Subject: [External_Sender] FW: Revised agenda for next week - note time changes
Attachments: Agenda January 2017 NDE Tech Info Exch Public Meeting ML17011A273 .pdf

FYI.

With best regards,

Pradeep Ramuhalli, PhD
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

From: Nove, Carol [mailto:Carol.Nove@nrc.gov]
Sent: Wednesday, January 11, 2017 1:48 PM
To: Diaz, Aaron A <Aaron.Diaz@pnnl.gov>; Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>; Denslow, Kayte M <Kayte.Denslow@pnnl.gov>; D'Agostino, Amy <Amy.DAgostino@nrc.gov>; Crawford, Susan L <Susan.Crawford@pnnl.gov>
Subject: Revised agenda for next week - note time changes

Carol A. Nove, Senior Materials Engineer
NRC/RES/DE/CIB
TWFN 10B71
Mailstop 10A36
301-415-2217
carol.nove@nrc.gov

AGENDA

INDUSTRY / NRC NONDESTRUCTIVE EXAMINATION TECHNICAL INFORMATION
EXCHANGE PUBLIC MEETING (CATEGORY 2)
AT U.S. NUCLEAR REGULATORY COMMISSION HEADQUARTERS
THREE WHITE FLINT NORTH (ROOMS 1C03 AND 1C05), 11601 LANDSDOWN STREET
NORTH BETHESDA, MD 20852

Time	Topic	Topic (Detail)	Presenter
Tuesday, January 17, 2017			
Opening items			
1:00	Meeting opening	Attendance, announcements, action items, EPRI ¹ and NRC ¹ organizational updates	NRC Alley Industry Selby
Code			
1:30	NDE ¹ -related ASME ¹ Code activities	Review of 2016 NDE ¹ -related Code activities	Industry Lofthus
2:00	RPV ¹ threads in flange	Industry progress on developing a technical basis to remove this requirement from Code	Industry Hacker
2:30	UT ¹ in lieu of RT ¹	Update on Industry efforts enabling the use of UT ¹ instead of RT ¹ for various applications	Industry Hacker
2:50	Break		
PDI			
3:10	PDI ¹ update	Update of PDI ¹ operational items	Industry Anthony
3:30	PDI ¹ qualification statistics update	PDI ¹ Program statistics update since last meeting	Industry Anthony
3:50	IGSCC ¹ requalification	Update on Industry IGSCC ¹ requalification activities	Industry Hacker
4:30	Public comments	Opportunity for members of the public to make comments and to ask questions of the NRC ¹	NRC Alley
4:40	Adjourn		

Time	Topic	Topic (Detail)	Presenter
Wednesday, January 18, 2017			
Reliability			
8:00	Proposed rulemaking on Class 1 DM ¹ welds	The proposed 2013 Rulemaking (which has already been gone thru public comments) contains a condition for the encoded inspection of all Class 1 DM ¹ welds. How may Industry/NRC ¹ handle potential relief requests?	Joint discussion Industry Hacker NRC Collins
8:45	Industry activities for NDE ¹ reliability improvement	Status of Industry's activities for NDE ¹ reliability improvement	Industry Hacker
9:00	Low Value / High Impact NDE ¹ applications	Update on Industry Low Value / High Impact NDE ¹ Examination Project	Industry Hacker
Research overviews			
9:25	BWRVIP ¹ NDE ¹ projects	Brief descriptions of NDE ¹ -related projects	Industry McKean
9:40	MRP ¹ NDE ¹ projects	Brief descriptions of NDE ¹ -related projects	Industry Nowakowski
10:00	Break		
10:20	NDE ¹ Program projects	Brief descriptions of NDE ¹ -related projects	Industry Hacker
11:05	Thermal fatigue UT ¹ examination guidance	NRC ¹ : provide background on regulatory interest. Industry: Update on implementation of MRP ¹ -146 and EPRI ¹ interim guidance MRP ¹ 2015-025 regarding thermal fatigue examinations and how limited coverage is addressed	NRC Cumblidge Industry Nowakowski
11:45	Public comments	Opportunity for members of the public to make comments and to ask questions of the NRC ¹	NRC Alley
11:50	Lunch		
1:00	Introduction to EPRI/RES ¹ MOU ¹	High-level introduction to EPRI/RES ¹ joint research process under a MOU ¹	NRC Nove
1:10	Update on Remote VT ¹ Round Robin	Objectives, design and execution status of Phase 3 round robin	NRC Nove Industry Oliveri
2:20	CASS ¹ research (part 1)	Research on examination capabilities for CASS ¹ and the development of Appendix VIII, Supplement 9 technical basis	NRC Nove Industry Hacker
3:00	Break		

3:20	CASS ¹ research (continued)	Research on examination capabilities for CASS ¹ and the development of Appendix VIII, Supplement 9 Technical Basis	NRC Nove Industry Hacker
3:50	HDPE ¹ research	NDE ¹ capability for HDPE ¹ piping, including 2016 round robin opportunity	NRC Nove Industry Lofthus
4:40	Public comments	Opportunity for members of the public to make comments and to ask questions of the NRC ¹	NRC Alley
4:50	Adjourn		
Thursday, January 19, 2017			
Broad NDE picture			
8:00	UT ¹ modeling and simulation	Research status and planning as stakeholders work toward agreement on modeling best practices	NRC Nove Industry Hacker
8:40	Human factors research	Research results, literature search; summary of the new MOU ¹ Attachment on human factors	NRC D'Agostino Industry Hacker
9:20	Design for inspectability overview	Emergent hot topic within ASME ¹ Code, NRC ¹ and Industry is the design for inspectability issue with AP1000 ¹ . A new ASME ¹ Code Task Group has been formed to address the issue. The issue brings in many items of NDE ¹ research included single sided austenitic examination qualification, CASS ¹ examination, limited examination coverage, and possibly risk-informed ISI ¹ . Brief update with discussion to follow.	Industry Lofthus
9:50	Break		
10:10	RV ¹ upper head bare metal visual examination	Discuss examination requirements and experience with addressing relevant conditions	NRC Cumblidge Industry Hacker
10:40	Rulemakings in the works	Discuss timeline for adoption of ASME ¹ 2009-2013; also reprise NRC ¹ presentation at Code August 2016.	NRC Cumblidge
11:00			
11:20	Open discussion	Further discussion of any items; looking ahead	Industry/ NRC
11:40	Closing items	New action items, announcements, next meeting	Industry/ NRC
11:55	Public comments	Opportunity for members of the public to make comments and to ask questions of the NRC ¹	NRC Alley
12:00	Adjourn		

Acronym¹

EPRI – Electric Power Research Institute
NRC – U.S. Nuclear Regulatory Commission
ASME – American Society of Mechanical Engineers
RPV – Reactor Pressure Vessel
RV – Reactor Vessel
UT – Ultrasonic Testing
RT – Radiographic Testing
PDI – Performance Demonstration Initiative
IGSCC – Intergranular Stress Corrosion Cracking
DM – Dissimilar Metal
BWRVIP – Boiler Water Reactor Vessel and Internals Project
MRP – Materials Reliability Program
RES – NRC: Office of Nuclear Regulatory Research
MOU – Memorandum of Understanding
VT – Visual Examination
CASS – Cast Austenitic Stainless Steel
HDPE – High Density Polyethylene
AP1000 – Advanced Passive 1000
ISI – Inservice Inspection

From: Ramuhalli, Pradeep
Sent: Mon, 14 Nov 2016 17:32:03 +0000
To: Purtscher, Patrick
Subject: [External_Sender] Info

Pat,

As discussed last week, I owe you some info. I am waiting for some additional info from our financial specialist – should have it in a bit this morning. Will call you after that.

With best regards,

Pradeep

Pradeep Ramuhalli, PhD
Senior Research Scientist,
Applied Physics Group
Pacific Northwest National Laboratory
902 Battelle Blvd.
P.O.Box 999, MSIN K5-26
Richland, WA 99352
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov
<http://www.pnnl.gov>

From: Ramuhalli, Pradeep
Sent: Tue, 7 Jun 2016 15:58:35 +0000
To: Hiser, Matthew
Cc: Purtscher, Patrick;Hull, Amy;Knobbs, Katie
Subject: [External_Sender] NEI/DOE/NRC workshop on SLR at PNNL

Matt,

As promised, the current list of attendees for the workshop is below.

1. Jerud Hanson, NEI
2. Jason Remer, NEI
3. Rich Reister, DOE
4. Sherry Bernhoft, EPRI
5. Rich Tilley, EPRI
6. Steve Swilley, EPRI
7. Dave Gerber, Structural Integrity
8. John Disosway, Dominion
9. Gary Peters, AREVA
10. Andy Taylor, Entergy
11. John Twomey, Energy-Northwest
12. John Hornbuckle, Southern Company
13. John Hilditch, Exelon

NRC:

14. Kathryn Brock
15. Daryl Murdock
16. Mohammed Sadollah
17. Cliff Douth
18. Brian Wittick
19. Seung Min
20. Sarah Obadina

Pradeep Ramuhalli, PhD
Senior Research Scientist,
Applied Physics Group
Pacific Northwest National Laboratory
902 Battelle Blvd.
P.O.Box 999, MSIN K5-26
Richland, WA 99352
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

<http://www.pnnl.gov>

From: Ramuhalli, Pradeep
Sent: Tue, 26 Sep 2017 14:34:35 +0000
To: Purtscher, Patrick
Subject: [External_Sender] RE: [External_Sender] Discuss Report Comments

Yes, but I will have to get off the call before 10 am Pacific (1 ET) as I have another meeting at that time.
Any chance you are available later today (after 3 pm) or tomorrow (anytime – I am wide open)?
I will go ahead and get this moved by an hour just in case.

With best regards,
Pradeep Ramuhalli, PhD
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

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

From: Purtscher, Patrick [<mailto:Patrick.Purtscher@nrc.gov>]

Sent: Tuesday, September 26, 2017 3:08 AM

To: Ramuhalli, Pradeep

Subject: New Time Proposed: [External_Sender] Discuss Report Comments

When: Tuesday, September 26, 2017 8:30 AM-9:30 AM (UTC-08:00) Pacific Time (US & Canada).

Where: Call-in number below

I have had another meeting come up that I need to attend. Can we postpone our call for 1 hour?

From: Chen, Yiren
Sent: Tue, 27 Mar 2018 00:19:59 +0000
To: Purtscher, Patrick
Cc: Natesan, Krishnamurti
Subject: [External_Sender] Re: follow up on harvesting

Hi Pat,
I will check the storage and get back to you tomorrow.
Thanks,
Yiren

From: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>

Sent: Monday, March 26, 2018 1:47:05 PM

To: Chen, Yiren

Cc: Natesan, Krishnamurti

Subject: RE: RE: Re: follow up on harvesting

One more thing, could you add a description of the approximate size of unirradiated material. It can go under comments.

Thanks,
Pat

From: Chen, Yiren [mailto:yiren_chen@anl.gov]

Sent: Friday, March 09, 2018 2:25 PM

To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>

Cc: Natesan, Krishnamurti <natesan@anl.gov>

Subject: [External_Sender] RE: Re: follow up on harvesting

Hi Pat,

Please see our updates on the tables as attached. The new inputs are in red. Please let me know if you have any question or need clarification.

Thanks,
Yiren

From: Purtscher, Patrick [mailto:Patrick.Purtscher@nrc.gov]

Sent: Friday, March 09, 2018 7:30 AM

To: Chen, Yiren <yiren_chen@anl.gov>

Subject: FW: Re: follow up on harvesting

Good morning,

We continue to review the information you provided regarding ex-plant/irradiated reactor materials.

We have rearranged the information in the spreadsheet that you prepared to better identify the materials. The # of samples for each line item is not always obvious when arranged this way. Could you verify the number of specimens for each condition?

Thank you.

Pat Purtscher

Materials engineer

RES/DE/CMB

--

From: Ramuhalli, Pradeep
Sent: Wed, 15 Feb 2017 23:58:28 +0000
To: Purtscher, Patrick; Hiser, Matthew
Subject: [External_Sender] RE: FW: Information on the 4th international conference on nuclear power plant life management (PLiM) which will be held in Oct. 23- 26 at Lyon France

Thanks.

With best regards,

Pradeep Ramuhalli, PhD
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

From: Purtscher, Patrick [mailto:Patrick.Purtscher@nrc.gov]
Sent: Wednesday, February 15, 2017 12:27 PM
To: Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: FW: Information on the 4th international conference on nuclear power plant life management (PLiM) which will be held in Oct. 23- 26 at Lyon France

Hi,

I think it is fine to refer to the workshop and your report, but there will not be any specific output from the workshop that will be public.

Pat

From: Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]
Sent: Wednesday, February 15, 2017 1:56 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: [External_Sender] FW: Information on the 4th international conference on nuclear power plant life management (PLiM) which will be held in Oct. 23- 26 at Lyon France

Patrick, Matt:

I presume you are aware of the upcoming PLiM meeting. This may be a good venue to talk/monitor about the harvesting issues and needs. I am not sure if either of you is planning on participating in this, but I know that LWRS is planning on sending a contingent, and I am looking into whether I can participate as well.

In a related note, the IFRAM (International Forum on Reactor Aging Management – funded at one point by NRC, though I believe it is no longer funded by NRC) is holding a series of conference calls later this month and in early March, to work towards a series of papers for the PLiM meeting, to be presented in an IFRAM session. I plan to participate in these calls. Is there any interest on your part in finding out the

outcomes, and is it OK for me to bring up the harvesting project/workshop as an example of how aging management may be better informed through R&D on harvested materials/components?

With best regards,

Pradeep Ramuhalli, PhD

Tel: 509-375-2763

Email: pradeep.ramuhalli@pnnl.gov

From: K.S.Kang@iaea.org [<mailto:K.S.Kang@iaea.org>]

Sent: Tuesday, February 07, 2017 7:53 AM

To: 4th-PLiM-Conference.Contact-Point@iaea.org

Cc: S.Siddiqui@iaea.org; M.Khaelss@iaea.org; R.Krivanek@iaea.org; K.S.Kang@iaea.org

Subject: Information on the 4th international conference on nuclear power plant life management (PLiM) which will be held in Oct. 23- 26 at Lyon France

Dear All,

The IAEA has organized the international conferences on Nuclear Power Plant Life Management Conference in 2002 at Budapest, Hungary, in 2007 at Shanghai, China and in 2012 at Salt Lake City, USA continuously.

Now time is preparing the 4th international conference on Nuclear Power Plant Life Management (PLiM) which will be held in **Oct. 23- 26 2017 at Lyon, France.**

The main objectives of the conference are to:

- Emphasize the role of PLiM programmes in assuring a safe and reliable nuclear power plant operation;
- Identify the economic impacts of PLiM and long term operation programmes, as well as methodologies for their evaluation
- Provide a forum for information exchange on national and international PLiM programmes, regulatory practises and the application in ageing management.

We will discuss and share operation experiences and information on following six main topics;

- Approaches to plant life management
- Economics of plant life management
- Ageing management and preparation of long term operation
- Configuration and modification management for safety enhancement
- Human factors and managerial aspects
- Regulatory approaches to ageing management and long term operation

Please send your two page synopses before the **end of April 2017** by e-mail or IDICO system.

See attached flyer.

All information will be available in conference website :

<http://www-pub.iaea.org/iaeameetings/50811/Fourth-International-Conference-on-Nuclear-Power-Plant-Life-Management>

Please share above information with your colleagues to participate in the conference.

Regards

Ki- Sig KANG

Technical Head (PLIM/LTO)
Nuclear Power Engineering Section
Division of Nuclear Power
International Atomic Energy Agency
Tel: +43 1 2600 22796
Fax: +43 1 2600 29598
E-mail: Ki-Sig.KANG@iaea.org

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From: Ramuhalli, Pradeep
Sent: Fri, 18 Nov 2016 16:35:08 +0000
To: Purtscher, Patrick
Subject: [External_Sender] RE: NUREG/CR-5314 Vol 3

Thanks! Will call you Monday with more info.

With best regards,

Pradeep Ramuhalli, PhD
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

From: Purtscher, Patrick [mailto:Patrick.Purtscher@nrc.gov]
Sent: Friday, November 18, 2016 5:40 AM
To: Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>
Subject: FW: NUREG/CR-5314 Vol 3

<http://www.nrc.gov/docs/ML0403/ML040360127.pdf> Table 1 shows all of the CASS components.

Pat

From: Purtscher, Patrick
Sent: Tuesday, June 17, 2014 11:26 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: NUREG/CR-5314

From: Ramuhalli, Pradeep
Sent: Fri, 13 Jan 2017 16:30:43 +0000
To: Purtscher, Patrick
Subject: [External_Sender] RE: update for template

FYI – my cell # is [REDACTED] (b)(6)

With best regards,

Pradeep Ramuhalli, PhD
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

From: Purtscher, Patrick [mailto:Patrick.Purtscher@nrc.gov]
Sent: Friday, January 13, 2017 7:53 AM
To: Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>
Subject: RE: update for template

Call me on my cell phone

[REDACTED] (b)(6)

From: Purtscher, Patrick
Sent: Tuesday, January 10, 2017 8:27 AM
To: Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>
Subject: RE: update for template

Good morning,

We are starting to finalize the agenda for the workshop in March. When can we talk about your work and how it fits into the workshop? I am available Wednesday and Friday mornings this week as well as Thursday afternoon.

Pat

Patrick Purtscher
Materials Engineer
Nuclear Regulatory Regulation
Division of Engineering
Vessel & Internals Branch
301-415-3942

From: Hiser, Matthew
Sent: Tue, 19 Feb 2019 19:41:49 +0000
To: Hiser, Matthew
Subject: FW: : pls will you send me the draft summary report?: 3 sections revised -- CMB update 20170517.docx

From: Hull, Amy
Sent: Thursday, May 18, 2017 8:31 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov> (b)(6)
Subject: I will take along printout to [REDACTED] and get any comments back to you by 8am tomorrow morning.....[eom]: pls will you send me the draft summary report?: 3 sections revised -- CMB update 20170517.docx

I will take along printout to [REDACTED] and get any comments back to you by 8am tomorrow morning.....[eom] (b)(6)

From: Hiser, Matthew
Sent: Tuesday, May 16, 2017 10:42 AM
To: Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: pls will you send me the draft summary report?: 3 sections revised -- CMB update 20170517.docx

Hi Amy,

Sure thing – here you go ☺ Please take a look and provide any comments or edits.

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: Tuesday, May 16, 2017 10:34 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: pls will you send me the draft summary report?: 3 sections revised -- CMB update 20170517.docx

Strategic Approach for Obtaining Material and Component Aging Information (Amy Hull, Pat Purtscher, Matt Hiser) (LTRP)

- Strategic harvesting is one of the new tasks in the new SLR UNR that will replace NRR-2010-006. Staff are working on specific task for Strategic Harvesting in NRR-2017-006.
- Final deliverable expected by early 2017. Final report publication will wait until after harvesting workshop in March.
- Proceedings from the Ex-Plant Materials Harvesting Workshop, held on March 7-8, are compiled in a CMB SharePoint site
<http://fusion.nrc.gov/res/team/de/cmb/LTO/default.aspx?RootFolder=%2Fres%2Fteam%2Fde%2Fcmb%2FLTO%2FProgram%20Documents%2FStrategic%20Approach%20for%20Obtaining%20Material%20and%20Component%20Aging%20Information&FolderCTID=0x012000A4119D2C08121A4CAE71D67AEB499BF9&View={A08F45B4-F7E9-4960-9890-37F16055A16F}> . Good frank discussion with external parties from DOE, EPRI, and international stakeholders on benefits and challenges of harvesting.
- CMB staff preparing workshop summary report (expected by end of May) and follow-up on action items with interested workshop attendees focused on a database for sources of materials and prioritizing data needs for harvesting.
- Pradeep Ramuhalli, PNNL contractor, visited RES/DE/CMB staff concerning this project on 4/18/2017. This was a side-trip for another NDE/OLM project funded by DOE related to advanced reactors.
- One-pager submitted for DE management review.

From: Hull, Amy

Sent: Tuesday, May 16, 2017 10:28 AM

To: Frankl, Istvan (Istvan.Frankl@nrc.gov) <Istvan.Frankl@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>

Subject: 3 sections revised -- CMB update 20170517.docx

From: Hiser, Matthew
Sent: Tue, 19 Feb 2019 19:41:22 +0000
To: Hiser, Matthew
Subject: FW: Revised agendas for the Nov 18 interface & Nov 19 planning meetings
Attachments: Revised Agenda DLR-RES Interface Mtg_11182015.docx, Pre-meeting agenda for Dec 2 DLR-RES Interface Mtg_11192015.docx

Note to requester: Attachments are immediately following.

From: Hull, Amy
Sent: Tuesday, November 10, 2015 3:22 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: Steve Bloom said if we want, we can add agenda item to Dec 2 for RES/DLR coordination on ex-plant harvesting strategic planning [eom]: Revised agendas for the Nov 18 interface & Nov 19 planning meetings

Steve Bloom said if we want, we can add agenda item to Dec 2 for RES/DLR coordination on ex-plant harvesting strategic planning [eom]:

From: Wong, Albert
Sent: Tuesday, November 10, 2015 3:00 PM
To: Bloom, Steven <Steven.Bloom@nrc.gov>; Litkett, Bernard <Bernard.Litkett@nrc.gov>; Jones, Heather <Heather.Jones@nrc.gov>; Burton, William <William.Burton@nrc.gov>; Brady, Bennett <Bennett.Brady@nrc.gov>; Billoch, Araceli <Araceli.Billoch@nrc.gov>; PSVIRDI@rediffmail.com; Iyengar, Raj <Raj.Iyengar@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>
Subject: Revised agendas for the Nov 18 interface & Nov 19 planning meetings

The focus of the Nov 18 meeting is to discuss the remaining UNRs and listen to management's view on how to conduct the next interface meeting on Dec 2. The planning meeting on Nov 19 is to set the agenda for the Dec 2 meeting.

Let me know if you have questions. I will append the agendas to the meeting invites. Thx.

aw

AGENDA

Meeting between the NRR/Division of License Renewal and RES/Division of Engineering to

Discuss Current License Renewal and Subsequent License Renewal

November 18, 2015, Time: 09:30 AM – 11: 00 AM

NRC Headquarters/ One White Flint, Room 07B04

Bridge Line: 888-455-1698, Passcode: (b)(6)

	Agenda Item	Lead	Time (AM)
1	Introduction	Steve	09:30
2	Status of User Need Request Letters	Bennett/Rob	09:35
3	Preparation for the December 2 DLR/RES Interface Meeting	Raj/Albert	10:45

AGENDA

Pre-Meeting for a December 2 Interface Meeting between NRR/Division of License Renewal
and RES/Division of Engineering

November 19, 2015, Time: 10:00 AM – 11: 00 AM

One White Flint North, Room 011B02

Bridge Line: 888-455-1698, Passcode: (b)(6)

	Agenda Item	Lead	Time (AM)
1	Synopsis of the DLR/RES management's insight on how to prepare the December 2 interface meeting	Raj/Albert	10:00
2	Status of Deep Dive Meetings	Raj	10:05
3	Outcome of the November 17 ACRS Meeting	Butch	10:10
4	Status of draft GALL-SLR Report and SRP-SLR	Bennett	10:20
5	Public meetings on draft GALL-SLR Report and SRP-SLR	Bennett	10:25
6	Status of draft GALL-SLR Report and SRP-SLR	Bennett	10:30
7	Discussion of the future use of the deep dive tables	Raj	10:35
8	Summary and Final Preparation for the December 2 DLR/RES Interface Meeting	Raj/Albert	10:40

From: Moyer, Carol
Sent: Fri, 7 Jul 2017 10:53:24 -0400
To: Hiser, Allen
Cc: Hiser, Matthew
Subject: FW: Acceptance of Oral presentation in the Fourth Int. Conference on Nuclear Power Plant Life Management

Allen,

This is the reply I got from the PLiM organizers. It says only "your paper," so I am *assuming* they are referring to the overview one, not the one specific to harvesting. I have not heard whether the harvesting abstract was accepted for presentation.

Carol

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

From: PLIM2@iaea.org [<mailto:PLIM2@iaea.org>]

Sent: Thursday, June 29, 2017 9:59 AM

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

Subject: [External_Sender] Acceptance of Oral presentation in the Fourth Int. Conference on Nuclear Power Plant Life Management

Dear Carol Moyer

We are pleased to inform you that your paper entitled with the ID number "143" and Moyer as primary author has been accepted for oral presentation at the Fourth International Conference on Nuclear Power Plant Life Management to be held in Lyon, France from 23 to 27 October 2017.

Please be aware however, for those authors whose Forms A and B have not been received by the IAEA through the official channels, the paper has been accepted upon the condition that these forms are received by 25 August 2017. If the forms are not received by the IAEA by that date, it will not be possible to include the paper in the conference programme.

The number assigned to the paper is IAEA-CN-246-143. Please refer to this number in all future communications concerning the paper.

Following please find some guidelines with regard to your paper and presentation:

- As required, liaise with the IAEA secretariat concerning your presentation.
- At the conference please attend a briefing meeting shortly before the session to meet with your chairperson and the other speakers in the session. Details on the briefing will be provided to you shortly before the conference.
- Please keep your presentation within the time slot allocated in the programme (to be available soon at the conference web site):
- Prepare your presentation in PowerPoint. Should you wish to use a different software, please send an e-mail address: PLIM2@iaea.org at least one month before the conference, so that compatibility can be checked.
- All presentations will be uploaded in advance to the conference PC. Please email your presentation and the full paper to email address: PLIM2@iaea.org by Wednesday, 18 October.
- Please complete the biographical data form at the conference web site. The form will aid the session chairperson in your introduction at the session. This form should be sent to email address PLIM2@iaea.org by 29 September 2017.

All accepted synopses (oral and poster) will be included in the Book of Extended Synopses which will be distributed to participants at the beginning of the Conference.

Best regards,

IAEA Scientific Secretaries

Conference website:

<http://www-pub.iaea.org/iaameetings/50811/Fourth-International-Conference-on-Nuclear-Power-Plant-Life-Management>

From: Hiser, Matthew
Sent: Tue, 28 Feb 2017 19:42:15 +0000
To: Salley, MarkHenry; Melly, Nicholas; Hamburger, Kenneth; Taylor, Gabriel
Subject: FW: Announcement of Ex-Plant Materials Harvesting Workshop
Attachments: Ex-Plant Materials Harvesting Workshop.pptx, Harvesting Workshop Draft Agenda.docx

Note to requester: Attachments are immediately following.

Agenda is attached as well as webinar information below.

From: Frankl, Istvan
Sent: Friday, February 24, 2017 2:24 PM
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

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
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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 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

Ex-Plant Materials Harvesting Workshop Draft Agenda

Tuesday, March 7

Session	Time	Organization	Speaker	Presentation Title
Intro	8:00	NRC		Welcome and Introduction to Workshop
1	8:15 – 8:45	EPRI	Sherry Bernhoft	
		DOE	Rich Reister	
		NRC	Robert Tregoning	NRC Perspective on Motivation for Harvesting
		GRS	Uwe Jendrich	
		CRIEPI	Taku Arai	
	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
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	2:30 – 2:45	DOE/ORNL	Tom Rosseel	
	2:45 – 3:00	DOE/INL	John Jackson	NSUF Material Sample Library
	3:00 – 3:15	Energy Solutions	Gerry van Noordennen	
	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	
	4:00 – 4:15	CNSC	Daniel Tello	
	4:15 – 5:00	DISCUSSION		

Wednesday, March 8

Session	Time	Organization	Speaker	Presentation Title
4	8:00 – 8:30	EPRI	Jean Smith	
	8:30 – 9:00	DOE	Tom Rosseel	
	9:00 – 9:30	NRC	Matthew Hiser	NRC Perspective on Harvesting Experience and Lessons Learned
	9:30 – 10:00	CRIEPI	Taku Arai	
	10:00 – 10:15	BREAK		
	10:15 - 10:45	Energy Solutions	Gerry van Noordennen	
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5	1:30 – 1:45	PNNL (for NRC)	Pradeep Ramuhalli	Technical Information Needed for Informed Harvesting Decisions
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	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		

From: Hiser, Matthew
Sent: Mon, 27 Feb 2017 15:58:15 -0500
To: Audrain, Margaret;Focht, Eric;Frankl, Istvan;Hiser, Matthew;Hull, Amy;Moyer, Carol;Oberson, Greg;Purtscher, Patrick;Rao, Appajosula;Rossi, Matthew
Subject: FW: Announcement of Ex-Plant Materials Harvesting Workshop
Attachments: Ex-Plant Materials Harvesting Workshop.pptx, Harvesting Workshop Draft Agenda.docx

Note to requester: Attachments are immediately following.

Fellow CMBers,

FYI – information on harvesting workshop.

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

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

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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>
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Sent: Mon, 6 Mar 2017 13:08:18 +0000
To: Pires, Jose
Subject: FW: Announcement of Ex-Plant Materials Harvesting Workshop
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From: Hiser, Matthew
Sent: Thu, 21 Jul 2016 15:19:56 +0000
To: Purtscher, Patrick
Subject: FW: Decommissioning Schedule

From: Watson, Bruce
Sent: Tuesday, April 19, 2016 8:17 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Decommissioning Schedule

The plants in active decommissioning are either way past the point for harvesting any meaningful material or the remainder are in SAFE STORE. EPRI seems to have a good handle on what is going on with the plants and suggest you keep close contact with them.

From: Hiser, Matthew
Sent: Friday, April 08, 2016 3:53 PM
To: Watson, Bruce <Bruce.Watson@nrc.gov>
Subject: Decommissioning Schedule

Hi Bruce,

I am a materials engineer in the Office of Research and we are in the early stages of a project to look into opportunities to harvest ex-plant materials from decommissioning (as well as operating) reactors where beneficial. I wanted to reach out to your branch to see if you have information on decommissioning schedules/plans or the plants that have announced their intention to close and decommission.

Do you know if this type of information is readily available? If so, is there a particular member of your staff that I should reach out to?

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, 15 Feb 2017 20:42:13 +0000
To: Tregoning, Robert; Purtscher, Patrick
Subject: FW: FW: Information on the 4th international conference on nuclear power plant life management (PLiM) which will be held in Oct. 23- 26 at Lyon France

Hi Rob,

Pradeep is asking about involving the harvesting topic in PLiM / IFRAM, which I think you are involved with. Do you see the harvesting topic as valuable to raise there?

Thanks!
Matt

From: Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]
Sent: Wednesday, February 15, 2017 1:56 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: [External_Sender] FW: Information on the 4th international conference on nuclear power plant life management (PLiM) which will be held in Oct. 23- 26 at Lyon France

Patrick, Matt:

I presume you are aware of the upcoming PLiM meeting. This may be a good venue to talk/monitor about the harvesting issues and needs. I am not sure if either of you is planning on participating in this, but I know that LWRS is planning on sending a contingent, and I am looking into whether I can participate as well.

In a related note, the IFRAM (International Forum on Reactor Aging Management – funded at one point by NRC, though I believe it is no longer funded by NRC) is holding a series of conference calls later this month and in early March, to work towards a series of papers for the PLiM meeting, to be presented in an IFRAM session. I plan to participate in these calls. Is there any interest on your part in finding out the outcomes, and is it OK for me to bring up the harvesting project/workshop as an example of how aging management may be better informed through R&D on harvested materials/components?

With best regards,

Pradeep Ramuhalli, PhD
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

From: K.S.Kang@iaea.org [mailto:K.S.Kang@iaea.org]
Sent: Tuesday, February 07, 2017 7:53 AM
To: 4th-PLiM-Conference.Contact-Point@iaea.org

Cc: S.Siddiqui@iaea.org; M.Khaelss@iaea.org; R.Krivanek@iaea.org; K.S.Kang@iaea.org

Subject: Information on the 4th international conference on nuclear power plant life management (PLiM) which will be held in Oct. 23- 26 at Lyon France

Dear All,

The IAEA has organized the international conferences on Nuclear Power Plant Life Management Conference in 2002 at Budapest, Hungary, in 2007 at Shanghai, China and in 2012 at Salt Lake City, USA continuously.

Now time is preparing the 4th international conference on Nuclear Power Plant Life Management (PLiM) which will be held in **Oct. 23- 26 2017 at Lyon, France.**

The main objectives of the conference are to:

- Emphasize the role of PLiM programmes in assuring a safe and reliable nuclear power plant operation;
- Identify the economic impacts of PLiM and long term operation programmes, as well as methodologies for their evaluation
- Provide a forum for information exchange on national and international PLiM programmes, regulatory practises and the application in ageing management.

We will discuss and share operation experiences and information on following six main topics;

- Approaches to plant life management
 - Economics of plant life management
 - Ageing management and preparation of long term operation
 - Configuration and modification management for safety enhancement
 - Human factors and managerial aspects
 - Regulatory approaches to ageing management and long term operation
- Please send your two page synopses before the **end of April 2017** by e-mail or IDICO system. See attached flyer.

All information will be available in conference website :

<http://www-pub.iaea.org/iaeameetings/50811/Fourth-International-Conference-on-Nuclear-Power-Plant-Life-Management>

Please share above information with your colleagues to participate in the conference.

Regards

Ki- Sig KANG

Technical Head (PLiM/LTO)
Nuclear Power Engineering Section
Division of Nuclear Power
International Atomic Energy Agency
Tel: +43 1 2600 22796
Fax: +43 1 2600 29598
E-mail: Ki-Sig.KANG@iaea.org

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From: Hull, Amy
Sent: Monday, March 5, 2018 2:25 PM
To: Herrity, Thomas; Burke, John; Moyer, Carol; Tregoning, Robert; Purtscher, Patrick; Audrain, Margaret; Harris, Brian
Cc: Frankl, Istvan; Hiser, Matthew
Subject: filling in some more time: RIC EPOSTERS AND DIGITAL PRESENTER GUIDANCE - NEXT STEPS
Attachments: ePOSTERS AND PRESENTATIONS Numbered; Poster Layout RIC 2018_3-1-18.pdf; 2018-shipping-label.docx; 2018 RIC poster Schedule.abh cm.abh.jb.rt.ma.pp.Bren.xlsx; RIC Poster 6 on AM_20180213.pptx; RIC Poster 8 on Harvesting_20180213.pptx

Importance: High

Note to requester:
Attachments to this email are immediately following.

Per our guidance below, I have updated the attached schedule for next week. Bren recommends below that poster presentations be staffed all of Tuesday morning. So there are 3 more hrs for AM and 3 more hrs for Harvesting. Please let us know if you want to have added time by the posters.

From: Warren, Brenett
Sent: Monday, March 05, 2018 1:55 PM
To: Bridge, Joanna <Joanna.Bridge@nrc.gov>; Mendiola, Mary <Mary.Mendiola@nrc.gov>; Zuberi, Sardar <Sardar.Zuberi@nrc.gov>; Dembek, Stephen <Stephen.Dembek@nrc.gov>; Yadav, Priya <Priya.Yadav@nrc.gov>; Kenny, Caylee <Caylee.Kenny@nrc.gov>; Sturzebecher, Karl <Karl.Sturzebecher@nrc.gov>; Bernardo, Robert <Robert.Bernardo@nrc.gov>; Wilson, Joshua <Joshua.Wilson@nrc.gov>; Hall, Victor <Victor.Hall@nrc.gov>; Couret, Ivonne <Ivonne.Couret@nrc.gov>; West, Stephanie <Stephanie.West@nrc.gov>; Savoy, Joanne <Joanne.Savoy@nrc.gov>; King, Shannon <Shannon.King@nrc.gov>; Ralph, Melissa <Melissa.Ralph@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Steger, Christine <Christine.Steger@nrc.gov>; Armstrong, Kenneth <Kenneth.Armstrong@nrc.gov>; Gifford, Ian <Ian.Gifford@nrc.gov>; Smith, Todd <Todd.Smith@nrc.gov>; Howells, Christopher <Christopher.Howells@nrc.gov>; Orf, Tracy <Tracy.Orf@nrc.gov>; Cruz, Holly <Holly.Cruz@nrc.gov>; Morey, Dennis <Dennis.Morey@nrc.gov>; Oberson, Greg <Greg.Oberson@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Bowman, Gregory <Gregory.Bowman@nrc.gov>
Cc: RICMST Resource <RICMST.Resource@nrc.gov>; Kipfer, Lorna <Lorna.Kipfer@nrc.gov>
Subject: RIC EPOSTERS AND DIGITAL PRESENTER GUIDANCE - NEXT STEPS
Importance: High

Good Afternoon Poster Presenters,

We are 1 week from RIC 2018 and I want to provide you with a few details to assist:

EPOSTER AND DIGITAL PRESENTATION SCHEDULE

- ePoster and Digital Presenters should be present at the RIC. Although your poster may be set on a continuous run/feed there should be a person present to discuss the poster and to field questions from the attendee viewing the slide presentation March 13 – 15, 2018.
- Refer to Program Agenda on the RIC website at <https://ric.nrc.gov/agenda> for the full schedule of the RIC. Recommended times for visual presence should be during the following:

Tuesday:

7:30 a.m. – 8:30 a.m. Meet and Greet – Networking Opportunity

8:30 a.m. – 10:00 a.m. Opening Sessions

10:00 a.m. – 10:30 a.m. Networking Break
10:30 a.m. 12:00 p.m. Commission Plenary
12:00 p.m. – 1:30 p.m. Lunch Break
3:00 p.m. – 3:30 p.m. Networking Breaks

Wednesday:

7:30 a.m. – 8:30 a.m. Meet and Greet – Networking Opportunity
10:00 a.m. – 10:30 a.m. Networking Break
12:00 p.m. – 1:30 p.m. Lunch Break
3:00 p.m. – 3:30 p.m. Networking Breaks

Thursday:

7:30 a.m. – 8:30 a.m. Meet and Greet – Networking Opportunity
10:00 a.m. – 10:30 a.m. Networking Break

LAPTOP SETUP AND TESTING WITH OCIO TECH

- Arrive at the Bethesda North Marriott Hotel and Conference Center on **Monday, March 12, 2018 between 9:00 a.m. and 11:00 a.m.**
 - Test laptop/monitor connection
 - Verify loaded presentation shows accurately on monitor
- There will be a NRC technician from OCIO to complete the install of laptops with interactive (multi page slides). Single slide presenters (ePoster) may view their presentation at that time as well.

FLOORPLAN FOR EPOSTER AND DIGITAL PRESENTATIONS

- The preliminary floorplan is attached for your reference. If for any reason the floorplan should change, you will be notified.
- Ensure accuracy when referring to your poster, refer to the attached ePoster and Digital Presentation by number. Note, the posters were previously renumbered however, some presenters continued to use the old numbers. Please use the following numbered posters and titles.

SHIPPING MATERIALS

- If you plan to include materials for your ePoster and Digital Presentation with the bulk shipment from the NRC to the Marriott, it is imperative that you have all of the items properly labeled and taken to the Reprographics OP1-B3500 common area - labeled RIC shipping by **close of business Thursday, March 8, 2018.**
- All materials must be packed, properly labeled and in the designated Reprographics pick up location by close of business March 8, 2018. Provide on the shipping label and also to RICMST.Resource@nrc.gov:
 - The total number of boxes
 - Include your name
 - Include title of your ePoster and Digital Presentation

- We do ask that you **limit the amount of materials** you will bring due to reduced space in the Marriott foyer area.
- Affix a completed **shipping label to each box**. The materials received will be included on the manifest report for tracking purposes.
- Return shipping will occur on March 15 at 1:00 pm. If you wish to have any materials returned to the NRC prior to your departure from the Marriott, please affix a returnTo ensure accurate return please affix a label with your name and mailstop. All unmarked materials left in the Marriott foyer unmarked will be discarded.

Thank you,

Brenett (Bren) U. Warren

Program Specialist
Office of Nuclear Reactor Regulation
NRR/DMPS/RISB
Location: O13D5
301-415-3114
Brenett.Warren@nrc.gov



Follow us on Twitter @nrcgov_ric

Poster staffing - 2018 RIC - March 13-15, 2018

	Tuesday		Wednesday		Thursday		
	Adv. Mfg.	Harvesting	Adv. Mfg.	Harvesting	Adv. Mfg.	Harvesting	
7:30 AM	Carol (AM)	Amy (Harv.)	Amy (AM)	Carol (Harvesting)	Rob (AM)	Amy (Harv.)	
8:00 AM	↓	↓	↓	↓	↓	↓	
8:30 AM	???	???	???				
9:00 AM	???	???	???				
9:30 AM	???	???	???				
10:00 AM	John	Pat	???	Meg	Amy (AM)	Pat	
10:30 AM	???	???	???				
11:00 AM	???	???	???				
11:30 AM	Amy(AM)	???	???				
12:00 PM	Amy(AM)	Pat	Carol (AM)	Meg	volunteer	Adv. Mfg. 1/2 hr sessions	Harvesting 1/2 hr sessions
12:30 PM	↓	Pat	↓	Meg	Carol M.	5	3
1:00 PM	John	Pat	↓	Rob	Amy H.	9	4
1:30 PM					J. Burke	2	
2:00 PM					Thom Herrity		
2:30 PM					Matt Hiser		
3:00 PM	Amy (AM)	Carol (Harvesting)	???	Meg	Meg Audrain		4
3:30 PM					Pat Purtscher		5
4:00 PM					R. Tregoning	2	1
4:30 PM					B. Harris		
5:00 PM	Amy (AM)		Amy (AM)		total	18	17
5:30 PM					total 1/2 hr sessions needed	23	23

Note to requester: This is the "2018 RIC poster Schedule" attachment to Amy Hull's 3/5/18 email.

Note to requester: This page, and the next page, is the "2018-shipping-label" attachment in Amy Hull's 3/5/18 email.



_____ of _____ (boxes/items)

SHIP TO (pre-conference):

Bethesda North Marriott Hotel and Conference Center
5701 Marinelli Road
North Bethesda, MD 20852

Attn: Gabor Csaszi, Director of Event Management, 301/822-9270

HOLD FOR:

NRC's 30th Annual Regulatory Information Conference (RIC), March 13-15, 2018
(NRC points of contact: Lorna Kipfer, 301-415-4065, or Bren Warren, 301-415-3114)

Delivery Drop-off Location(s) (check one): ☐ NRC Staff Office ☐ Grand Ballroom Foyer

☐ Registration Desk

Lead Presenter's Name: _____ NRC Office: _____ Phone: _____

ePoster/Digital Presentation Title Only: _____

Contents: _____



_____ of _____ (boxes/items)

RETURN TO (post-conference):

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
11555 Rockville Pike, Rockville, MD 20852

Received by: _____ NRC Office: _____ Phone: _____

Delivery Drop-off Location(s) (check one):

☐ NRC OWFN P1 Level (ADM/PB) ☐ NRR RIC Closet (8th fl)

Addressee Name: _____ Addressee Mailstop: _____

Contents: _____

From: NRCDigitalSender@nrc.gov
Sent: Mon, 5 Mar 2018 11:23:25 -0500
To: Warren, Brenett
Subject: ePOSTERS AND PRESENTATIONS Numbered
Attachments: image2018-03-05-162325.pdf

This document was digitally sent to you using Dell Digital Sending device.

Note to requester: This page, and its attachment, is the "ePOSTERS AND PRESENTATIONS Numbered" attachment in Amy Hull's 3/5/18 email.

EPOSTERS AND DIGITAL PRESENTATIONS

LOCATED IN THE GRAND BALLROOM FOYER—MAIN LEVEL

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>#1 Accident Sequence Precursor Program - Results, Trends, and Insights
<i>Sponsored by the Office of Nuclear Regulatory Research</i></p> <p>#2 Advanced Evacuation Simulations and Application to Emergency Preparedness
<i>Sponsored by the Office of Nuclear Security and Incident Response and the Office of Nuclear Regulatory Research</i></p> <p>#3 Application of the changes to NUREG/BR-0058 to the Regulatory Analysis of the Decommissioning of Power Reactors Rulemaking
<i>Sponsored by the Office of Nuclear Material Safety and Safeguards</i></p> <p>#4 Digital Dashboard for Operating Reactor Licensing Actions
<i>Sponsored by the Office of Nuclear Reactor Regulation</i></p> <p>#5 Enhancements to LIC-500, Topical Report Process
<i>Sponsored by the Office of Nuclear Reactor Regulation</i></p> <p>#6 Fun Facts on International Exports Programs
<i>Sponsored by the Office of International Programs</i></p> <p>#7 Harvesting of Aged Materials from Nuclear Power Plants
<i>Sponsored by the Office of Nuclear Regulatory Research</i></p> <p>#8 Knowledge Management
<i>Sponsored by the Office of the Chief Human Capital Officer</i></p> | <p>#9 Leveraging Cooperative Research Agreements to Improve NRC Safety Codes
<i>Sponsored by the Office of Nuclear Regulatory Research</i></p> <p>#10 Non-Reactor Decommissioning: Unexpected Fee Billing Implications
<i>Sponsored by the Office of Nuclear Material Safety and Safeguards and the Office of the Chief Financial Officer</i></p> <p>#11 Preserving the Lessons Learned from Fukushima
<i>Sponsored by the Office of Nuclear Reactor Regulation</i></p> <p>#12 Progression of Construction and Oversight Activities at Vogtle Units 3 and 4
<i>Sponsored by the Office of New Reactors</i></p> <p>#13 Public Communication - Learn about the Public Affairs Program at the NRC
<i>Sponsored by the Office of Public Affairs</i></p> <p>#14 Reactor Oversight Process Framework and Initiatives
<i>Sponsored by the Office of Nuclear Reactor Regulation</i></p> <p>#15 Review of Additive Manufacturing of Metallic Parts via Direct Metal Laser Melting
<i>Sponsored by the Office of Nuclear Regulatory Research</i></p> <p>#16 Web-based ADAMS - Providing Public Access to the NRC's Official Agency Document Repository
<i>Sponsored by the Office Information Officer</i></p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

EPOSTERS AND DIGITAL PRESENTATIONS

LOCATED IN THE GRAND BALLROOM FOYER—MAIN LEVEL

- #17 What You Need to Know About the Supplemental Proposed Rulemaking for 10 CFR Part 61, "Licensing Requirements Land Disposal of Radioactive Waste"

Sponsored by the Office of Nuclear Material Safety and Safeguards

- #18 xLPR Version 2 Code Brings State-of-the-art Probabilistic Analysis Capabilities to Nuclear Power Plant Piping

Sponsored by the Office of Nuclear Regulatory Research

The content and views in these presentations are those of the presenters and do not necessarily represent the views of the NRC.

Stairs to Lower Level
Conference Center
Entrance

Elevator to
Lower Level

Restrooms

Upper Level Conference Center Diagram Bethesda North Marriott Hotel & Conference Center

Note to requester: This page, and the next page, is the "Poster Layout RIC 2018_3-1-18" attachment in Amy Hull's 3/5/18 email.

Service Area

Overflow Monitor

Foyer

Salon A

Salon F

Salon B

Salon D

Salon E

Salon G

Foyer

Salon C

Salon H

Escalators to
Lower Level
Conference

13 13

91 91

14 12

11

10

9

8

7

6

5

4

3

2

1

18

17

15

Overflow Monitor

NRC
Information
Desk

Doors to Hotel Main Lobby
Meritage Restaurant,
On The Rocks Bar
& Coffee Shop

Restrooms

Overflow Monitor

Stairs to
Lower Level

2018 RIC ePoster and Digital
Presentations

Outside Veranda

Note: Final ePoster Layout Subject to Change Based Upon Space Requirements and Display Placement!

Technical Poster and Tabletop Presentations

- (16) Covered cocktail squares or rounds in front of each Display Monitor, (1) Chair in front of each, #s 1, 4,5,7-12, 1, 17 and 18; (2) chairs for #'s 2,3,6,13,15, 16
- (2) 6 foot skirted tables in front of Display #13 and 16 with 2 chairs
- (7) Laptops to be provided by BAV (Poster/tabletop #'s: 2, 6, 13 (2), 14, 16, and 18)
- (2) 27" Monitors to be supplied by BAV (ePoster/tabletop #'s: (2) for #16)
- (17) 46" Monitors to be supplied by BAV (all ePosters except #16)
- (16) USB Media Players to be supplies by BAV
- (18) Electricity Required for ALL
- (6) Internet requests for poster/tabletops #'s: 6, 13 (2), 14, 16 (2)
- (1) 6 foot skirted table with 1 chair for **NRC Information Desk** (first table on Salon H side of foyer)
- (5) Easels for poster/tabletops #'s: NRC Information Desk; NEA, IAEA, and OECD Tables (lower level), and NMSS/FCIX



Review of Additive Manufacturing by Direct Metal Laser Melting

A. Hull, T. Herrity, and C. Moyer, U.S. Nuclear Regulatory Commission (NRC)

Background and Motivation

The NRC has been informed that parts created by additive manufacturing (AM) are being considered for applications in the operating fleet as early as calendar year 2018. In 2017, industry prototyping efforts involved use of the direct metal laser melting (DMLM) method to manufacture parts for reactor components. The Office of Nuclear Regulatory Research is beginning to evaluate the technology to gain insight into any technical issues that must be addressed to assure safety and reliability of specific DMLM-produced components that may be accepted by the NRC, including design, precursor materials, finished material properties, structural integrity, nondestructive evaluation, and quality assurance. This welding-based process may be susceptible to, for example, porosity, systematic defects, and anisotropy of properties not currently addressed for conventionally manufactured components.

On November 28–29, 2017, the NRC held a public meeting entitled, “Additive Manufacturing for Reactor Materials and Components.” Presentations from 28 speakers representing American and international industry, EPRI, NEI, DoD facilities, DOE and National Laboratories, ASME, ASTM, ANSI, FAA, NASA, and NIST are available in ADAMS (Accession No. ML17338A880).

Current Activities

The NRC is developing a strategic plan to address the use of additive manufacturing for reactor materials and components. The NRC plans to leverage ongoing research and evaluation of this technology being performed by Federal counterparts.

The NRC strategic plan will focus on topic areas of interest identified at the Additive Manufacturing for Reactor Materials and Components public meeting:

- ❖ Quality of AM materials and components for nuclear power plants
- ❖ Codes and standards development for AM
- ❖ Properties and structural performance
- ❖ Service performance/aging degradation
- ❖ Regulatory infrastructure

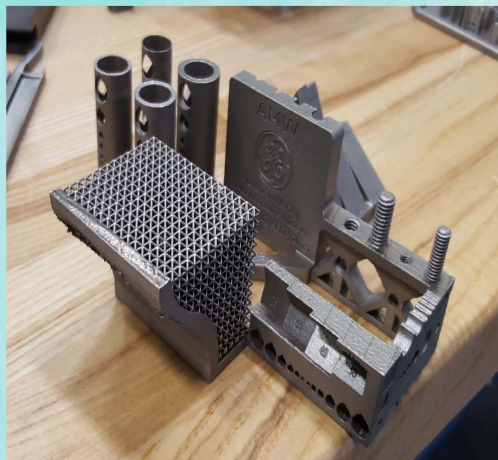
Note to requester: This page is the “RIC Poster 6 on AM_20180213” attachment in Amy Hull’s 3/5/18 email.

Path Forward

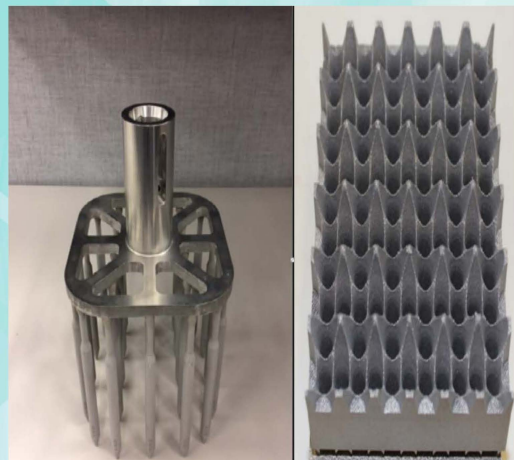
AM has been identified as a technique that the nuclear industry may use in the future. Prevailing questions are: How will AM be used in nuclear power plants, and when? What is the regulatory infrastructure for determining how safe it is?

NRC areas of interest include the quality, properties, and structural performance of AM parts, including their inspectability. The service performance and aging degradation of AM parts are critical. It will be essential to compare the performance of parts from AM and those from conventional manufacturing processes.

Challenges to be addressed include the limited understanding of acceptable ranges of variation for key manufacturing parameters, limited understanding of key failure mechanisms and material anomalies, the potential for systematic defects, cybersecurity considerations, lack of industry databases, and lack of industry specifications and standards. The development of codes and standards for AM is key to successful implementation.



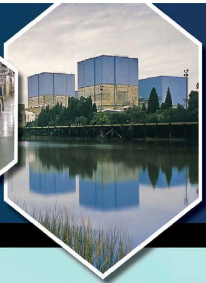
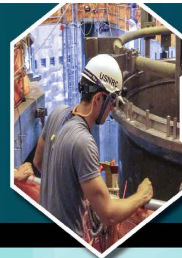
DMLM Process Demonstration Specimen at GE Power Advanced Manufacturing Works, Greenville, SC, C. Moyer, December 11, 2017.



Westinghouse’s DMLM Examples: Thimble Plugging Device, Advanced Debris Filtering Bottom Nozzle, B. Cleary, November 28, 2017.



Standards Development Organizations Involved with AM Standardization, J. McCabe, November 29, 2017



Harvesting of Aged Materials from Nuclear Power Plants

M. Hiser^a, P. Purtscher^a, P. Ramuhalli^b, A.B. Hull^a, and R. Tregoning^a; ^aU.S. Nuclear Regulatory Commission (NRC), ^bPacific Northwest National Laboratory

Background and Motivation

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 United States, 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 and quantify 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 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 United States 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 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.

Current Activities

The NRC has recently undertaken an effort, with the assistance of Pacific Northwest National Laboratory, to develop a strategic approach to harvesting aged materials from NPPs. Because of 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 and should be defined with as much detail as appropriate in terms of the material (alloy, composition, etc.) and environment (temperature, fluence, chemistry, etc.).

Potential Criteria for Harvesting Prioritization

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

- Applicability of harvested material for addressing critical gaps
 - Harvesting for critical gaps is 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, and 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 material (fabrication methods, etc.) is no longer available.
- Fleet-wide vs. plant-specific applicability of data
 - There is 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 is less expensive and less complex than harvesting from the reactor internals or reactor pressure vessel.
- Availability of reliable in-service inspection (ISI) techniques for the material/component
 - If mature inspection methods exist and are easy to apply, harvesting may be less valuable.
- Availability of materials for harvesting
- Timeliness of the expected research results relative to the objective.



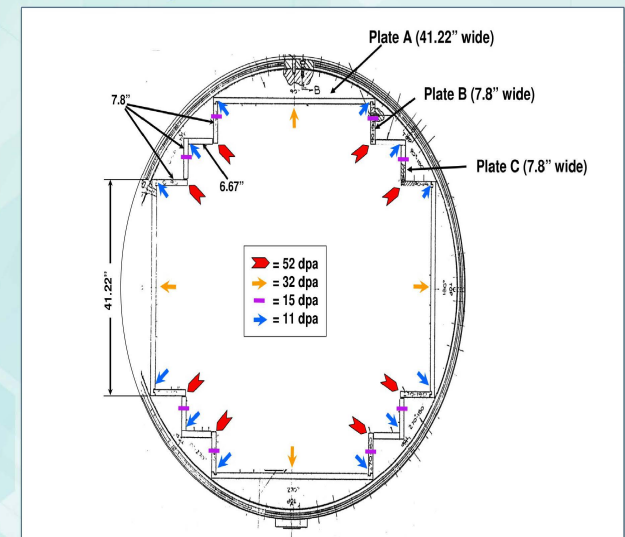
Lifting operation for irradiated materials transport cask

Harvesting Database

The NRC is pursuing the 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 high-priority data needs to the available sources of materials. The level of detail for the database should be appropriate for the factors influencing decisionmaking. The NRC is interested in engaging with other organizations in developing the database.

Path Forward

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



Example of reactor internals harvesting plan

Note to requester: This page is the "RIC Poster 8 on Harvesting_20180213" attachment in Amy Hull's 3/5/18 email.

From: Hiser, Matthew
Sent: Tue, 10 Oct 2017 14:29:09 +0000
To: Purtscher, Patrick
Subject: FW: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

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: Tregoning, Robert
Sent: Tuesday, October 10, 2017 8:32 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>
Cc: Thomas, Brian <Brian.Thomas@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Allen:

Thanks for the head's up and for offering to make a presentation on this for RES. We're targeting to put together a 20 minute presentation on harvesting that we can discuss with you on Thursday morning. We'll also cover your points 2 and 3 at that time.

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: Hiser, Allen

Sent: Tuesday, October 10, 2017 7:27 AM

To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>

Cc: Thomas, Brian <Brian.Thomas@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>

Subject: FW: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Importance: High

Another twist to the harvesting paper/presentation/poster for the PLiM conference.

I am willing to make a presentation at this "side event" if RES will put together slides - I would shoot for 20 minutes.

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1. Can RES pull together a presentation in the next day or two, that we can discuss Thursday AM?
2. Has a paper been prepared (it appears from below that this is possible for inclusion in the conference proceedings)? If so, can I get a copy of it, or other background information.
3. When will the poster be available to be mailed to Lyon? (Can I get a copy of what it will look like?)

I am sure that other questions will arise.

Allen

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

From: KANG, Ki-Sig [<mailto:K.S.Kang@iaea.org>]

Sent: Tuesday, October 10, 2017 7:17 AM

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

Cc: KHAELSS, Martina <M.Khaelss@iaea.org>; KRIVANEK, Robert <R.Krivanek@iaea.org>; 4th PLiM Conference - Contact Point <4th-PLiM-Conference.Contact-Point@iaea.org>

Subject: [External_Sender] Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Dear Allen,

Regarding " Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants", now this paper will be presented on poster session in programme.

I think all of participants will be very interesting to this topic. But we have no time slot to present in oral session. Thus I recommend to arrange a side event to introduce this topic from 13:20 -14:00 on 24, Oct (Tuesday) if you want.

We can arrange the meeting room for presentation and discussion. Please think about and let me know.

Ki- Sig KANG

Technical Head (PLiM/LTO)
Nuclear Power Engineering Section
Division of Nuclear Power
International Atomic Energy Agency
Tel: +43 1 2600 22796
Fax: +43 1 2600 29598
E-mail: Ki-Sig.KANG@iaea.org

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From: Hiser, Matthew
Sent: Tue, 10 Oct 2017 11:34:17 +0000
To: Frankl, Istvan
Subject: FW: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants
Importance: High

From: Hiser, Allen
Sent: Tuesday, October 10, 2017 7:27 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>
Cc: Thomas, Brian <Brian.Thomas@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>
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Tel: +43 1 2600 22796
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E-mail: Ki-Sig.KANG@iaea.org

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From: Hiser, Allen
Sent: Wed, 11 Oct 2017 07:13:17 -0600
To: Hiser, Matthew
Subject: FW: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants
Importance: High

And of course yesterday (??), let's also do a presentation and a paper!

From: Hiser, Allen
Sent: Tuesday, October 10, 2017 7:27 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>
Cc: Thomas, Brian <Brian.Thomas@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>
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Tel: +43 1 2600 22796
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replying to this message and then delete it from your system.

From: Purtscher, Patrick
Sent: Tue, 19 Dec 2017 15:55:35 +0000
To: Hiser, Matthew;Tregoning, Robert;Audrain, Margaret
Subject: FW: Harvesting TLR

FYI

From: Brady, Bennett
Sent: Tuesday, December 19, 2017 10:55 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting TLR

The branch chiefs say that they have a lot of RES reports to review. The branch chiefs and SLs will get together in January to prioritize and set up a schedule for the review of these reports. I will let you know in January when I can get back to you with comments.

Bennett

From: Purtscher, Patrick
Sent: Thursday, December 14, 2017 8:28 AM
To: Brady, Bennett <Bennett.Brady@nrc.gov>
Subject: RE: Harvesting TLR

I would like to get some feedback, verbal or written, by the middle of January.

Pat

From: Brady, Bennett
Sent: Tuesday, December 12, 2017 10:53 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting TLR

Thank you, Pat.

I am getting in DMLR to review the TLR. What is the timeline?

Bennett

From: Purtscher, Patrick
Sent: Monday, December 11, 2017 2:32 PM
To: Brady, Bennett <Bennett.Brady@nrc.gov>
Subject: FW: Harvesting TLR

Here is the report from PNNL related to harvesting of ex-plant materials to support NRR-2017-006, task 2.

Pat

From: Ramuhalli, Pradeep [<mailto:Pradeep.Ramuhalli@pnnl.gov>]
Sent: Thursday, December 07, 2017 10:29 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Hass, Kay E <Kay.Hass@pnnl.gov>; O'Neil, Tara <tara.oneil@pnnl.gov>
Subject: [External_Sender] Harvesting TLR

Patrick,

Attached is the cleared TLR, with the PNNL number included. Let me know if you have any questions.

Thanks.

With best regards,

Pradeep

Pradeep Ramuhalli, PhD
Senior Research Scientist,
Applied Physics Group
Pacific Northwest National Laboratory
902 Battelle Blvd.
P.O.Box 999, MSIN K5-26
Richland, WA 99352
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov
<http://www.pnnl.gov>

From: Tregoning, Robert
Sent: Wed, 16 Mar 2016 09:22:34 -0400
To: Obodoako, Aloysius;Hiser, Matthew
Subject: FW: Harvesting WG

Good news, see below.....

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
Blackberry: 301-873-6393
fax: 301-415-6671

From: McHale, John
Sent: Wednesday, March 16, 2016 8:46 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: Harvesting WG

Rob,

After our conversation yesterday, I did confirm with Jeff Poehler that he will be our rep on the harvesting WG. Unfortunately, he had a (b)(6) (b)(6) so he won't be able to make it in today for the meeting. I hope this will not be too much of an impact for today's meeting and we'll be able to support better the next time around.

Jack

Note to requester: The RIC poster was attached to this email, it is immediately following.

From: Hiser, Matthew
Sent: Wed, 24 Jan 2018 14:45:18 +0000
To: Frankl, Istvan
Cc: Purtscher, Patrick
Subject: FW: Gentle Reminder for Presentation Submissions to OGC/QTE
Importance: High

Hi Steve,

I have put the harvesting poster info into the RIC template. This is largely the same information that was used for the PLiM meeting late last year. Please review and send on to division management for approval if you approve.

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: RICMST Resource

Sent: Wednesday, January 24, 2018 8:09 AM

To: Bernardo, Robert <Robert.Bernardo@nrc.gov>; Hall, Victor <Victor.Hall@nrc.gov>; Wilson, Joshua <Joshua.Wilson@nrc.gov>; Jones, Heather <Heather.Jones@nrc.gov>; Bridge, Joanna <Joanna.Bridge@nrc.gov>; Mendiola, Mary <Mary.Mendiola@nrc.gov>; Zuberi, Sardar <Sardar.Zuberi@nrc.gov>; Dembek, Stephen <Stephen.Dembek@nrc.gov>; Yadav, Priya <Priya.Yadav@nrc.gov>; Gifford, Ian <Ian.Gifford@nrc.gov>; Smith, Todd <Todd.Smith@nrc.gov>; Orf, Tracy <Tracy.Orf@nrc.gov>; Cruz, Holly <Holly.Cruz@nrc.gov>; Morey, Dennis <Dennis.Morey@nrc.gov>; Oberson, Greg <Greg.Oberson@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Savoy, Joanne <Joanne.Savoy@nrc.gov>; Ralph, Melissa <Melissa.Ralph@nrc.gov>; King, Shannon <Shannon.King@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Armstrong, Kenneth <Kenneth.Armstrong@nrc.gov>

Cc: RICMST Resource <RICMST.Resource@nrc.gov>; Kipfer, Lorna <Lorna.Kipfer@nrc.gov>

Subject: Gentle Reminder for Presentation Submissions to OGC/QTE

Importance: High

Good Morning ePoster and Digital Presenters,

This is a gentle reminder to do the following:

- Obtain managerial approval for your ePoster and Digital Presentation
- If your poster has been selected for OGC Review please submit and cc RICMST.Resource@nrc.gov
- Submit your poster to QTE for Level 1 review (note all ePosters and Digital Presentations should be submitted to QTE for final reviews)

Refer to ePoster and Digital Presentation Flowchart for further guidance (also attached). It is important that you adhere to the due dates as close as possible. If you are unable to meet this deadline please contact me as soon as possible via email Brenett.warren@nrc.gov or call me at 415-3114.

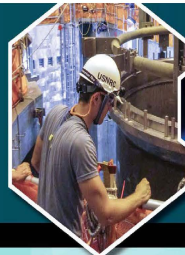
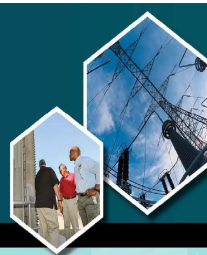
Once again thank you,

Brenett (Bren) U. Warren

Program Specialist
Office of Nuclear Reactor Regulation
NRR/DMPS/RISB
Location: O13D5
301-415-3114
Brenett.Warren@nrc.gov



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Harvesting of Aged Materials from Nuclear Power Plants

M. Hiser^a, P. Purtscher^a, P. Ramuhalli^b, A. B. Hull^a, and R. Tregoning^a; ^aU.S. Nuclear Regulatory Commission (NRC), ^bPacific Northwest National Laboratory (PNNL)

Background and Motivation

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 and quantify 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.

Current Activities

NRC has recently undertaken an effort, with the assistance of Pacific Northwest National Laboratory (PNNL), to develop a strategic approach to 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 and should be defined with as much detail as appropriate in terms of the material (alloy, composition, etc.) and environment (temperature, fluence, chemistry, etc.).

Potential Criteria for Harvesting Prioritization

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, and 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, 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 un-irradiated 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, harvesting may be less valuable.
- Availability of materials for harvesting
- Timeliness of the expected research results relative to the objective.



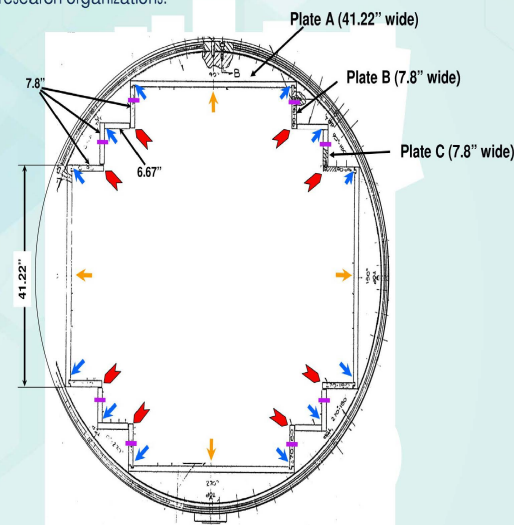
Lifting operation for irradiated materials transport cask

Harvesting Database

The NRC is pursuing the 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. The level of detail for the database should be appropriate for the factors influencing decision-making. NRC is interested in engaging with other organizations in developing the database.

Path Forward

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



Example of reactor internals harvesting plan

From: Moyer, Carol
Sent: Tue, 31 Jul 2018 13:24:48 +0000
To: Hiser, Matthew
Subject: FW: Holtec International to Purchase Oyster Creek Generating Station & Decommission Nuclear Plant Within Eight Years

Matt,

In decommissioning (and harvesting??) news...

-Carol

From: Holtec International [mailto:holtec=holtecinternational.com@mail79.atl51.rsgsv.net] **On Behalf Of** Holtec International
Sent: Tuesday, July 31, 2018 9:04 AM
To: Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: [External_Sender] Holtec International to Purchase Oyster Creek Generating Station & Decommission Nuclear Plant Within Eight Years

[Download HH 33.14 →](#)



Holtec International to Purchase Oyster Creek
Generating Station and Decommission
Nuclear Plant Within Eight Years

Exelon Generation, the owner of the nation's largest fleet of nuclear energy facilities, and Holtec International, a global leader in used nuclear fuel management technologies, today announced an agreement for Holtec to purchase Oyster Creek Generating Station.

Under the terms of the agreement, which is subject to regulatory approvals, Holtec will assume ownership of the site, real property and used nuclear fuel. As the site's owner, Holtec will manage all site decommissioning and restoration activities.

The transaction is expected to close in the third quarter of 2019, pending the Nuclear Regulatory Commission's and other regulatory approval, and will not impact the scheduled shutdown of Oyster Creek, as previously announced. Holtec will be accelerating Oyster Creek's decommissioning timeline with the highest standard of safety, quality and environmental stewardship.

"This landmark agreement is good news for Oyster Creek employees, the Lacey community and the state of New Jersey," said Bryan Hanson, Exelon Generation's chief nuclear officer. "Holtec's commitment to the nuclear industry and its presence in New Jersey will allow many of our employees previously facing relocation to continue living and working in the Garden State. Further, with three decades of experience in nuclear fuel technologies and a partnership with global decommissioning leader SNC-Lavalin, Holtec is ideally positioned to complete the decommissioning of Oyster Creek safely and swiftly."

"It is with wistful pride that we, a New Jersey-born company which has spread around the globe, will take over the State's oldest nuclear plant and decommission it with the latest technologies that will preserve the pristine New Jersey shore and accrete minimal dose to the workers. We hope to offer job

opportunities to the many Oyster Creek-based Exelon employees who may wish to pursue exciting career opportunities with our company,” said Holtec’s President & CEO, Dr. Kris Singh.

As the new owner of the plant, Holtec will contract with Comprehensive Decommissioning International, LLC (CDI) to perform the decontamination and decommissioning of the plant. CDI is a joint venture company of Holtec and SNC-Lavalin. Headquartered in Camden, N.J., CDI will bring the expertise of both companies together to ensure safe, rapid, and economic nuclear plant decommissioning. With its experience and state-of-the-art technologies, CDI is well equipped to decommission Oyster Creek within eight years, more than 50 years ahead of the industry-allowed 60-year timeline.

As part of the sale agreement, CDI will offer employment to Oyster Creek decommissioning employees, effective upon the transaction closing.

Holtec will submit a new Oyster Creek decommissioning plan, which must be reviewed and approved by the NRC. The process provides opportunities for public review and comment on the plan during the NRC evaluation period.

Holtec recently submitted a license application for an autonomous consolidated interim storage facility (CISF) in New Mexico to accept spent nuclear fuel from all nuclear plants in the US, including from Oyster Creek. Once licensed, fuel could be sent to the New Mexico CISF based upon the established use of interim storage locations by the federal government which would allow Holtec to return the full site to unrestricted use once the fuel has been transported off-site.

The funds from the site’s decommissioning trust will be transferred to Holtec

upon closing and will be used by Holtec to cover the cost of the decommissioning. The trust fund was established decades ago to pay for decommissioning, and no additional funds from utility customers will be required.

In February 2018, Exelon Generation announced Oyster Creek will permanently shut down this fall at the end of its current operating cycle. Exelon Generation is required to close Oyster Creek no later than December 2019 as part of an agreement with the State of New Jersey.

Oyster Creek is located about 60 miles east of Philadelphia in Ocean County, N.J. The plant produces 636 net megawatts of zero-emission electricity at full power, enough electricity to supply 600,000 typical homes, the equivalent to all homes in Monmouth and Ocean counties combined.

About Holtec International

Holtec International is a privately held energy technology company with operation centers in Florida, New Jersey, Ohio and Pennsylvania in the US, and globally in Brazil, Dubai, India, South Africa, Spain, UK and Ukraine. Holtec's principal business concentration is in the nuclear power industry. Holtec has played a preeminent role since the 1980s by densifying wet storage in nuclear plants' spent fuel pools deferring the need for and expense of alternative measures by as much as two decades at over 110 reactor units in the US and abroad. Dry storage and transport of nuclear fuel is another area in which Holtec is recognized as the foremost innovator and industry leader with a dominant market share and an active market presence in eighteen countries. Among the Company's pioneering endeavors are the world's first below-ground Consolidated Interim Storage Facility being developed in New Mexico and a 160-Megawatt walk away safe small modular reactor, SMR-160. The SMR-160

is developed to bring cost competitive carbon-free energy to all corners of the earth including water-challenged regions. Holtec is also a major supplier of special-purpose pressure vessels and critical-service heat exchange equipment such as air-cooled condensers, steam generators, feedwater heaters, and water-cooled condensers. Virtually all products produced by the Company are built in its three large manufacturing plants in the US and one in India. Thanks to a solid record of consistent profitability and steady growth since its founding in 1986, Holtec has no history of any long-term debt and enjoys a platinum credit rating from the financial markets. Nearly 100 US and international patents protect the Company's intellectual property from predation by its global competitors and lend predictable stability to its business base. To learn more about Holtec International, visit: www.holtecinternational.com.

About Comprehensive Decommissioning International (CDI)

CDI provides comprehensive project solutions for the accelerated retirement of nuclear power plants. CDI's global operations provide expertise and technological innovation to protect the public in an environmentally responsible, safe and ethical manner. The joint venture is committed to the enrichment of the communities in which it operates, employing financially sustainable business practices that ensure the upholding of obligations made as a trusted steward of legacy nuclear materials. To learn more about CDI, visit: www.cdi-decom.com.

For more information, please contact:

Erika Grandrimo, Publisher

Phone: (856) 797-0900, ext. 3920 | Email: e.grandrimo@holtec.com



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From: Hiser, Matthew
Sent: Wed, 21 Sep 2016 19:59:24 +0000
To: Watson, Bruce
Cc: Carter, Ted
Subject: FW: HRP/IAEA/NEA Decommissioning Workshop – Third Announcement

Hi Bruce,

I am involved with the Halden Reactor Project as part of my responsibilities here in RES and I wanted to share with you a decommissioning workshop that Halden is planning in Norway in February of next year, in case you or any of your staff are interested. NRC is a member of the Halden Reactor Project, so it looks like there would be no registration fee from my reading of the announcement below. If you have any other questions, please feel free to reach out to the contacts listed below or I can help facilitate communication if you'd prefer.

I also spoke with you a few months ago regarding harvesting materials from decommissioning plants. Regarding the material harvesting effort, we are looking at reaching out to plants (both already shutdown and planning to shutdown) to inquire about technical information regarding what materials they have available and whether they might be of interest for harvesting. I want to make sure this is coordinated through the proper channels, so I am reaching out to DORL in NRR for plants still operating. For plants that have already shutdown, would your branch be the proper place within NRC to work through in order to find information regarding contacts to the plants/utilities that I could reach out to?

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: Jannicke Margrethe Neeb [<mailto:jannicke.neeb@ife.no>]
Sent: Wednesday, September 21, 2016 6:08 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: [External_Sender] HRP/IAEA/NEA Decommissioning Workshop – Third Announcement

Dear Robert TREGONING,

A workshop on “Current and Emerging Methods for Optimising Safety and Efficiency in Nuclear Decommissioning” (7th – 9th February 2017) organised by the Institute for Energy Technology (IFE) on behalf of the OECD Halden Reactor Project (OECD-HRP) in collaboration with the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA).

Registration is now open on the [Workshop Home Page](#).

PLEASE NOTE!: Due to the high interest the **venue for the workshop has been moved** to Quality Hotel Sarpsborg (about 30 km from Halden), and the **deadline for early bird registration** has been changed to **November 1**. The registration fee has also been reduced!

Costs:

Registration fee:

450 EUR by **October 31**

650 EUR after **October 31**

Registration fee will be waived for three participants from each HRP member organisation, as well as all IAEA and NEA staff.

Accommodation at workshop site (Quality Hotel Sarpsborg):

The hotel is situated approximately 4 kilometres from Sarpsborg city centre. Since there are no other hotels and restaurants in the nearby area we recommend you to take advantage of our offer for accommodation with full pension:

- Double room (1 person) 1650 NOK (currently ~180 EUR) pr. person per day, including full pension (breakfast, lunch and dinner) and use of hotel commodities.
- Double room (2 person) 1350 NOK (~147 EUR) pr. person per day, including full pension (breakfast, lunch and dinner) and use of hotel commodities.

For those wishing to stay at other hotels we request:

- a daily charge for 550 NOK (~60 EUR) pr. person per day that covers all coffee breaks and lunch at the workshop hotel; and
- a ticket for the workshop dinner ticket for 580 NOK (~63 EUR) if you wish to participate.

For those staying in the workshop hotel this is included in the registration fee and hotel price.

Abstracts:

Abstracts should be submitted by **November 30**.

Maximum one A4 page (12 pt, 25mm margins) abstracts written in English are expected.

Abstracts can be submitted via email to Jannicke.Neeb@ife.no

Authors will be notified by **December 23**.

Final presentation and paper:

Presentations for accepted abstracts should be submitted by **January 31**.

Submittal of a paper is also welcome. Deadline is **January 31**.

Papers will be uploaded onto the workshop website at your discretion.

Please distribute this invitation!

We are looking forward to see you in February!

With Kindest Regards from the organisers,

Jannicke Margrethe Neeb (IFE - workshop secretary): Jannicke.Neeb@ife.no

Inge Weber (OECD-NEA): Inge.WEBER@oecd.org

Vladimir Michal (IAEA): V.Michal@iaea.org

Grete Rindahl (IFE / OECD-HRP): Grete.Rindahl@ife.no

Espen Nystad (IFE / OECD-HRP): Espen.Nystad@ife.no

István Szőke (IFE / OECD-HRP): Istvan.Szoke@ife.no

From: Hull, Amy
Sent: Wed, 4 Oct 2017 12:04:59 -0400
To: Hiser, Matthew
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. RAMUHALLI^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

Dear Brian,

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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

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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>
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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*

Thanks,
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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, "Wilson, George" <George.Wilson@nrc.gov>

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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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: [REDACTED] | F: (+43-1) 2600-7-21315 |

(b)(6)



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[PLiM conference web site](#)

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communication to others. Also please notify the sender by replying to this message and then delete it from your system.

From: Hull, Amy
Sent: Fri, 29 Sep 2017 10:18:39 -0400
To: Hiser, Matthew; Purtscher, Patrick
Subject: FW: I recommend we go forward with NRR presenting our work.....: PLiM Conference

FYI. I did what I could.

From: Hull, Amy
Sent: Friday, September 29, 2017 10:15 AM
To: Thomas, Brian <Brian.Thomas@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan (Istvan.Frankl@nrc.gov) <Istvan.Frankl@nrc.gov>
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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: Hull, Amy
Sent: Wed, 4 Oct 2017 12:35:35 -0400
To: Hiser, Matthew
Subject: FW: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Looks like Steve F. did not follow up. I was about to do reply all with the correction, but then noticed your email to Steve, and agreed that it was his job to support his staff.

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Sent: Wednesday, October 04, 2017 12:32 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>; Regan, Christopher <Christopher.Regan@nrc.gov>
Subject: Re: I recommend we go forward with NRR presenting our work.....: PLiM Conference

Allen,

Thanks for getting back to me on this. Please go ahead and coordinate with Steve Frankl and staff on the paper and presentation material. I expect to see the final draft of the material that is to be provided to you. Given that and your need to have the material sooner than expected, I expect that they will have accelerate their efforts a little to get the material to you before Oct. 12th.

Thanks again

Brian

On: 04 October 2017 11:50, "Hiser, Allen" <Allen.Hiser@nrc.gov> wrote:

Dear Brian,

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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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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>

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

Dear Madam/Sir,

You are registered for above conference but we are still awaiting approval from your authorities.

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

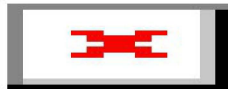
Ms Martina KHAELSS | Conference Service Assistant |

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

(b)(6)



Note to requester: The IAEA logo after her contact information did not come through in our redaction software, instead it created a box with an X inside it.

Follow us on www.iaea.org



Note to requester: After the IAEA web site, there are 5 small social media icons, which did not come through in our redaction software.

[PLiM conference web site](#)

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From: Hiser, Allen
Sent: Wed, 11 Oct 2017 07:08:07 -0600
To: Hiser, Matthew
Subject: FW: I recommend we go forward with NRR presenting our work.....: PLiM Conference

This is the first I was aware of the poster.

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 [REDACTED] is putting together, so we have to add this to the list of topics to cover.

(b)(6)

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

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

From: Hull, Amy
Sent: Friday, September 29, 2017 10:15 AM
To: Thomas, Brian <Brian.Thomas@nrc.gov>
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

Brian,

Carol is out today. 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. HISER^A, P. PURTSCHER^A, P. RAMUHALLI^B, A. B. HULL^A, R. TREGONING^A, AND C. E.
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

Thanks,
Amy

From: Thomas, Brian
Sent: Friday, September 29, 2017 9:09 AM
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

From: Hiser, Allen
Sent: Friday, September 29, 2017 8:57 AM
To: Thomas, Brian <Brian.Thomas@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>; 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>
Subject: RE: PLiM Conference

Brian,

What is the status of the RES presentation & paper?

If needed, I can make the presentation for RES.

Allen

From: Thomas, Brian

Sent: Friday, September 29, 2017 8:55 AM

To: Freeman, Eric <Eric.Freeman@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>

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>

Subject: PLiM Conference

Eric, George, Allen,

After further discussion of this matter with Mike Weber, RES has decided to not participate in the PLiM Conference this year. Notwithstanding that George has been invited as Keynote speaker, and the RES travel was previously (initially) approved, Mike has expressed concerns that we are even planning on sending additional staff to the conference given all our higher priority program activities. He also thinks, and I agree, that we address research to support SLR through a number of different venues in our interactions with the international community. Our plans were well intended, however, given our priorities coupled with our drive to be more efficient and effective in the conduct of research we will not participate in this year's PLiM Conference.

Please **stop** all activities to prepare for the research part of the conference. Thanks to all the staff who provided your support in preparation for RES to be presented in the conference.

Brian

From: Hiser, Allen

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,

"Wilson, George" <George.Wilson@nrc.gov>

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

Dear Madam/Sir,

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

(b)(6)



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[PLiM conference web site](#)

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From: Tregoning, Robert
Sent: Wed, 5 Oct 2016 10:30:23 -0400
To: Hiser, Matthew; Purtscher, Patrick
Subject: FW: ICOND 2016 - International Conference on Nuclear Decommissioning - 21st-24th November - Aachen - Germany

Another interesting conference of interest to our harvesting efforts.....

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: Hull, Amy
Sent: Wednesday, October 05, 2016 10:25 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: FW: ICOND 2016 - International Conference on Nuclear Decommissioning - 21st-24th November - Aachen - Germany

Just passing on before deleting (am not sure who gets what info) Maybe of interest re strategic harvesting ?

From: Andreas Havenith [<mailto:havenith@net.rwth-aachen.de>]
Sent: Wednesday, September 07, 2016 3:03 AM
To: Hull, Amy <Amy.Hull@nrc.gov>
Subject: [External_Sender] ICOND 2016 - International Conference on Nuclear Decommissioning - 21st-24th November - Aachen - Germany

Dear Mrs. Dr. Amy Hull,

In autumn 2016, the decision of the Federal Constitutional Court to phase out nuclear power in Germany is expected.

Will the German government be liable for financial damages caused by the phase-out?

The 5th International Conference on Nuclear Decommissioning (**ICOND**) provides a platform for professional exchange.

The conference focuses on decommissioning strategies, project management, cost-effective approaches and waste management.

Decision makers and project managers of the utilities, nuclear industry executives and experts from technical safety organizations and regulators are among the participants.

We are pleased that Mr. Jan C. Homan (Managing Director of PreussenElektra GmbH, formerly E.ON Kernkraft GmbH) will give an overview of decommissioning in Germany and short-term developments. Furthermore, Mr. Kjell Westerberg, head of decommissioning at Vattenfall AB, will report on the situation in Sweden.

The **ICOND** takes place in **Aachen (Germany) from 22nd to 24th November 2016**. On November 21st a pre-conference workshop will be offered.

You can find the programme on our website: <http://www.icond.de/index.php/programme.html>

Just in time for the ICOND 2016, the [Aachen Christmas market](#) starts, which was voted to be one of the most beautiful Christmas markets in Europe.

We offer an **early bird discount of 10% for bookings up to and including 16th of September 2016**.

Representatives of nuclear regulatory and licensing authorities as well as government departments and academic institutions receive an **additional discount of 20%**.

The ICOND will be accompanied by an exhibition. An up-to-date exhibitor list is available at: <http://www.icond.de/index.php/exhibitors.html>

If you have any questions or remarks, please do not hesitate to contact me.

Kind Regards
Andreas Havenith

Aachen Institute for Nuclear Training GmbH (AiNT)

Cockerillstraße 100
52222 Stolberg (Rhld.)
Germany

Dr.-Ing. Andreas Havenith
Managing Director

Tel: +49 241 47 58 32 45

Fax: +49 241 47 58 32 21

Mobile: (b)(6)

E-Mail: havenith@nuclear-training.de

Web: www.nuclear-training.de
www.icond.de

Register court: Aachen

Register number: HRB 16884

VAT ID: DE277764612

From: Frankl, Istvan
Sent: Wed, 7 Sep 2016 09:41:57 -0400
To: Hiser, Matthew; Purtscher, Patrick
Cc: Hull, Amy
Subject: FW: ICOND 2016 - International Conference on Nuclear Decommissioning - 21st-24th November - Aachen - Germany

FYI

May be a good source for developing harvesting related contacts in Germany.

Steve

From: Andreas Havenith [mailto:havenith@net.rwth-aachen.de]
Sent: Wednesday, September 07, 2016 2:50 AM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: [External_Sender] ICOND 2016 - International Conference on Nuclear Decommissioning - 21st-24th November - Aachen - Germany

Dear Mr. Istvan Frankl,

In autumn 2016, the decision of the Federal Constitutional Court to phase out nuclear power in Germany is expected.

Will the German government be liable for financial damages caused by the phase-out?

The 5th International Conference on Nuclear Decommissioning (**ICOND**) provides a platform for professional exchange.

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<http://www.icond.de/index.php/exhibitors.html>

If you have any questions or remarks, please do not hesitate to contact me.

Kind Regards
Andreas Havenith

Aachen Institute for Nuclear Training GmbH (AiNT)

Cockerillstraße 100
52222 Stolberg (Rhld.)
Germany

Dr.-Ing. Andreas Havenith
Managing Director

Tel: +49 241 47 58 32 45
Fax: +49 241 47 58 32 21
Mobile: [REDACTED] (b)(6)
E-Mail: havenith@nuclear-training.de
Web: www.nuclear-training.de
www.icond.de

Register court: Aachen
Register number: HRB 16884
VAT ID: DE277764612

From: Hiser, Matthew
Sent: Fri, 17 Feb 2017 12:57:02 +0000
To: Tregoning, Robert;Purtscher, Patrick
Subject: FW: NRC Materials Harvesting Workshop

Just received this email from John Jackson about INL participation in the workshop. His rationale is their NSUF sample library. I'd suggest we could have one person from INL attend in-person, but let's talk first thing next week and then get back to people.

Thanks!
Matt

From: Jackson, John Howard [mailto:john.jackson@inl.gov]
Sent: Thursday, February 16, 2017 7:06 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: [External_Sender] NRC Materials Harvesting Workshop

Matt,

My NSUF folks have asked me about an NRC Materials Harvesting workshop that you are hosting next month. It looks like an LWRS/NRC effort (Rich Reister, Keith Leonard, and Tom Rosseel) and I know they're highly involved in materials retrieval efforts. As you are most likely aware, we've got a pretty large effort to collect and place relevant specimens in our NSUF sample library. (...the Zorita TEM discs, for example) Rory Kennedy (NSUF director) has expressed an interest in having someone from NSUF participate (I would probably be this someone). There may be good reasons to have NSUF participation since we are set up to store and catalog materials and are focused on providing funding to researchers who propose research on them.

Hopefully I'm not stepping on toes. I understand your space is limited so let me know if this is too big of an ask.

Best,

John

JOHN H. JACKSON, Ph.D.

GAIN Technical Interface/NSUF Industry Program Lead

Idaho National Laboratory
P.O. Box 1625
Idaho Falls, ID. 83415-3870

Voice: 208-526-0293

Fax: 208-526-4822

john.jackson@inl.gov



SAVE THE DATE! Mark your calendar today!

**August 13–17, 2017 • Marriott Portland Downtown
Waterfront Portland, Oregon, USA**



Note to requester: The attachment is immediately following.

From: Moyer, Carol
Sent: Thu, 15 Mar 2018 15:34:29 +0000
To: Hahn, Alison (Krager)
Subject: FW: one additional presentation
Attachments: SLR NRC Overview_DOELWRS_final_20180315_2slides.pdf

Oops, I meant to include you on this.

From: Moyer, Carol
Sent: Thursday, March 15, 2018 11:33 AM
To: 'Hallbert, Bruce P' <bruce.hallbert@inl.gov>
Subject: RE: one additional presentation

Thank you, Bruce.

For your reference, my slides are attached.

See you soon,
Carol

From: Hallbert, Bruce P [mailto:bruce.hallbert@inl.gov]
Sent: Thursday, March 15, 2018 9:58 AM
To: Moyer, Carol <Carol.Moyer@nrc.gov>; Hahn, Alison (Krager) <Alison.Hahn@nuclear.energy.gov>
Subject: [External_Sender] one additional presentation

For our introductory remarks.

I look forward to seeing you this afternoon. Alison and I will already be meeting with Mark Thaggard so will come over to the desk at about 12:30 from lunch at the NRC cafeteria.

Best Regards,

Bruce

--

Bruce P. Hallbert, Ph.D.

Director, Light Water Reactor Sustainability Program Technical Integration Office

Idaho National Laboratory

ph: 208.526.9867

cell: [REDACTED] (b)(6)

Light Water Reactor Sustainability Program: lwrs.inl.gov



Overview of NRC Research Initiatives for Aging Management

Office of Nuclear Regulatory Research
DOE-LWRS Meeting, March 15, 2018

Carol Moyer
*Sr. Materials Engineer,
Office of Nuclear Regulatory Research,
Division of Engineering, Corrosion & Metallurgy Branch*



Outline

- Background, motivation for plant life extension
- Technical bases and regulatory guidance
- Confirmatory research for subsequent license renewal (SLR)
- Materials-related research for SLR

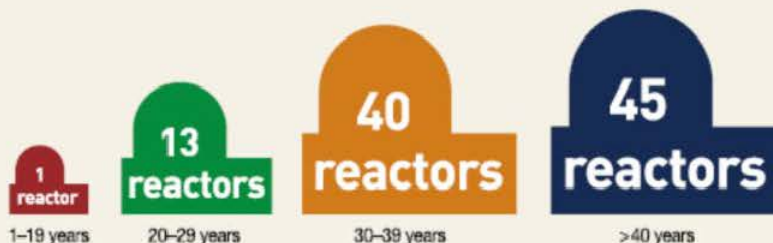
Background

- 86 U.S. nuclear power plants granted renewed licenses to operate up to 60 years
- 3 expected to apply for subsequent license renewal (SLR) in FY 2018 and 2019; others later
- Aging management is a key part of the technical basis for SLR
- Research on materials degradation central to RES mission for > 3 decades
- RES supports the Office of Nuclear Reactor Regulation (NRR) with technical bases for license renewal guidance documents

3

Motivation: Aging of the US NPP Fleet

Figure 17. U.S. Commercial Nuclear Power Reactors—Years of Operation by the End of 2017



Note: Ages have been rounded up to the end of the year. For the most recent information, go to the Dataset Index Web page at <https://www.nrc.gov/reading-rm/doc-collections/datasets/>

Source: NRC Information Digest, NUREG-1350, Vol. 29, Rev. 1, ML18037A641

4

US NPP Fleet (as of Feb. 2018)



License Renewals Granted for Operating Nuclear Power Reactors



Licensed to Operate (99)

▲ Original License (13) ▲ License Renewal Granted (86)

Note: The NRC has issued a total of 89 license renewals; three of these units have permanently shut down. Data are as of February 2018. For the most recent information, go to the Dataset Index Web page at <https://www.nrc.gov/reading-rm/doc-collections/datasets/>.

5

US NPP Fleet (as of Feb. 2018)



License Renewals Granted for Operating Nuclear Power Reactors



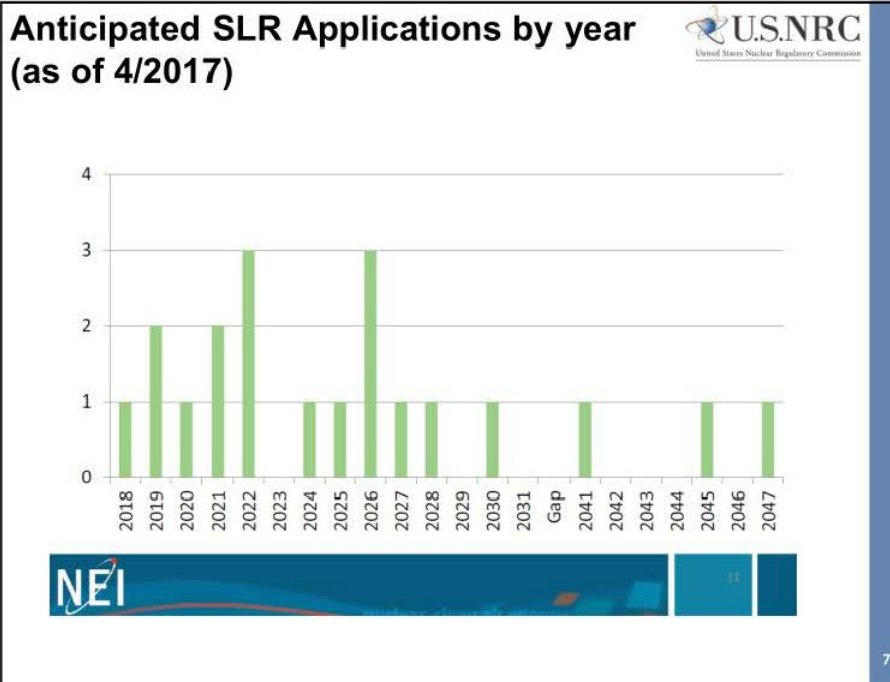
Licensed to Operate (99)

▲ Original License (13) ▲ License Renewal Granted (86)

Note: The NRC has issued a total of 89 license renewals; three of these units have permanently shut down. Data are as of February 2018. For the most recent information, go to the Dataset Index Web page at <https://www.nrc.gov/reading-rm/doc-collections/datasets/>.

Lead Plants for SLRAs:
 Turkey Point (FL), PWR
 Peach Bottom (PA), BWR
 Surry (VA), PWR

6



U.S.NRC
United States Nuclear Regulatory Commission

Foundation for Aging Management

- Proactive Material Degradation Assessment (PMDA) (2004 - 2007) – NUREG/CR-6923
 - Expert elicitation to identify degradation that could affect plant systems in operation up to 40 years
- Extended Material Degradation Assessment (EMDA) (2008 – 2016) – NUREG/CR-7153
 - Evaluated broader range of structures, systems, and components (SSCs), up to 80 years
 - Focused on reactor pressure vessel, internals & piping, concrete structures, and electrical cables
 - Joint work with DOE ORNL

8



Development of SLR Guidance Involved Rigorous Staff Review

- Technical sources used for SLR guidance
 - Expanded Materials Degradation Assessment
 - AMP effectiveness audits at plants in the period of extended operation
 - Relevant domestic and international operating experience
 - External stakeholder, staff comments

9



SLR Guidance Documents and Technical Bases

- Generic Aging Lessons Learned for SLR (GALL-SLR) Report (NUREG-2191)
 - Contains generic aging effects to be managed and appropriate AMPs
 - ~3000 aging management review (AMR) line items
- Standard Review Plan for the Review of SLR Applications for Nuclear Power Plants (SRP-SLR) (NUREG-2192)
 - Contains guidance to NRC safety reviewers of the SLR application
- **Updated guidance documents published in July 2017**
- Technical Bases for Changes in the SLR Guidance Documents (NUREG-2221), Dec. 2017

10



Ongoing Confirmatory Research: Four Key Technical Issues for SLR

- Reactor pressure vessel neutron embrittlement at high fluence
- Irradiation-assisted stress corrosion cracking (IASCC) of reactor internals and primary system components
- Concrete and containment degradation
- Electrical cable qualification and condition assessment

11



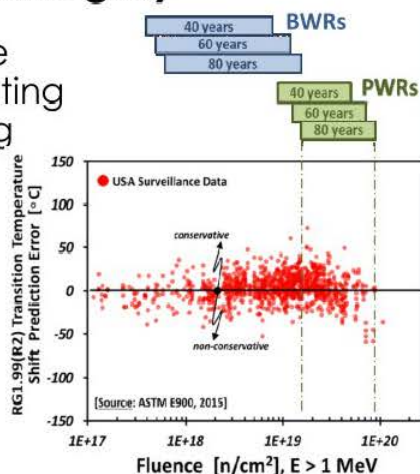
Subsequent License Renewal (SLR) Confirmatory Research: *Materials Degradation Overview*

Office of Nuclear Regulatory Research
DOE-LWRS Meeting, March 15, 2018

Carol Moyer
Sr. Materials Engineer,
Office of Nuclear Regulatory Research,
Division of Engineering, Corrosion & Metallurgy Branch

Staff is Ensuring Reactor Pressure Vessel Integrity

- Confirming predictive methods using operating experience (including surveillance data)
- Assessing embrittlement at higher fluence levels



RPV Embrittlement

- A revised aging management program (AMP) included in the GALL-SLR report will provide a consistent generic approach for existing plant surveillance programs.
 - Capsules from such programs will be removed from their host reactors for testing in the coming decade.
- EPRI has undertaken supplemental surveillance programs to obtain data at high fluence for PWRs.
- The staff will use the data from these programs to assess the continued validity of the NRC predictive model and to confirm the adequacy of the RPV AMP.



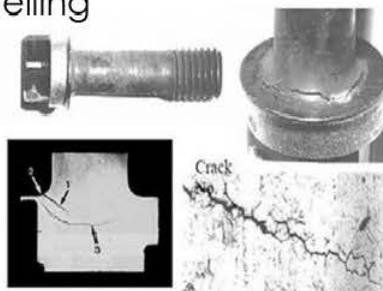
RPV Embrittlement: Cooperative Research

- The NRC seeks to cooperate with DOE on research to resolve SLR sub-issues, including:
 - Formation and effects of late-blooming phases (LBP) and other potential high-fluence embrittlement mechanisms
 - Neutron attenuation in RPVs
 - Modeling of flux effects at high neutron fluence
- Fracture toughness data that is not from test reactors is lacking
 - EPRI PWR Supplemental Surveillance Program (PSSP) will supply some data, through 2028
 - DOE data or specimens for benchmarking would be welcome

1
5

Staff is Assessing Effects of Irradiation-Assisted Degradation of Internals

- Evaluating impacts of IASCC, loss of fracture toughness, and void swelling
- Testing materials at higher irradiation levels



Cracking in a PWR baffle bolt

1
6



RPV Internals

- Materials harvested from decommissioned plants are being tested to assess damage
- Samples will be subjected to additional irradiation at the Halden reactor to simulate the irradiation-assisted degradation expected during the SLR period.
- Collaborating with EPRI and international regulators
 - The Zorita Internals Research Project is examining specimens from the decommissioned Zorita plant in Spain.
- The staff will use confirmatory research to evaluate a revision to EPRI's MRP-227 report from the Materials Reliability Program: "Pressurized Water Reactor Internals Inspection and Evaluation Guidelines."
 - The revised report covers the SLR period (80 years)

1
7

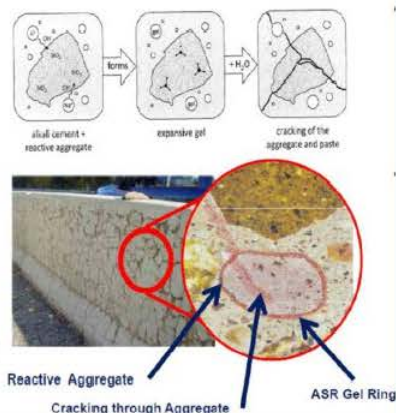
RPV Internals: Cooperative Research

- The NRC continues to cooperate with EPRI and DOE on testing of materials from the Zorita plant
 - NRC has proposed additional irradiation of Zorita plate material to 80 dpa, then characterizing void swelling and mechanical properties. This would require further cooperation/leveraging with DOE and identification of a suitable test reactor.
 - Baffle former bolts from a US plant may be made available to DOE NSUF material library
- DOE work on modeling segregation & predictive model for IASCC are of interest to NRC

1
8

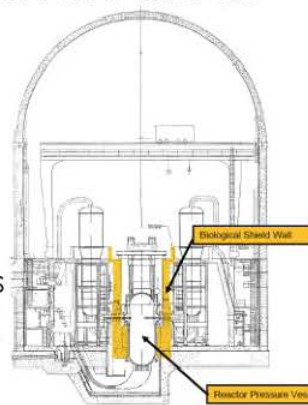
Staff is Assessing Concrete Degradation

- Evaluating effects of ASR on structural performance of concrete
- Confirming structural integrity
- U.S. and international collaborative research

1
9

Staff is Confirming Structural Concrete Integrity

- Evaluating effects of irradiation on concrete structures
 - Confirming DOE concrete irradiation damage and EPRI concrete structural performance results
 - Assessing EPRI's evaluation of susceptible plant configurations
 - Assessing neutron fluence and gamma dose on structural bio-shield concrete

2
0



Concrete Degradation: Cooperative Research

- ORNL and ANL staff participation in RIC 2018 session is appreciated
- Concrete Joint Roadmap process is working for monitoring research activities
- Some open questions include:
 - Rate effect of irradiation
 - Configuration effects – attenuation, inspectability of bio shield walls of various plant designs
 - Modeling of flux at concrete surfaces inside containment and possible streaming effects
 - Methods for effective non-destructive examination of concrete structures

2
1

Staff is Confirming Adequacy of Cable Condition Assessment Techniques

- Evaluating condition monitoring techniques for detecting degradation of low voltage cables with concurrent radiation and thermal aging



Thermal aging of jacketed cables

- Confirming condition assessment of medium voltage cable submergence qualification by reviewing EPRI program and test results. Considering additional tests.

2
2



Cable Degradation: Cooperative Research

- DOE Lab staff participation in RIC 2017 session is appreciated,
- DOE and NRC are both working toward understanding synergistic effects of radiation and thermal aging. A predictive model of degradation appears beyond NRC's reach, but it would be of use to us.
- Cable condition monitoring is the main focus for NRC and EPRI. NRC intends to review and validate EPRI's guidance for qualification and condition monitoring.

2
3

Staff Engagement with DOE & EPRI

- Deep-dive meetings – detailed technical reviews of available information and research gaps – 2015-'16
- Strategic Harvesting workshop – March 2017
- Site visits & Roadmap meetings
 - Salem/Hope Creek (buried pipe, electrical, self-assessment for LR inspections) – Feb 2015
 - ORNL (RPV, internals, inspection) – July 2015
 - Westinghouse (RPV, internals, inspection) – April 2016
 - PNNL (cables degradation, NDE) – July 2016
 - AREVA (internals, inspection) – October 2016
 - Univ. of TN (concrete degradation, ASR) – April 2017
- Periodic phone calls, meetings, program reviews, etc. to maintain alignment

2
4



Ongoing Work

- License renewal (LR) framework is basis for SLR
 - Research provided the basis for enhancements to the SLR guidance
- Extensive stakeholder engagement continues
- Confirmatory research is ongoing for technical issues
 - Near-term results support review of initial SLR applications
 - Longer-term research will continue, to augment the technical basis for further updates to SLR guidance
 - NRC planning public workshops in 2019 & 2020 to solicit and disseminate research results
 - Industry guidance (MRP-227 R2) for SLR expected in 2020
- As our technical understanding evolves, guidance documents may need additional updates

2
5

Further Information

- Reactor License Renewal Web Page
<http://www.nrc.gov/reactors/operating/licensing/renewal.html>
- Subsequent License Renewal Web Page
<https://www.nrc.gov/reactors/operating/licensing/renewal/subsequent-license-renewal.html>

2
6

From: Hiser, Matthew
Sent: Fri, 3 Feb 2017 18:10:18 +0000
To: Purtscher, Patrick
Subject: FW: RE: Draft slides

(b)(6)

Hey Pat, can you give me a call at [REDACTED] to discuss feedback to Pradeep?

From: Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]
Sent: Friday, February 03, 2017 10:37 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: [External_Sender] RE: Draft slides

Shoot! Will resend in a bit.

With best regards,
Pradeep

Pradeep Ramuhalli, PhD.
Senior Research Scientist
Pacific Northwest National Laboratory
pradeep.ramuhalli@pnnl.gov
509-375-2763

Sent from my Android phone using Symantec TouchDown (www.symantec.com)

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

From: Hiser, Matthew [Matthew.Hiser@nrc.gov]
Received: Friday, 03 Feb 2017, 4:46AM
To: Ramuhalli, Pradeep [Pradeep.Ramuhalli@pnnl.gov]; Purtscher, Patrick [Patrick.Purtscher@nrc.gov]
Subject: RE: Draft slides

FYI – slides didn't make it through...

From: Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]
Sent: Friday, February 03, 2017 1:36 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: [External_Sender] Draft slides

Symantec Mail Security replaced Harvesting workshop slides draft.pptx with this text message.
The original file was a malformed file, therefore it cannot be scanned and was quarantined.

ID:HQPWMSMRS04::SYQ3370fc312
The email message was also quarantined.

From: Purtscher, Patrick
Sent: Mon, 30 Jan 2017 11:14:19 -0500
To: Hiser, Matthew
Subject: FW: RE: Harvesting Workshop slides

FYI

From: Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]
Sent: Monday, January 30, 2017 10:56 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: [External_Sender] RE: Harvesting Workshop slides

Patrick – yes. Working on these and will have them out Thursday.

On the report – we had an internal review of the document that came back with numerous comments. I am finishing up addressing the comments today and hope to have it sent out tonight or tomorrow.

With best regards,

Pradeep Ramuhalli, PhD
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

From: Purtscher, Patrick [mailto:Patrick.Purtscher@nrc.gov]
Sent: Monday, January 30, 2017 7:47 AM
To: Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>
Subject: FW: Harvesting Workshop slides

CAN WE SEE DRAFT SLIDES BY THIS THURSDAY?

PAT

From: Hiser, Matthew
Sent: Monday, January 30, 2017 9:40 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop

Will do Pat – here are the documents we'll be speaking to.

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: Wed, 11 Jul 2018 15:40:06 +0000
To: Audrain, Margaret; Hiser, Matthew
Subject: FW: RE: PNNL Visit

FYI

From: Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]
Sent: Wednesday, July 11, 2018 11:34 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: [External_Sender] RE: PNNL Visit

Pat,

Let me check on the status of this inventory and how to share it with you. Last I heard, it was pretty close to ready to be sent out. I have to check with the PM on that work though – he may prefer to send it formally to Carol (if it is a deliverable) and have her route it to you.

With best regards,

Pradeep Ramuhalli, PhD
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

From: Purtscher, Patrick [mailto:Patrick.Purtscher@nrc.gov]
Sent: Tuesday, July 10, 2018 10:29 AM
To: Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>
Subject: RE: PNNL Visit

When we talked yesterday, you mentioned that you already had an inventory of ex-plant materials that was assembled for Care Nove.

If you can forward that list to me soon that could let us review it and then Meg could come to the meeting better prepared. She said that they have a pretty full agenda for her trip and the time to talk harvesting is valuable.

Thanks,

Pat

From: Hiser, Matthew
Sent: Tue, 3 May 2016 17:08:11 +0000
To: Purtscher, Patrick
Subject: FW: RE: RE: RRIM Project Updates

From: Hiser, Matthew
Sent: Tuesday, April 19, 2016 8:24 AM
To: 'Ramuhalli, Pradeep' <Pradeep.Ramuhalli@pnnl.gov>; 'Knobbs, Katie' <katie.knobbs@pnnl.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: RE: RE: RRIM Project Updates

Action Item Summary

- Pradeep will work with the materials group at PNNL to evaluate CASS and cables with respect to:
 - Materials degradation data gaps – where can harvesting add unique value
 - Harvesting plan – what information is needed to make harvesting decisions: technical, practical considerations
- Pradeep/PNNL will flesh out the harvesting plan focused on three stages:
 - Planning – assessing technical needs and available materials for benefits of harvesting
 - Harvesting – technical and logistical consideration for implementing a harvesting program
 - Research – how will harvested materials be tested or characterized in order to improve technical basis for safe operation
- Matt will provide feedback on draft review of DM welds degradation data gaps
- Matt will work within NRC to get more information on decommissioning schedules
 - Look into FSARs for technical information related to components of interest

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: Friday, April 08, 2016 1:53 PM
To: 'Ramuhalli, Pradeep' <Pradeep.Ramuhalli@pnnl.gov>; Obodoako, Aloysius <Aloysius.Obodoako@nrc.gov>; Knobbs, Katie <katie.knobbs@pnnl.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: RE: RE: RRIM Project Updates

Summary of Action Items

- Pradeep will provide a draft document of the review of DM welds degradation data gaps early next week (April 11-12).
- Pradeep will work with the materials group at PNNL to evaluate CASS with respect to:
 - Materials degradation data gaps – where can harvesting add unique value
 - Harvesting plan – what information is needed to make harvesting decisions: technical, practical considerations
 - Expected draft deliverable by April 15-19
- In May, Katie will put together a proposal for a phased approach to develop the software tool.
- Matt will reach out within NRC to get more information on decommissioning schedules
 - Look into FSARs for technical information related to components of interest

Thanks!
Matt

From: Ramuhalli, Pradeep [<mailto:Pradeep.Ramuhalli@pnnl.gov>]
Sent: Friday, April 08, 2016 11:34 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Obodoako, Aloysius <Aloysius.Obodoako@nrc.gov>; Knobbs, Katie <katie.knobbs@pnnl.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: [External_Sender] RE: RE: RRIM Project Updates

Matt,

(b)(6)

I am working from home today – [REDACTED] but should be able to get on the call. Let's take care of this today. Talk to you in a bit.

Pradeep Ramuhalli, PhD
 Tel: 509-375-2763
 Email: pradeep.ramuhalli@pnnl.gov

From: Hiser, Matthew [<mailto:Matthew.Hiser@nrc.gov>]
Sent: Thursday, April 07, 2016 11:27 AM
To: Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>; Obodoako, Aloysius <Aloysius.Obodoako@nrc.gov>; Knobbs, Katie <katie.knobbs@pnnl.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: RE: RRIM Project Updates

Hi Pradeep,

(b)(6) [REDACTED] I'd vote to stick with the meeting tomorrow.

(b)(6) [REDACTED] we can reschedule for Monday. I am free from 12:00 to 1:30 and 2:30 to 4:00 on Monday.

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: Ramuhalli, Pradeep [<mailto:Pradeep.Ramuhalli@pnnl.gov>]
Sent: Thursday, April 07, 2016 12:34 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Obodoako, Aloysius <Aloysius.Obodoako@nrc.gov>; Knobbs, Katie <katie.knobbs@pnnl.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: [External_Sender] RE: RRIM Project Updates

Matt, Amy,

(b)(6)

(b)(6)

should we move this meeting to Monday next week? If so, what time on Monday would work for you?

Pradeep Ramuhalli, PhD
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

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

From: Ramuhalli, Pradeep
Sent: Thursday, March 31, 2016 9:20 AM
To: Ramuhalli, Pradeep; Hiser, Matthew (Matthew.Hiser@nrc.gov); Obodoako, Aloysius; Knobbs, Katie; amy.hull@nrc.gov
Subject: RRIM Project Updates
When: Friday, April 08, 2016 10:00 AM-11:00 AM (UTC-08:00) Pacific Time (US & Canada).
Where: Skype Meeting

→ [Join Skype Meeting](#)

This is an online meeting for Skype for Business, the professional

meetings and communications app formerly known as Lync.

Join by phone

[Join the meeting and have Lync call you or dial-in](#) (Richland) English (United States)

[866-528-1882 or 509-375-4555](#) (Richland) English (United States)

[On-campus PNNL staff dial 5-4555](#) (Richland) English (United States)

[Find a local number](#)

Conference ID: (b)(6)

[Forgot your dial-in PIN?](#) | [Help](#)

From: Hiser, Matthew
Sent: Tue, 27 Feb 2018 14:22:58 +0000
To: Purtscher, Patrick;Tregoning, Robert
Cc: Hull, Amy;Frankl, Istvan
Subject: FW: RIC -- 20 of 34 segments now have proposed volunteered time for staffing 2 posters

Hi Pat and Rob,

Would either of you guys be able to help cover time slots for the RIC poster on harvesting? Amy has graciously coordinated the coverage for the harvesting and AM posters as you can see below...

I may be able to help some, particularly the little 30-minute slots, but I'm hesitant to commit given the unpredictability of my schedule, especially that week...

Thanks!
Matt

From: Hull, Amy
Sent: Tuesday, February 27, 2018 8:56 AM
To: Burke, John <John.Burke@nrc.gov>; Herrity, Thomas <Thomas.Herrity@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: RIC -- 20 of 34 segments now have proposed volunteered time for staffing 2 posters

Thanks. Schedule below and on Gdrive is updated.

Poster staffing - 2018 RIC - March 13-15, 2016						
	Tuesday		Wednesday		Thursday	
	Adv. Mfg.	Harvesting	Adv. Mfg.	Harvesting	Adv. Mfg.	Harvesting
7:30 AM	Carol (AM)	Amy (Harv.)	Amy (AM)	Carol (Harvesting)		Amy (Harv.)
8:00 AM	↓	↓	↓	↓		↓
8:30 AM						
9:00 AM						
9:30 AM						
10:00 AM	John				Amy (AM)	

10:30 AM							
11:00 AM							
11:30 AM							
12:00 PM	Amy(A M)		Carol (AM)				
12:30 PM	↓		↓		volunteer	Adv. Mfg. 1/2 hr sessions	Harvesting 1/2 hr sessions
1:00 PM	John		↓		Carol	5	3
1:30 PM					Amy	6	4
2:00 PM					J. Burke	2	
2:30 PM					Thom Herrity		
3:00 PM	Amy (AM)	Carol (Harvesting)			Matt Hiser		
3:30 PM					Pat Purtscher		
4:00 PM					R. Tregoning		
4:30 PM					total	13	7
5:00 PM					total 1/2 hr sessions needed	17	17

From: Burke, John

Sent: Tuesday, February 27, 2018 8:06 AM

To: Hull, Amy <Amy.Hull@nrc.gov>; Herrity, Thomas <Thomas.Herrity@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>

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

Subject: RE: RIC --17 of 34 segments now have proposed volunteered time for staffing 2 posters

I'll do some on Tuesday

John Burke

NRO/DCIP
301 415 2343

From: Hull, Amy
Sent: Tuesday, February 27, 2018 8:04 AM
To: Herrity, Thomas <Thomas.Herrity@nrc.gov>; Burke, John <John.Burke@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RIC --17 of 34 segments now have proposed volunteered time for staffing 2 posters

As a starting point, Carol and I have each proposed about 8 ½-hr sessions for ourselves over the 2 posters. Thom and John would you also like to staff the AM poster sometime? Please fill in which/any slots you would like. (You can bounce me if that helps)
See below and saved to G\DE\CMB\RIC. Matt would you like me to send this to the other Harvesting coauthors also or are you handling this?

Amy

From: Moyer, Carol
Sent: Monday, February 26, 2018 4:12 PM
To: Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: prototype schedule to complete for staffing posters

I entered my proposals & saved to G\DE\CMB\RIC

From: Hull, Amy
Sent: Monday, February 26, 2018 10:21 AM
To: Herrity, Thomas <Thomas.Herrity@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Burke, John <John.Burke@nrc.gov>
Cc: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: prototype schedule to complete for staffing posters

Attached and pasted below (highlighted in blue) are the times when the e-posters are highlighted in the attached agenda. Please let me know if/when you would like to volunteer to stand by the poster and interact with the visitors. I will work around your desired schedules to fill in the blank spaces because I am flexible during this time.

Matt, I have copied you on this because I am a coauthor on your poster and I can help staff that poster also if you would like. I don't know where you are with developing a volunteer schedule.

The RIC CAC to use for this is MF1396.

Amy

From: Hull, Amy
Sent: Monday, February 26, 2018 10:10 AM

To: Hull, Amy <Amy.Hull@nrc.gov>

Subject: prototype schedule to complete for staffing posters

From: Frankl, Istvan
Sent: Mon, 27 Nov 2017 15:15:51 +0000
To: Hiser, Matthew
Cc: Hull, Amy; Moyer, Carol
Subject: FW: RIC ePoster Approval: Evaluation of Additive Manufacturing of Metallic Parts via Direct Metal Laser Melting (DMLM)
Attachments: NRC 1102 - AM (IF).pdf
Importance: High

Note to requester: The attachment is immediately following.

Matt,

Amy and Carol are busy now, so please send the attached form to the RICMIST resource **by noon**.

Also, since you already prepared the ePoster for harvesting, please share your lessons learned with Amy.

Thanks,

Steve

From: Frankl, Istvan
Sent: Monday, November 27, 2017 9:30 AM
To: Hull, Amy <Amy.Hull@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: RE: RIC ePoster Approval: Evaluation of Additive Manufacturing of Metallic Parts via Direct Metal Laser Melting (DMLM)
Importance: High

Amy,

I have a minor fix in the attached revision.

This needs to be sent to the RICMIST resource **by noon**.

Please note additional actions for the ePoster below.

Carol,

If Amy is busy with the prep for the public meeting, please send the attachment to RICMIST.

Thanks,

Steve

From: Hull, Amy
Sent: Saturday, November 25, 2017 5:31 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>

Subject: FW: RIC ePoster Approval: Evaluation of Additive Manufacturing of Metallic Parts via Direct Metal Laser Melting (DMLM)

Hi Steve,

Here's my NRC 1102 for the RIC poster on additive manufacturing for your review. It needs to be "vetted through your division level management" by Monday, November 27.

Thanks!
Amy

From: RICMST Resource

Sent: Friday, November 17, 2017 7:45 AM

To: Oberson, Greg <Greg.Oberson@nrc.gov>

Cc: Bowman, Gregory <Gregory.Bowman@nrc.gov>; RICMST Resource <RICMST.Resource@nrc.gov>; Zabel, Joseph <Joseph.Zabel@nrc.gov>; DiFrancesco, Nicholas <Nicholas.DiFrancesco@nrc.gov>; Boyce (RES), Tom <Tom.Boyce@nrc.gov>; Peters, Sean <Sean.Peters@nrc.gov>

Subject: RIC ePoster Approval: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

We are pleased to inform you that the topic mentioned above has been approved as a Digital ePoster for the RIC 2018 program.

NEXT STEPS

1. **Refine Title, Description, Information** – Now is your opportunity to fine tune your eposter title, description information in preparation for publication. ***(Please note that this is the version that will be published in conference materials and on the RIC website.)*** Use the updated NRC Form 1102 located in the NRC Sharepoint Library (description field has been expanded). Please ensure all changes have been vetted through your division level management before submission to RICMST.Resource@nrc.gov (deadline for updated write-ups to RICMST by 12 noon on 11/27/2017)
2. **Determine ePoster Format** – As you develop your eposter, you might consider what format would be most useful (i.e., single slide or multi slide). Guidance for Determining the type of eposter template is located on RIC Central at <http://drupal.nrc.gov/ric>, under the "Digital Presentation (ePoster) Toolbox" tab.
3. **Development of ePoster** - Beginning this year the Graphics Team will no longer be developing ePosters for offices, rather, offices are now responsible for developing their ePosters. However, the Graphics Team is available to provide guidance through the process and will be hosting a meet/greet with ePoster developers to answer any questions you may have on the process. Graphics has created an ePoster template which is available for your use on RIC Central at <http://drupal.nrc.gov/ric>. (deadline for providing names of ePoster developer(s) and presenter(s) to RICMST 12/1/2017)

LOOKING FORWARD

- CAC information and guidance for creating your Digital ePoster, etc.
- Graphics meet and greet information.

We thank you for your participation and we look forward to working with you!

Lorna Kipfer and Bren Warren
RIC Meeting Support Team (RICMST)

RIC PROPOSED DIGITAL PRESENTATION
SUBMISSION FORM☐ Original Submission
☒ Updated Submission

Description: A graphical presentation of research results, the status of standards development, the status of safety or security issues, or other topics of major interest to the agency, interested parties and/or the public.

Standard Setup: Standard setup consists of one 46" monitor (screen size 40" width x 22.5" height) mounted on a floor stand; one USB media player; one remote control; one small table and one chair.

- **Digital Presentation (Single-slide):** Format is a one-slide PowerPoint. Word limit is 400-500. Limit of 5-6 large photos, images, or diagrams.
- **Digital Presentation (Multi-slide):** Format is a multi-slide PowerPoint. Word limit is 400-500 per slide. Limit of 5-6 large photos, images, or diagrams per slide.

Submitting Office(s): Enter office acronym, if a joint session, enter lead office followed by supporting office.

RES

Title: Title should be relatively short, yet creative and appealing to the audience.

Evaluation of Additive Manufacturing of Metallic Parts via Direct Metal Laser Melting (DMLM)

Description: Description should be innovative, succinct, and include key elements such as purpose, learning objectives, focus areas, and/or take-away messages.

The NRC has been informed that Additively Manufactured (AM) parts are being considered for applications in the operating fleet as early as calendar year 2018. The first industry alert in June 2017 concerned using the DMLM method to manufacture parts for reactor components. A subsequent scoping study by RES staff provided more insight into the technical issues that must be addressed to assure reliability of specific DMLM-produced components accepted by NRC, including design, precursor materials, finished material properties, structural integrity, nondestructive evaluation, and quality assurance. This poster also discusses the emergence and harmonization of relevant codes & standards activities.

This poster will give an overview of NRC findings and preliminary recommendations related to additive manufacturing via DMLM.

Presenter(s): If known, for each presenter, enter first and last name, position, division title and organization. If possible, list names in the order they will be presenting.

No.	First and Last Name	Position Title	Division Title	Office/Organization (NRC) (Acronyms)	Organization/Agency (Non-NRC)	Add (+) Remove (-)
1	Amy Hull	Senior Materials Engineer	Division of Engineering	RES		<input type="checkbox"/> + <input type="checkbox"/> -
2	Thomas Herrity	Reactor Operations Engineer	Division of Construction Inspection & Operational Programs	NRO		<input type="checkbox"/> + <input type="checkbox"/> -
3	Carol Moyer	Senior Materials Engineer	Division of Engineering	RES		<input type="checkbox"/> + <input type="checkbox"/> -

Topic Submitted By: If the names of the Presenter(s) are not known, enter a point of contact, Name and contact information, for the topic submission.

Please submit the completed form, via e-mail, by the following date:

Due Date:

11/27/2017

From: Hiser, Matthew
Sent: Thu, 1 Dec 2016 22:42:56 +0000
To: Hiser, Allen
Subject: FW: strawman harvesting workshop agenda
Attachments: Workshop Agenda 12-1-16.docx, NRC Harvesting Workshop Announcement.docx

Note to requester: The attachments are immediately following.

(b)(6)

This is the email Rob sent to DOE/EPRI just today with the "strawman" agenda for discussion. Our thought is to get input/engagement from DOE and EPRI on the agenda/topics. As part of that discussion, we'd try to identify the international presenters. If you have ideas of individuals / organizations that might be good for certain sessions, please share because we are very open to ideas.

For session 1, the thought is to more lay the groundwork of what the prior harvesting experience has been, both a description of what was harvested as well as some reflection on technical benefits and challenges in the past programs. The thought is for Session 5 (retitled, but similar focus as before to my mind) to focus on the discussion of future harvesting programs (hopefully building off the prior 4 sessions, including the lessons learned in session 1.)

I discussed the agenda yesterday with Rob, including your suggestion of one presentation summarizing past harvesting activities. We decided to keep it as-is for now with separate talks by NRC, DOE, and EPRI, but will raise a single summary presentation as an option when discussing with DOE and EPRI.

Thanks!
Matt

From: Tregoning, Robert
Sent: Thursday, December 01, 2016 3:26 PM
To: Bernhoft, Sherry [sbernhoft@epri.com] (sbernhoft@epri.com) <sbernhoft@epri.com>; richard.reister@nuclear.energy.gov
Cc: lyengar, Raj <Raj.lyengar@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: strawman harvesting workshop agenda

Sherry/Rich:

As promised, we've put together an announcement and a draft agenda for the harvesting workshop on March 7th and 8th. I'd like you both to take a look at the agenda prior to our call next week so that we can discuss the draft agenda during the call. Our proposal is that we agree on the topics and organizations for the talks and then explicitly solicit presenters from those organizations. We'd like to finalize the agenda prior to the holidays if possible so that we can start contacting presenters. Please let me know if you have any questions prior to our call next week.

As always, thanks for your help with this.

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

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 8:10 – 8:45
 - Perspective on Harvesting Lessons Learned / Prior Experience
- DOE 8:45 – 9:20
 - Perspective on Harvesting Lessons Learned / Prior Experience
- NRC 9:20 – 9:50
 - Perspective on Harvesting Lessons Learned / Prior Experience

BREAK 9:50 – 10:05

- International (Japan?) 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
- DOE/industry 12:55 – 1:20
 - Perspective on harvesting data needs
- International 1:20 – 1:45
 - Perspective on harvesting data needs
- International 1:45 – 2:10
 - Perspective on harvesting data needs

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
- International (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 – (DOE/EPRI – joint?) 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: Future Harvesting Program Planning

- PNNL / NRC 12:45 – 1:15
 - Technical information needed for informed harvesting decisions
- EPRI/NEI 1:15 – 1:45
 - Perspective on future harvesting efforts
- NRC 1:45 – 2:15
 - Perspective on future harvesting efforts
- International (France?) 2:15 – 2:45
 - Perspective on future harvesting efforts
- DISCUSSION 2:45 – 4:00
 - Potential harvesting partnerships
 - RPV, internals, piping, concrete, cables
 - US, international opportunities

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

Note to requester: Attachments are immediately following.

From: Tregoning, Robert
Sent: Mon, 8 Jan 2018 13:08:29 +0000
To: Frankl, Istvan; Moyer, Carol
Subject: FW: ACTION: input to bilateral meeting planning sheets for RIC
Attachments: International Priorities - Canada.docx, International Priorities - South Korea.docx, International Priorities - Germany.docx, International Priorities - France.docx, International Priorities - Japan.docx

Steve/Carol:

Should we add a general topic on material's degradation to cover both OpE and long-term operation issues on all of these (except for Germany)?

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: Oberson, Greg
Sent: Thursday, January 04, 2018 3:31 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>; Boyce (RES), Tom <Tom.Boyce@nrc.gov>; Seber, Dogan <Dogan.Seber@nrc.gov>; Jenkins, Ronaldo <Ronaldo.Jenkins@nrc.gov>; Miller, Kenneth A <KennethA.Miller@nrc.gov>; Ake, Jon <Jon.Ake@nrc.gov>; Birla, Sushil <Sushil.Birla@nrc.gov>; Pires, Jose <Jose.Pires@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Homiack, Matthew <Matthew.Homiack@nrc.gov>; Gardocki, Stanley <Stanley.Gardocki@nrc.gov>
Cc: Regan, Christopher <Christopher.Regan@nrc.gov>
Subject: ACTION: input to bilateral meeting planning sheets for RIC

BCs & SLs:

RES is preparing for bilateral meetings with Canada, France, Japan, Germany, and South Korea at RIC. IPT has requested that for each country, that we provide a listing of requests for assistance or engagement to help support our research programs. These are not intended to document ongoing collaborations, but rather new requests. I've started lists using info previously submitted under the "international prioritization" activity. Please add/delete/edit. The status line should indicate if you have had any previously discussions or interactions on the topic. If you have had none, you should indicate as such. You can mark up these sheets and email back to me. I will consolidate the list. Please aim to provide by Jan. 16. Please let me know if you have any questions.

Greg

International Priorities
Canada

Priorities:

1. Request for participation in Observatory of Durability of the Reinforced Concrete (ODOBA) project
 - Overview – Project involves experiments on large concrete blocks to investigate several types of concrete that have been used to build reactor containments. Blocks will be subjected to accelerated aging processes to simulate operating periods from 60 to 80 years.
 - Regulatory Need – Tests will complement ongoing NRC research on alkali-silica reaction and creep and are needed to address technical knowledge gaps in preparation for review of applications for reactor subsequent license renewal
 - Status –
2. Request for technical exchange on safety certification of digital devices and systems (Software Safety Consortium – McMaster University)
 - Overview – McMaster University is knowledgeable about third-party certification of digital systems, including experiences from medical devices, automotive, and aerospace applications
 - Regulatory Need – The technical exchange would support staff progress in addressing aspects of the DI&C integrated action plan.
 - Status –
3. Request for participation in international probabilistic fracture mechanics working group (CNSC)
 - Overview – Exchange information and share best practices on the use of probabilistic fracture mechanics for component integrity analyses.
 - Regulatory Need – Engagement will increase NRC confidence in the use of probabilistic fracture mechanics computer codes for regulatory applications
 - Status –

International Priorities
South Korea

Priorities:

1. Request for materials harvesting from decommissioned reactors (KAERI, KINS, KHNP)
 - Overview – Components or materials may be harvested from decommissioning reactors, with particular interest in reactor pressure vessel (RPV) steel, reactor internals, concrete, and cables.
 - Regulatory Need – Harvested materials may be tested to assess the effects of in-plant conditions on component integrity, with focus on aging-related degradation relevant to subsequent license renewal
 - Status – Kori 1, a Westinghouse PWR shut down in 2017, has been identified by KHNP as a potential source of harvested materials.
2. Request for embrittlement and mechanical property data for RPV steels (KAREI, KINS)
 - Overview – Acquire data reflecting the mechanical properties of, and embrittlement effects upon, RPV steels.
 - Regulatory Need – Data can assist with the verification and validation of models used to predict the embrittlement of RPV steels
 - Status –

International Priorities

Germany

Priorities:

1. Request for materials property data from AVR prototype pebble bed reactor (GRS)
 - Overview – AVR was a prototype pebble bed reactor that operated between the 1960s and 1980s. It is currently undergoing decommissioning.
 - Regulatory Need – Materials property data will be used for component integrity analyses to further staff's readiness for advanced reactor safety evaluations.
 - Status –

International Priorities
IRSN

Priorities:

1. Request for engagement on digital instrumentation and controls (DI&C)
 - Overview – A technical exchange would allow NRC staff to benefit from IRSN's significant experience with digital systems in nuclear power plants. IRSN is also active within IEC and IAEA.
 - Regulatory Need – The technical exchange would support staff progress in addressing aspects of the DI&C integrated action plan.
 - Status –
2. Request for materials harvesting from decommissioned reactors
 - Overview – Components or materials may be harvested from decommissioning reactors, with particular interest in reactor pressure vessel (RPV) steel, reactor internals, concrete, and cables.
 - Regulatory Need – Harvested materials may be tested to assess the effects of in-plant conditions on component integrity, with focus on aging-related degradation relevant to subsequent license renewal
 - Status –
3. Request for embrittlement and mechanical property data for RPV steels
 - Overview – Acquire data reflecting the mechanical properties of, and embrittlement effects upon, RPV steels.
 - Regulatory Need – Data can assist with the verification and validation of models used to predict the embrittlement of RPV steels
 - Status –
4. Request for cooperative research on non-destructive examination and in-service inspection of reactor components.
 - Overview – Cooperative research may involve assessing the ability of simulation tools such as CIVA and UltraVision to model inspections conducted in NPPs.
 - Regulatory Need – The findings from this research will be used to evaluate licensees' alternatives to ASME Code requirements, new plant submittals, proposed changes to the ASME Code, and ASME Code Cases for NRC endorsement.
 - Status –
5. Request for materials property data from Phenix and Superphenix reactors
 - Overview – Phenix and Superphenix were fast breeder reactors in France. Phenix was a small-scale test reactor and Superphenix was a full-scale power reactor. Superphenix was shut down in the 1990s.
 - Regulatory Need – Materials property data will be used for component integrity analyses to further staff's readiness for advanced reactor safety evaluations.
 - Status –

International Priorities
JAPAN

Priorities:

1. Request for irradiated concrete data (JNRA)
 - Overview – JNRA has completed high value accelerated irradiation and testing in Halden for characterization of some aspects of degradation of concrete due to radiation. This is the most significant research results on radiation related concrete degradation under LWR environment.
 - Regulatory Need – Access to these data would support the staff's development of aging management guidance for concrete during the subsequent license renewal operating period
 - Status – RES/DE staff visited JNRA in December 2017 to discuss these data
2. Request for technical exchange on state-of-the-art seismic 3D modeling methods (Tepco, NRRRC)
 - Overview – The Japanese seismic evaluation methods are highly developed and unique. A technical exchange would help to ensure US readiness to assess seismic risk for certain sites
 - Regulatory Need – This technical exchange would help address NTTF recommendations and support staff efforts associated with regional seismic source and ground motion models for the Central and Eastern United States.
 - Status –
3. Request for materials harvesting from decommissioned reactors (JNRA, JAEA, CRIEPI)
 - Overview – Components or materials may be harvested from decommissioning reactors, with particular interest in reactor pressure vessel (RPV) steel, reactor internals, concrete, and cables.
 - Regulatory Need – Harvested materials may be tested to assess the effects of in-plant conditions on component integrity, with focus on aging-related degradation relevant to subsequent license renewal
 - Status – Staff from JNRA, JAEA, and CRIEPI attended the RES-sponsored workshop on materials harvesting at NRC headquarters in March, 2017.
4. Request for embrittlement and mechanical property data for RPV steels (JNRA, CRIEPI)
 - Overview – Acquire data reflecting the mechanical properties of, and embrittlement effects upon, RPV steels.
 - Regulatory Need – Data can assist with the verification and validation of models used to predict the embrittlement of RPV steels
 - Status –
5. Request for participation in international probabilistic fracture mechanics working group (JNRA, JAEA)
 - Overview – Determine feasibility of pursuing a benchmarking project involving xLPR V2 and PASCAL-SP codes and further pursuit of international activities to increase confidence in probabilistic fracture mechanics methodologies and tools
 - Regulatory Need – Engagement will increase NRC confidence in the use of probabilistic fracture mechanics computer codes for regulatory applications
 - Status –
6. Request for materials property data from Monju sodium-cooled fast reactor (JNRA)

- Overview – Monju is a Japanese sodium-cooled fast reactor, located in Tsuruga Nuclear Power Plant, Fukui Prefecture. The reactor has been inoperative for most of the time since it was originally built, and was last operated in 2010. It is planned to be decommissioned.
- Regulatory Need – Materials property data will be used for component integrity analyses to further staff's readiness for advanced reactor safety evaluations.
- Status –

From: Tregoning, Robert
Sent: Fri, 10 Feb 2017 12:27:45 +0000
To: Hiser, Matthew; Purtscher, Patrick
Subject: FW: AW: AW: Interest in Harvesting Workshop

Seems like a better talk for session 1?

Robert Tregoning
Technical Advisor for Materials
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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: Jendrich, Uwe Dr. [mailto:Uwe.Jendrich@grs.de]
Sent: Friday, February 10, 2017 7:14 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Sievers, Jürgen Dr. <Juergen.Sievers@grs.de>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: [External_Sender] AW: AW: Interest in Harvesting Workshop

Rob,

Thank you for the information about the workshop.

I am willing to give a short presentation in session 3: Role of GRS, plants in decommissioning in Germany.

Another contact address of a state-owned company dedicated to dismantling (Greifswald (WWER 440), German research reactors, presumably involved in KWO(PWR at Obrigheim)):

EWN Entsorgungswerk für Nuklearanlagen GmbH

Postfach 1125

17507 Lubmin

Technical Director: Henry Cordes

Telefon 038354 4-5000

henry.cordes@ewn-gmbh.de

Kind regards

Uwe

Von: Tregoning, Robert [mailto:Robert.Tregoning@nrc.gov]
Gesendet: Mittwoch, 8. Februar 2017 19:12
An: Jendrich, Uwe Dr.
Cc: Sievers, Jürgen Dr.; Hiser, Matthew; Purtscher, Patrick
Betreff: RE: AW: Interest in Harvesting Workshop

Uwe:

Thanks for your reply. I'm glad you'll be attending the workshop. I've attached a presentation file that has logistical information, the overall workshop objectives, and objectives for individual sessions. Would you be willing to make a presentation in 1 or more of these sessions? In general the presentations should be short (e.g., a few slides at most for sessions 1 and 5; and at most 20 – 30 minutes for one of the other sessions) and the plan is to have everything be informal so that the preparation time is not too great and we leave plenty of time for discussion. Please let me know if you would be amenable to this and if you have any questions about the workshop.

Also, thank you for the contact information at VGB Powertech. We will certainly contact Dr. Mohrbach. Let me know if you have any luck finding any other contacts. We've currently trying to reach someone at EBNW.

Warm regards,

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: Jendrich, Uwe Dr. [<mailto:Uwe.Jendrich@grs.de>]
Sent: Wednesday, February 08, 2017 12:02 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Sievers, Jürgen Dr. <Juergen.Sievers@grs.de>
Subject: [External_Sender] AW: Interest in Harvesting Workshop

Dear Rob,

(b)(6)

Please apologize my late reply due to two weeks of

As answers to your questions:

1. I am planning to participate in the workshop. I just need the traveling permits etc.
2. I try to contact a couple of people to find out persons responsible for decommissioning. These will certainly be different for the plants from different operators. You may also try Mr. Mohrbach at the headquarter of the Association of all power plant operators (VGB Powertech, Dr. Ludger Mohrbach, Tel: +49 201 8128 221, E-Mail: ludger.mohrbach@vgb.org.)

Kind regards

Uwe

Dr. Uwe Jendrich
Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) gGmbH
Abteilung Anlagenkonzepte / Plant Concepts Department
Bereich Reaktorsicherheitsanalysen / Reactor Safety Analyses Division
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Vorsitzende des Aufsichtsrates: Parl. Staatssekretärin Rita Schwarzelühr-Sutter
Geschäftsführer: Uwe Stoll, Hans J. Steinhauer
Registergericht: Amtsgericht Köln, HRB 7665
Sitz der Gesellschaft: Köln
Disclaimer: www.grs.de/content/email-disclaimer

Von: Tregoning, Robert [<mailto:Robert.Tregoning@nrc.gov>]
Gesendet: Montag, 30. Januar 2017 13:31
An: Jendrich, Uwe Dr.
Cc: Sievers, Jürgen Dr.
Betreff: RE: Interest in Harvesting Workshop

Dr. Jendrich:

I just want to follow up on the information that I sent you on the Harvesting Workshop that will be held on March 7 – 8, 2017 at the U.S. NRC Headquarters in Rockville, MD USA. I have two questions that I'm hoping you can help me with.

1. Will you or a colleague from GRS attend and hopefully participate in the workshop?
2. We would like to invite a participant from a German decommissioning company. We currently have participants representing U.S. decommissioning companies but the German situation is both unique and different compared to the U.S. Is there someone in one of these companies that you can put me in touch with? I'm aware of a few companies but I would prefer not to just randomly contact them.

Thank you so much for your consideration and support of the workshop.

All the best,

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: Tuesday, January 17, 2017 4:56 PM
To: Jendrich, Uwe Dr. <Uwe.Jendrich@grs.de>
Cc: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: Interest in Harvesting Workshop

Dear Dr. Jendrich:

Thank you so much for your email and your interest in getting more information about the harvesting workshop. I've attached a workshop announcement as well as a condensed workshop agenda for your information. You can see that we are planning five unique sessions as part of the workshop. Each session has a specific theme, or objective, as outlined below (and in the attached agenda).

1. Session 1 will consist of short presentations and a panel discussion on the motivation for harvesting.
2. Session 2 will discuss data needs best met through harvesting.
3. Session 3 will discuss sources of materials for harvesting programs
4. Session 4 will discuss lessons-learned from past harvesting programs and practical aspects associated with harvesting.
5. Session 5 will attempt to summarize the workshop and planning a harvesting program, as well as discuss actions and next steps

Please let me know if you have any questions or would like any additional information after reviewing the attachments. Thank you again for your interest.

Regards,

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: Jendrich, Uwe Dr. [<mailto:Uwe.Jendrich@grs.de>]
Sent: Monday, January 16, 2017 3:38 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: [External_Sender] Interest in Harvesting Workshop

Dear Mr. Tregoning,

I am interested in the topic of the Harvesting Workshop.
Can you please provide me with more detailed information.
Thank you.

With kind regards

Uwe Jendrich

Dr. Uwe Jendrich
Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) gGmbH
Abteilung Anlagenkonzepte / Plant Concepts Department
Bereich Reaktorsicherheitsanalysen / Reactor Safety Analyses Division
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Vorsitzende des Aufsichtsrates: Parl. Staatssekretärin Rita Schwarzelühr-Sutter
Geschäftsführer: Uwe Stoll, Hans J. Steinhauer
Registergericht: Amtsgericht Köln, HRB 7665
Sitz der Gesellschaft: Köln
Disclaimer: www.grs.de/content/email-disclaimer

From: Hiser, Matthew
Sent: Fri, 21 Oct 2016 17:26:20 +0000
To: Tregoning, Robert; Iyengar, Raj
Subject: FW: RE: [External] FW: Harvesting Workshop Announcement

It looks like there's an ACRS full committee meeting on SLR GALL planned for Thursday, March 9 before RIC. <http://www.nrc.gov/reactors/operating/licensing/renewal/subsequent-license-renewal.html#milestones>

That's tough if we want to have a 2-day workshop...

From: Bernhoft, Sherry [mailto:sbernhof@epri.com]
Sent: Friday, October 21, 2016 1:04 PM
To: Reister, Richard <Richard.Reister@nuclear.energy.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Dyle, Robin <rdyle@epri.com>
Cc: Iyengar, Raj <Raj.Iyengar@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; 'Rosseel, Thomas M.' <rosseeltm@ornl.gov>
Subject: [External_Sender] RE: [External] FW: Harvesting Workshop Announcement

One thought – if most of the attendees for the harvesting meeting are not planning to attend the RIC consider having the meeting the week before since it is already impossible to get hotel rooms in the area for that week.

Sherry Bernhoft
Electric Power Research Institute
EPRI, Senior Program Manager
1300 West WT Harris Boulevard | Charlotte, NC 28262
704.595.2740 (office)
(b)(6) [REDACTED] (cell)
Email: sbernhof@epri.com
www.epri.com

Together...Shaping the Future of Electricity

From: Reister, Richard [mailto:Richard.Reister@nuclear.energy.gov]
Sent: Friday, October 21, 2016 11:57 AM
To: Bernhoft, Sherry <sbernhof@epri.com>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Dyle, Robin <rdyle@epri.com>
Cc: Iyengar, Raj <Raj.Iyengar@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; 'Rosseel, Thomas M.' <rosseeltm@ornl.gov>
Subject: RE: [External] FW: Harvesting Workshop Announcement

We can probably support any of the dates suggested and agree with Sherry about trying to limit travel by combining meeting dates/locations. I'm including Tom Rosseel on these emails who is coordinating LWRS lab participation.

Rich

From: Bernhoft, Sherry [<mailto:sbernhoft@epri.com>]
Sent: Friday, October 21, 2016 12:49 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Reister, Richard <Richard.Reister@nuclear.energy.gov>; Dyle, Robin <rdyle@epri.com>
Cc: Iyengar, Raj <Raj.Iyengar@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: [External] FW: Harvesting Workshop Announcement

I would prefer this around another meeting to limit travel – either the RIC as you have suggested, or the ACRS meeting on the SLR GALL that will be the week before the RIC.

Sherry Bernhoft
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EPRI, Senior Program Manager
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704.595.2740 (office)

(b)(6)  (cell)
Email: sbernhoft@epri.com
www.epri.com

Together...Shaping the Future of Electricity

From: Tregoning, Robert [<mailto:Robert.Tregoning@nrc.gov>]
Sent: Friday, October 21, 2016 8:16 AM
To: Bernhoft, Sherry <sbernhoft@epri.com>; Rich Reister (Richard.Reister@nuclear.energy.gov) <Richard.Reister@nuclear.energy.gov>; Dyle, Robin <rdyle@epri.com>
Cc: Iyengar, Raj <Raj.Iyengar@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: [External] FW: Harvesting Workshop Announcement

Robin/Sherry/Rich:

Attached is a draft announcement for the materials harvesting workshop that we're planning around the time of the RIC. Before setting final dates, we wanted to get some feedback from you whether the Thursday-Friday of RIC week (March 16 – 17) or the following Monday – Tuesday (March 20 – 21) are preferable from your current schedule.

We're leaning toward the Thursday – Friday of RIC week just to capture some international folks who may be coming anyway for the RIC but recognize that a workshop ending on Friday can also have its drawbacks. We're anticipating two full days for this. Please provide any feedback on dates by COB next Friday (10/28) so that we can finalize the announcement and start to publicize the workshop.

We'd also like to work with you both in identifying discussion/session topics and speakers/organizations.

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: Hiser, Matthew
Sent: Friday, October 21, 2016 9:05 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Iyengar, Raj <Raj.Iyengar@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

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From: Tregoning, Robert
Sent: Fri, 10 Feb 2017 11:46:54 +0000
To: Hiser, Matthew; Purtscher, Patrick
Subject: FW: RE: RE: Harvesting Workshop

Matt/Pat:

We need to determine if we have room for these two talks. I'm probably less interested in the talk in Session 2 unless it's like a 5 to 10 minute talk at most. We don't need a talk here.

Rob

Robert Tregoning
Technical Advisor for Materials
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ph: 301-415-2324
fax: 301-415-6671

From: Alpan, F. Arzu [mailto:alpanfa@westinghouse.com]
Sent: Thursday, February 09, 2017 6:40 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Semmler, Michael G. <semmleng@westinghouse.com>; Hiser, Matthew <Matthew.Hiser@nrc.gov>;
Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: [External_Sender] RE: RE: Harvesting Workshop

Dear Rob,

Thank you for giving me the opportunity to present. I would like to propose to give two talks:

- (1) Under Session 2, titled "Importance of Harvesting to Evaluate Radiation Effects on Concrete Properties"
- (2) Under Session 3, titled "Potential Harvesting of Concrete from Mihama Unit 1"

Please note that the talk in Session 2 will be focused on irradiation effects on the compressive strength of concrete. I am not sure if there would be a similar talk in Session 2 that would make mine redundant.

Please let me know the deadline for submitting presentations.
Best regards,
Arzu

From: Tregoning, Robert [mailto:Robert.Tregoning@nrc.gov]
Sent: Tuesday, February 07, 2017 7:05 AM
To: Alpan, F. Arzu

Cc: Semmler, Michael G.; Hiser, Matthew; Purtscher, Patrick
Subject: RE: RE: Harvesting Workshop

Arzu:

Thank you for your email and your interest in the workshop. I've attached a presentation that has logistical information as well as more information on the overall workshop objectives and the format and objectives of each session.

You can see that we are planning five unique sessions as part of the workshop. Each session has a specific theme, or objective, as outlined below (and in more detail in the attachment).

1. Session 1 will consist of short presentations and a panel discussion on the motivation for harvesting.
2. Session 2 will discuss data needs best met through harvesting.
3. Session 3 will discuss sources of materials for harvesting programs
4. Session 4 will discuss lessons-learned from past harvesting programs and practical aspects associated with harvesting.
5. Session 5 will attempt to summarize the workshop and planning a harvesting program, as well as discuss actions and next steps

I think the talk you proposed might fit best in either sessions 2 or 3. Session 2 is focusing on data needs best met through harvesting. Session 3 is focusing on potential sources of materials or components. You can see that the focus is on relatively short talks to allow plenty of time for discussion. You could even split your talk to cover why you want to get irradiated concrete in session 2 and then address the attributes of Mihama in Session 3.

Given these options, can you provide me with your preference of one talk or two and provide title(s) so that we can add you to the agenda.

Regards,

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: Alpan, F. Arzu [<mailto:alpanfa@westinghouse.com>]
Sent: Monday, February 06, 2017 4:48 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Semmler, Michael G. <semmleng@westinghouse.com>; Hiser, Matthew <Matthew.Hiser@nrc.gov>;
Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: [External_Sender] RE: Harvesting Workshop

Dear Rob,

Thank you for the information you provided to me on the harvesting workshop that will be held at the NRC Headquarters next month.

I would like to attend this workshop, and, if possible, give a short talk. Westinghouse is in the preliminary stages of communicating with Kansai in investigating the possibility of harvesting concrete from Mihama Unit 1 to analyze the irradiation effects on concrete. This topic (irradiation effects on concrete) has been an interest to various organizations particularly for long-term operation of nuclear power plants. The talk would be mainly to inform the attendees why we are interested in this work and why we are interested in the Mihama Unit 1 concrete.

Is there an attendance fee for the workshop? I would appreciate it if you could provide me any further information related to the workshop (I have the attached documents) and the possibility for my attendance and a short talk.

Best regards,

Arzu

Arzu Alpan, Ph.D.

Principal Engineer

Nuclear Operations & Radiation Analysis Group

Primary Systems Design and Repair

[Products and Services](#)

Westinghouse Electric Company

1000 Westinghouse Drive

Suite 332

Cranberry Township, PA 16066, U.S.A.

Phone: +1 (412) 374-4735

Fax: +1 (724) 940-8565

Email: alpanfa@westinghouse.com

Home Page: www.westinghousenuclear.com

From: Tregoning, Robert [<mailto:Robert.Tregoning@nrc.gov>]

Sent: Tuesday, January 17, 2017 7:37 AM

To: Alpan, F. Arzu

Cc: Semmler, Michael G.; Hiser, Matthew; Purtscher, Patrick

Subject: RE: Harvesting Workshop

Arzu:

Thank you for contacting me about the workshop. The invitation is not open to the public and we are soliciting/inviting both talks and participants so that the workshop stays relatively small and focused. Having said this, it's fine to send the announcement and agenda to Kansai. Please also be aware that we are already in contact with both JNRA (Kazu Sakamoto) and CRIEPI (Naoki Soneda) to coordinate Japanese participation. It would therefore be good for Kansai to coordinate with them if they are interested in attending or participating in the workshop. Kansai should also contact me as well if they are interested in participating or attending.

Thanks for your interest. Please let me know if you have any other questions about the workshop.

Regards,

Rob

Robert Tregoning
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ph: 301-415-2324
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From: Alpan, F. Arzu [<mailto:alpanfa@westinghouse.com>]
Sent: Friday, January 13, 2017 5:44 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Semmler, Michael G. <semmleng@westinghouse.com>
Subject: [External_Sender] Harvesting Workshop

Dear Robert,

Sherry Bernhoft has informed Westinghouse about the harvesting workshop that will be held at the NRC Headquarters in Rockville, MD on March 7-8, 2017. If this is a workshop that is open to the public, I would like to send the announcement and agenda, which are attached to this email, to our colleagues at Kansai Electric Power Company. I would appreciate it if you could let me know if I may forward the attached information to Kansai.

Best regards,

Arzu

Arzu Alpan, Ph.D.

Principal Engineer
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From: Hiser, Matthew
Sent: Thu, 29 Sep 2016 12:44:58 -0400
To: Purtscher, Patrick
Subject: FW: RE: RE: Thanks!

Hi Pat,

My calendar is up to date for next week and fairly free (maybe 1 or 2 meetings per day).

Thanks!
Matt

From: Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]
Sent: Thursday, September 29, 2016 12:43 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: [External_Sender] RE: RE: Thanks!

Patrick,

Just catching up after travel. Would next week work for you and Matt?

With best regards,

Pradeep Ramuhalli, PhD
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

From: Purtscher, Patrick [mailto:Patrick.Purtscher@nrc.gov]
Sent: Monday, September 19, 2016 10:53 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>
Subject: RE: RE: Thanks!

Good morning,

We had another internal meeting here with NRR to discuss the Harvesting Program. We would like to update you on where we are & discuss your progress on the draft report. We are not available on Thursday the 22nd or Tuesday & Wednesday next week, the 27th & 28th.

Let us know when is a good time.

Pat

From: Hiser, Matthew
Sent: Thursday, September 15, 2016 8:01 AM
To: 'Ramuhalli, Pradeep' <Pradeep.Ramuhalli@pnnl.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: RE: Thanks!

Hi Pradeep,

I just wanted to follow up from our meeting a couple weeks ago and see where you stood with developing another draft of this report.

Thanks!
Matt

From: Ramuhalli, Pradeep [<mailto:Pradeep.Ramuhalli@pnnl.gov>]
Sent: Friday, September 02, 2016 4:11 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: [External_Sender] RE: Thanks!

Matt,

Same here – good to finally meet both of you in person! I also appreciated the chance meeting withouri – it was good to see him back!

With best regards,

Pradeep Ramuhalli, PhD
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov

From: Hiser, Matthew [<mailto:Matthew.Hiser@nrc.gov>]
Sent: Friday, September 02, 2016 12:53 PM
To: Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Thanks!

Thanks Pradeep! Appreciate you making the time in your travel to stop by, also great to finally meet you in-person!

Have a happy Labor Day!
Matt

From: Ramuhalli, Pradeep [<mailto:Pradeep.Ramuhalli@pnnl.gov>]
Sent: Friday, September 02, 2016 3:41 PM

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

Subject: [External_Sender] Thanks!

Matt, Patrick,

Thank you for the time spent on meeting with me Wednesday, and the subsequent info on Zorita. I will work these into the report draft and get it out to you next week for review and further feedback.

With best regards,

Pradeep

Pradeep Ramuhalli, PhD
Senior Research Scientist,
Applied Physics Group
Pacific Northwest National Laboratory
902 Battelle Blvd.
P.O.Box 999, MSIN K5-26
Richland, WA 99352
Tel: 509-375-2763
Email: pradeep.ramuhalli@pnnl.gov
<http://www.pnnl.gov>

Note to requester: This email record was provided to the FOIA staff only containing the 2/26/2018 email header at the end.

From: Tregoning, Robert
Sent: Tue, 27 Feb 2018 15:08:32 +0000
To: Hull, Amy
Cc: Audrain, Margaret; Moyer, Carol; Purtscher, Patrick; Hiser, Matthew; Frankl, Istvan
Subject: FW: RIC -- 20 of 34 segments now have proposed volunteered time for staffing 2 posters

Amy:

See below for the revised table of volunteers. We've got the harvesting poster covered. I can also do the Thursday morning AM slots. It looks like we just need to cover the Wednesday AM sessions at 10:00 and 3:00 pm. I might be able to help out with one or more of these, but I need to dig into my RIC sessions more deeply to determine this. Let me know if you still need coverage for these sessions.

Regards,

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: Audrain, Margaret
Sent: Tuesday, February 27, 2018 10:01 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: RIC -- 20 of 34 segments now have proposed volunteered time for staffing 2 posters

I can cover the other spots on Wednesday, except for the very end of lunch (have to be back in TWF by 1).

From: Purtscher, Patrick
Sent: Tuesday, February 27, 2018 9:55 AM
To: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: RIC -- 20 of 34 segments now have proposed volunteered time for staffing 2 posters

I can cover 5 slots on Tuesday and Thursday.

Pat

Poster staffing - 2018 RIC - March 13-15, 2016

	Tuesday		Wednesday		Thursday	
	Adv. Mfg.	Harvesting	Adv. Mfg.	Harvesting	Adv. Mfg.	Harvesting
7:30 AM	Carol (AM)	Amy (Harv.)	Amy (AM)	Carol (Harvesting)	Rob	Amy (Harv.)
8:00 AM	↓	↓	↓	↓	Rob	↓
8:30 AM						
9:00 AM						
9:30 AM						
10:00 AM	John	Pat		Meg	Amy (AM)	Pat
10:30 AM						
11:00 AM						
11:30 AM						
12:00 PM	Amy (AM)	Pat	Carol (AM)	Meg		
12:30 PM	↓	Pat	↓	Meg	volunteer	Adv. Mfg. 1/2 hr sessions Harvesting 1/2 hr sessions
1:00 PM	John	Pat	↓	Rob	Carol	5 3
1:30 PM					Amy	6 4
2:00 PM					J. Burke	2
2:30 PM					Thom Herrity	
3:00 PM	Amy (AM)	Carol (Harvesting)		Meg	Matt Hiser	
					Meg Audrain	4
3:30 PM					Pat Purtscher	5
4:00 PM					R. Tregoning	2 1

4:30 PM					total	13	17
5:00 PM					total 1/2 hr sessions needed	15	17

From: Burke, John

Sent: Tuesday, February 27, 2018 8:06 AM

To: Hull, Amy <Amy.Hull@nrc.gov>; Herrity, Thomas <Thomas.Herrity@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>

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

Subject: RE: RIC --17 of 34 segments now have proposed volunteered time for staffing 2 posters

I'll do some on Tuesday

John Burke

NRO/DCIP

301 415 2343

From: Hull, Amy

Sent: Tuesday, February 27, 2018 8:04 AM

To: Herrity, Thomas <Thomas.Herrity@nrc.gov>; Burke, John <John.Burke@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>

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

Subject: RIC --17 of 34 segments now have proposed volunteered time for staffing 2 posters

As a starting point, Carol and I have each proposed about 8 ½-hr sessions for ourselves over the 2 posters. Thom and John would you also like to staff the AM poster sometime? Please fill in which/any slots you would like. (You can bounce me if that helps)
See below and saved to G\DE\CMB\RIC. Matt would you like me to send this to the other Harvesting coauthors also or are you handling this?

Amy

From: Moyer, Carol

Sent: Monday, February 26, 2018 4:12 PM

To: Hull, Amy <Amy.Hull@nrc.gov>

Subject: RE: prototype schedule to complete for staffing posters

I entered my proposals & saved to G\DE\CMB\RIC

From: Hull, Amy

Sent: Monday, February 26, 2018 10:21 AM

To: Herrity, Thomas <Thomas.Herrity@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Burke, John <John.Burke@nrc.gov>

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

Subject: prototype schedule to complete for staffing posters

Attached and pasted below (highlighted in blue) are the times when the e-posters are highlighted in the attached agenda. Please let me know if/when you would like to volunteer to stand by the poster and interact with the visitors. I will work around your desired schedules to fill in the blank spaces because I am flexible during this time.

Matt, I have copied you on this because I am a coauthor on your poster and I can help staff that poster also if you would like. I don't know where you are with developing a volunteer schedule.

The RIC CAC to use for this is MF1396.

Amy

From: Hull, Amy

Sent: Monday, February 26, 2018 10:10 AM

To: Hull, Amy <Amy.Hull@nrc.gov>

Subject: prototype schedule to complete for staffing posters

Note to requester: Attachment is immediately following.

From: Hull, Amy
Sent: Thu, 28 May 2015 10:03:27 -0400
To: Frankl, Istvan
Cc: Tregoning, Robert;Hiser, Matthew
Subject: Harvesting Efforts June NRC-Industry materials mtg 5-28-15 mah.abh.pptx
Attachments: Harvesting Efforts June NRC-Industry materials mtg 5-28-15 mah.abh.pptx

We have made changes suggested. I will drop the 390 form off for you now.

Strategic Approach for Obtaining Material and Component Aging Information

Matthew Hiser

Amy Hull

U.S. NRC RES/DE/CMB

Industry/NRC Materials Programs Technical Information Exchange Meeting
Nuclear Regulatory Commission Headquarters
June 2 - 4, 2015

Outline

- Purpose
- Background
- Harvesting Experience
- Approach to Strategic Harvesting
- Engagement with Other Stakeholders

Purpose

- Create a framework for a strategic approach to harvesting ex-plant materials to support regulatory needs associated with 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/LTO activities with harvesting opportunities from decommissioning plants

Background

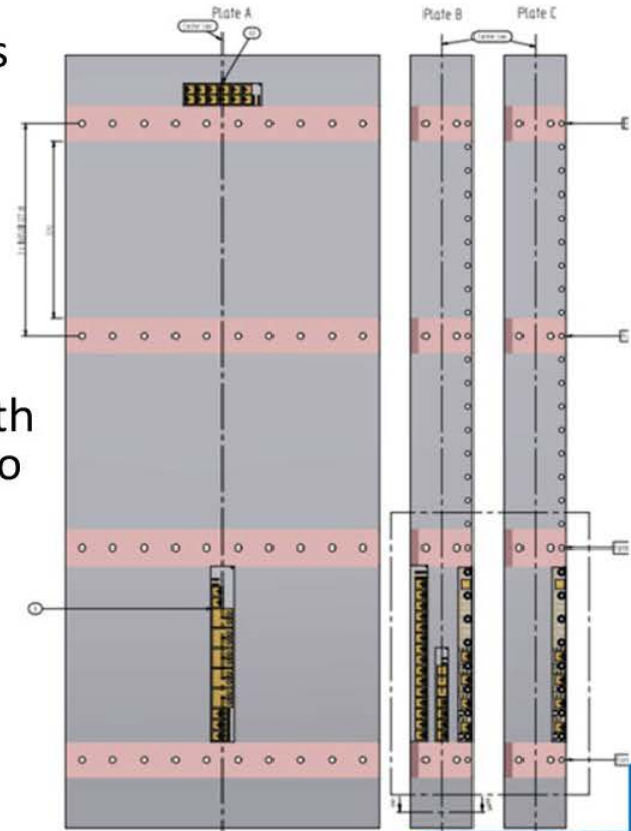
- To date, harvesting opportunities have been limited due to few decommissioning plants
 - Zion in U.S., Zorita in Spain
- However, several U.S. plants have already shut down or are planning to do so in the near future
 - Kewaunee, SONGS, Crystal River, Vermont Yankee, Oyster Creek
- This provides a 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 (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



ZIRP 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										★

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

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

Approach: Integrated Aging Degradation Need/Resource Interrogatory Tool



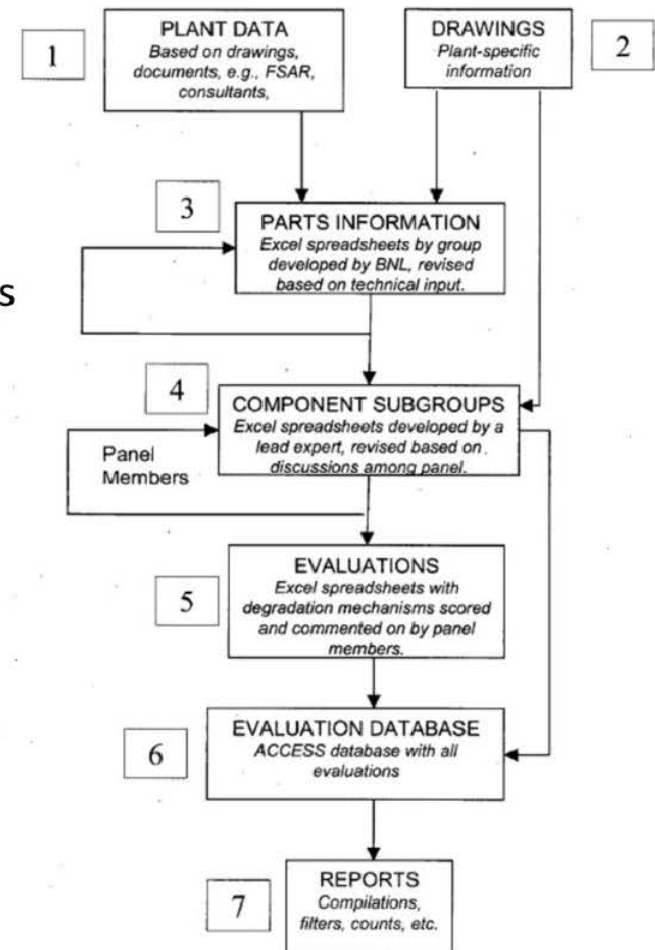
- Utilize various sources of technical information with respect to anticipated degradation in NPPs out to 80 years of operation
 - NRC, DOE, EPRI, IAEA
- Identify high-priority data needs that could be addressed through harvesting ex-plant materials
 - Focus on identifying characteristics of important systems, structures, and components (SSCs) for harvesting
- Evaluate what relevant ex-plant material from decommissioned reactors is projected to be available for potential harvesting given previously identified needs



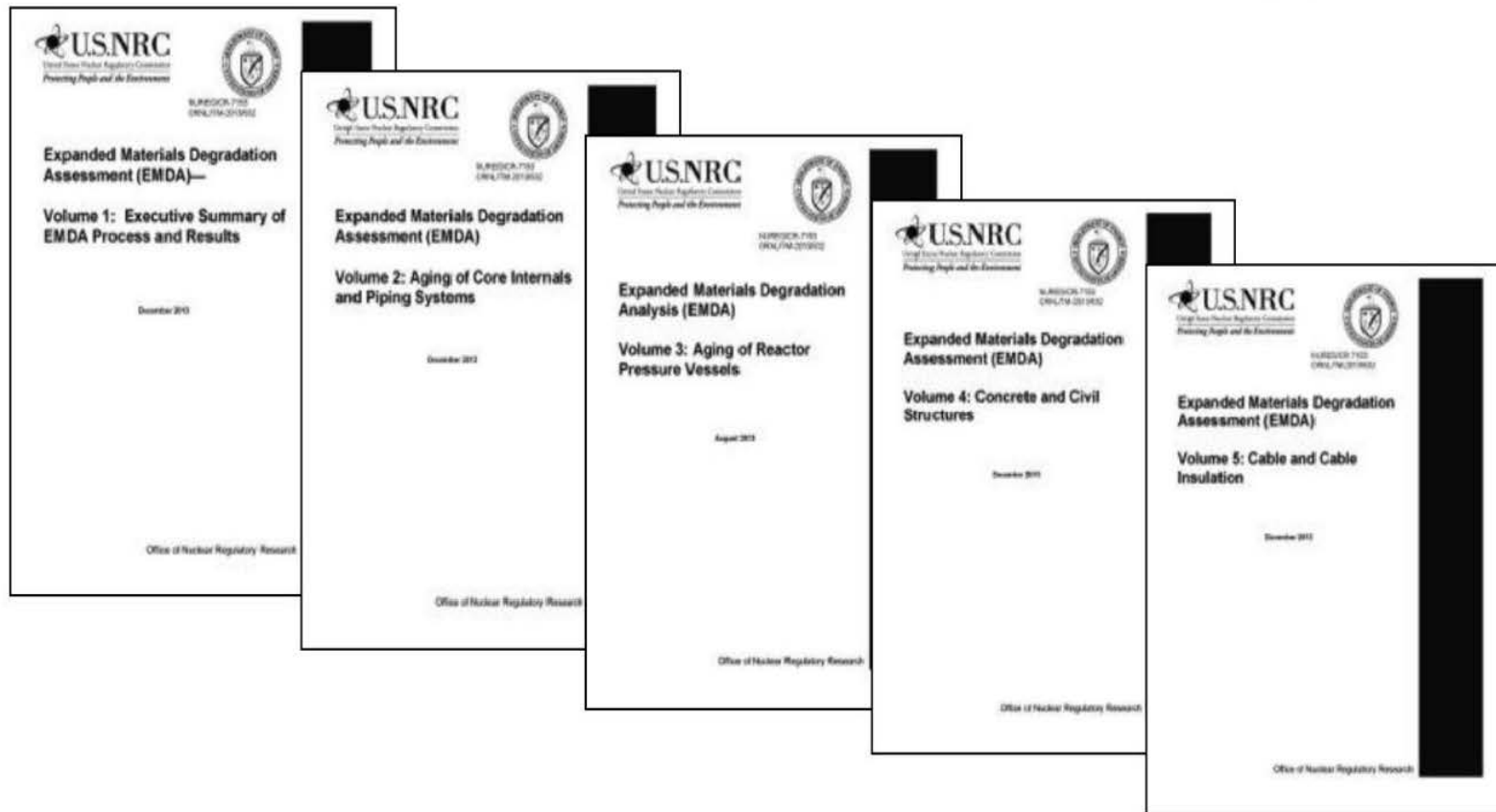
Sources: PMDA & EMDA

How does one try to predict the future?

- Experts were tasked with
 - Listing vulnerable reactor components
 - Reviewing relevant degradation mechanisms
 - Determining the degree to which the components were vulnerable to these mechanisms
 - Determining confidence level in their predictions
- The PMDA panel evaluated 3863 components (2203 for PWRs, 1603 for BWRs) for their susceptibility to 16 degradation mechanisms.
 - Documented in NUREG/CR-6923
- The EMDA panels investigated issues of reactor aging beyond 60 years to identify possible knowledge gaps, and provided an expansion of scope and time
 - Documented in NUREG/CR-7153



EMDA (NUREG/CR-7153)



Source: DOE LWRS Program

(J. Busby, Overview Presentation to NESCC May 12, 2015)

by 2016 – Lead Plant for
SLR Selected

by 2018 – First SLR
License Application
Submitted

by 2020 – First SLR
License Approved by
NRC

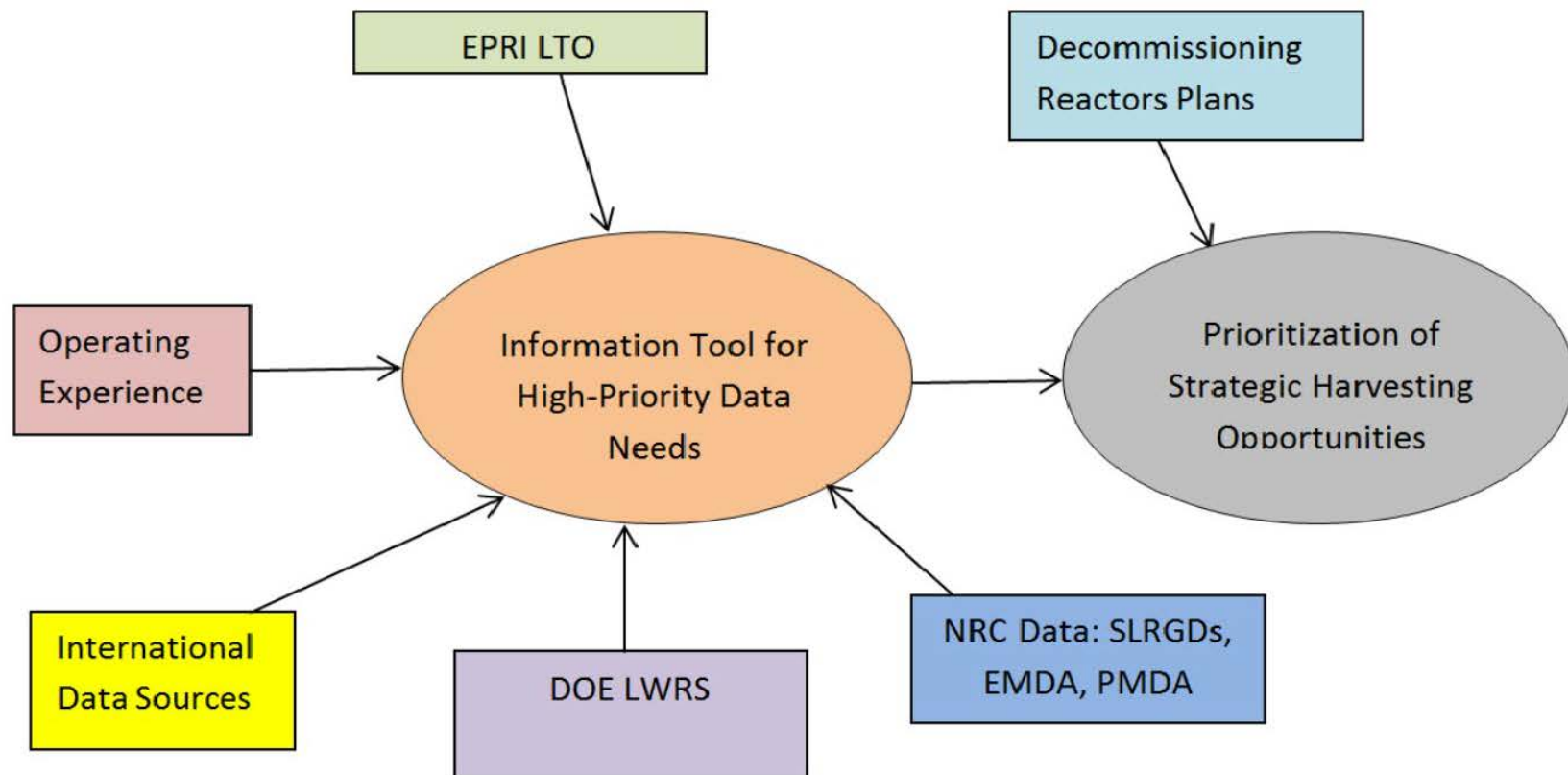
- Complete characterization of demonstration of RPV sections following annealing and reirradiation
- Complete development and testing of new advanced alloy with superior degradation resistance with ARRM partners

- Expanded Materials Degradation Assessment
- Model for transition temperature shifts in RPV steels

- Model for environmentally-assisted fatigue in LWR components
- Model for cable degradation
- Model for cast austenitic

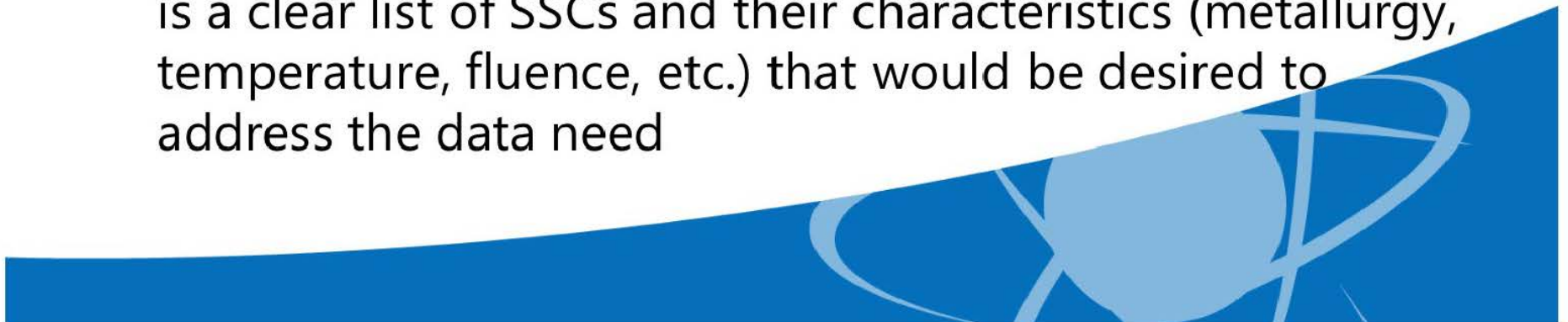
- Predictive capability for end of useful life for cable insulation
- New or improved NDE technologies for concrete and cable

The Vision: Integrated Aging Degradation Need/Resource Interrogatory Tool



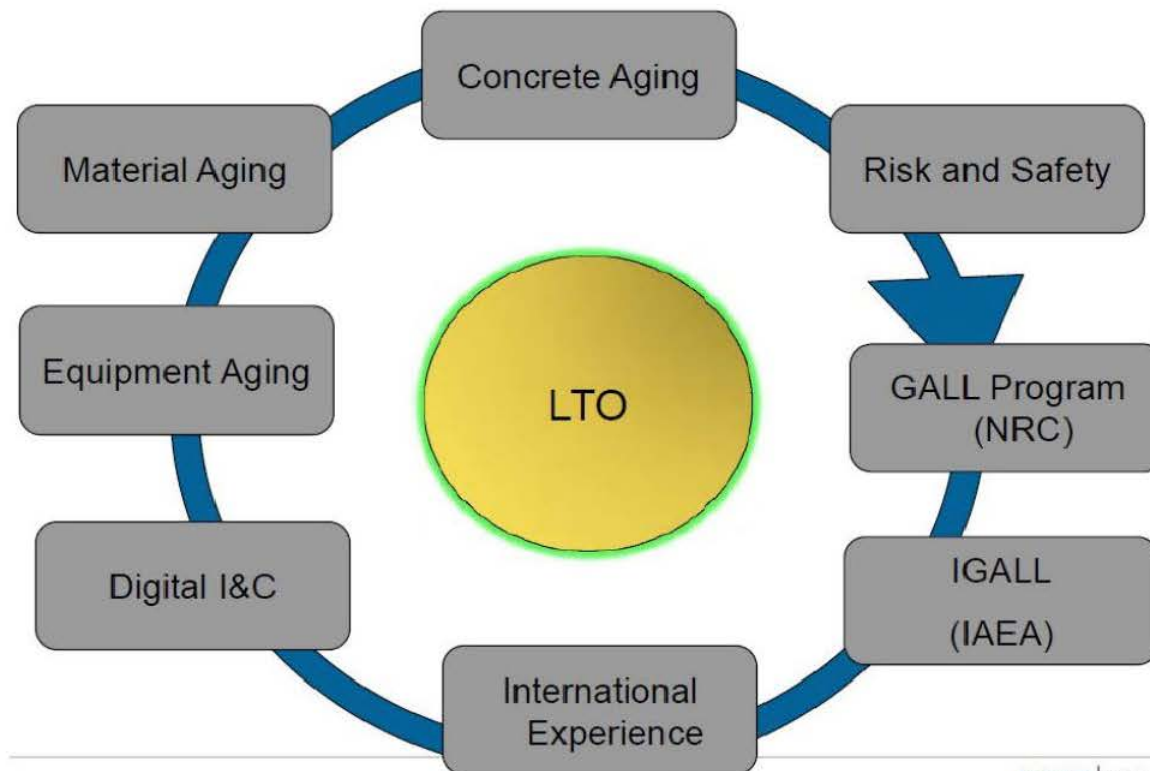
Implementation

- 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



Coordination with EPRI and DOE

- NRC has memorandums of understanding with EPRI LTO and DOE LWRS covering exchange of information related to SLR and welcomes the involvement of other stakeholders.



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Stakeholder Engagement



- IAEA CRP: Evaluation of Structures and Components Material Properties Utilizing Actual Aged Materials Removed from Decommissioned Reactors for Safe LTO.
- Conduct public workshops to further refine the concept of useful database of research objectives for ex-plant materials
- NRC welcomes collaboration under current EPRI/LTO and DOE/LWRS MOUs.



Acknowledgements

- Robert Tregoning, RES/DE
- Eric Focht, RES/DE
- Darrell Murdock, RES/DE
- Mita Sircar, RES/DE

Acronyms

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- CRP – coordinated research project (IAEA)
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- RPV – reactor pressure vessel
- SFP- spent fuel pool
- SLR – subsequent license renewal
- SLRGDs – subsequent license renewal guidance documents
- SRP-LR standard review plan for license renewal

Note to requester: Attachment is immediately following.

From: Hiser, Matthew
Sent: Thu, 28 May 2015 13:21:49 +0000
To: Hull, Amy
Subject: Harvesting Efforts June NRC-Industry materials mtg 5-28-15 mah.pptx
Attachments: Harvesting Efforts June NRC-Industry materials mtg 5-28-15 mah.pptx

Hi Amy,

Here are my changes to the slides based on Steve and Rob's comments. I deleted your first slide, but added one on "Implementation" to address Rob's comment. I also went through your slides and tried to reduce the wordiness to keep it more concise on the slides themselves. You can add the detail verbally.

Thanks!
Matt

Strategic Approach for Obtaining Material and Component Aging Information

Matthew Hiser

Amy Hull

U.S. NRC RES/DE/CMB

Industry/NRC Materials Programs Technical Information Exchange Meeting
Nuclear Regulatory Commission Headquarters
June 2 - 4, 2015

Outline

- Purpose
- Background
- Harvesting Experience
- Approach to Strategic Harvesting
- Engagement with Other Stakeholders

Purpose

- Create a framework for a strategic approach to harvesting ex-plant materials to support regulatory needs associated with 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/LTO activities with harvesting opportunities from decommissioning plants

Background



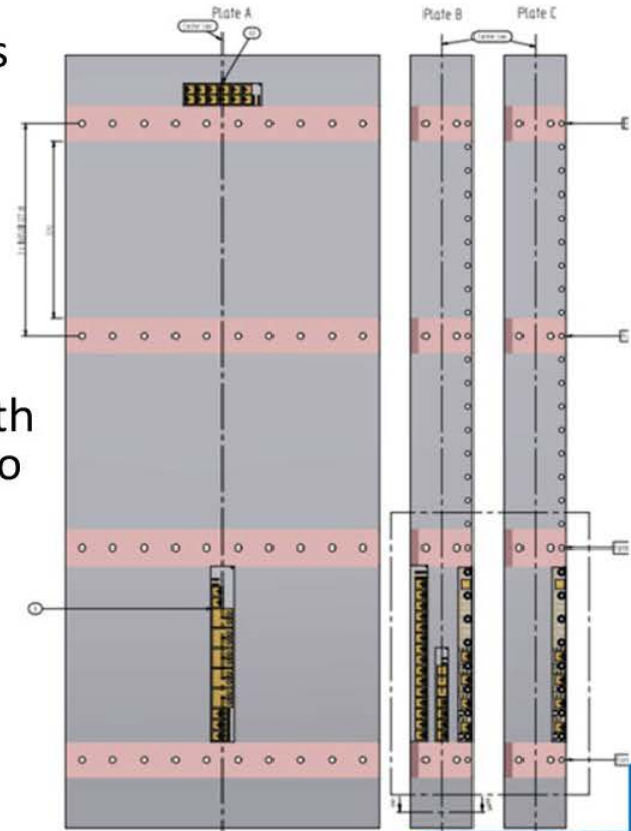
- To date, harvesting opportunities have been limited due to few decommissioning plants
 - Zion in U.S., Zorita in Spain
- However, several U.S. plants have already shut down or are planning to do so in the near future
 - Kewaunee, SONGS, Crystal River, Vermont Yankee, Oyster Creek
- This provides a unique opportunity to plan harvesting to address the highest priority technical 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 (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



ZIRP 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										★

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

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

Approach: Integrated Aging Degradation Need/Resource Interrogatory Tool



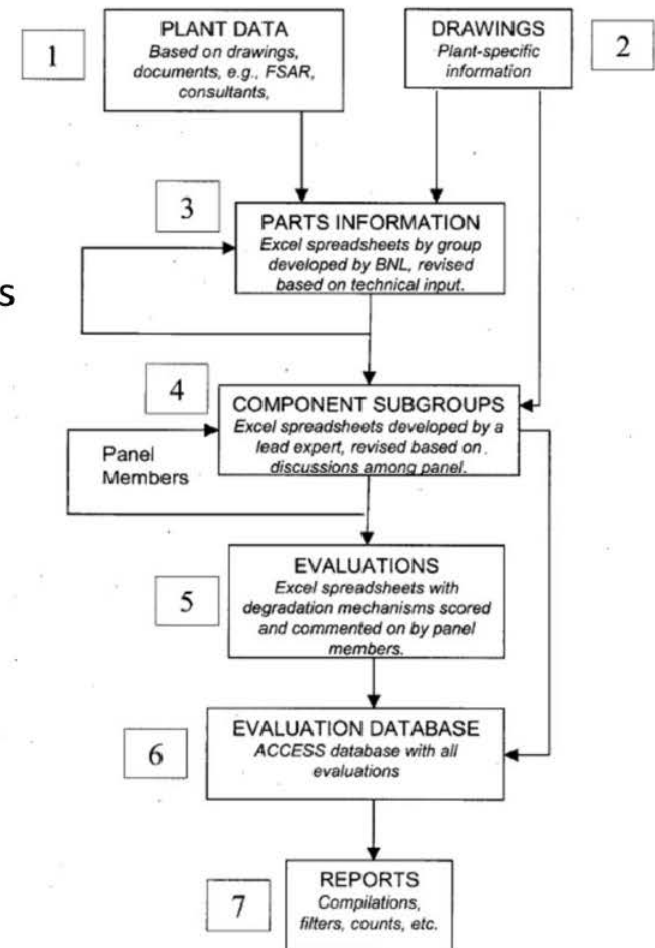
- Utilize various sources of technical information with respect to anticipated degradation in NPPs out to 80 years of operation
 - NRC, DOE, EPRI, IAEA
- Identify high-priority data needs that could be addressed through harvesting ex-plant materials
 - Focus on identifying characteristics of important systems, structures, and components (SSCs) for harvesting
- Evaluate what relevant ex-plant material from decommissioned reactors is projected to be available for potential harvesting given previously identified needs



Sources: PMDA & EMDA

How does one try to predict the future?

- Experts were tasked with
 - Listing vulnerable reactor components
 - Reviewing relevant degradation mechanisms
 - Determining the degree to which the components were vulnerable to these mechanisms
 - Determining confidence level in their predictions
- The PMDA panel evaluated 3863 components (2203 for PWRs, 1603 for BWRs) for their susceptibility to 16 degradation mechanisms.
 - Documented in NUREG/CR-6923
- The EMDA panels investigated issues of reactor aging beyond 60 years to identify possible knowledge gaps, and provided an expansion of scope and time
 - Documented in NUREG/CR-7153



EMDA (NUREG/CR-7153)



Source: DOE LWRS Program

(J. Busby, Overview Presentation to NESCC May 12, 2015)

by 2016 – Lead Plant for
SLR Selected

by 2018 – First SLR
License Application
Submitted

by 2020 – First SLR
License Approved by
NRC

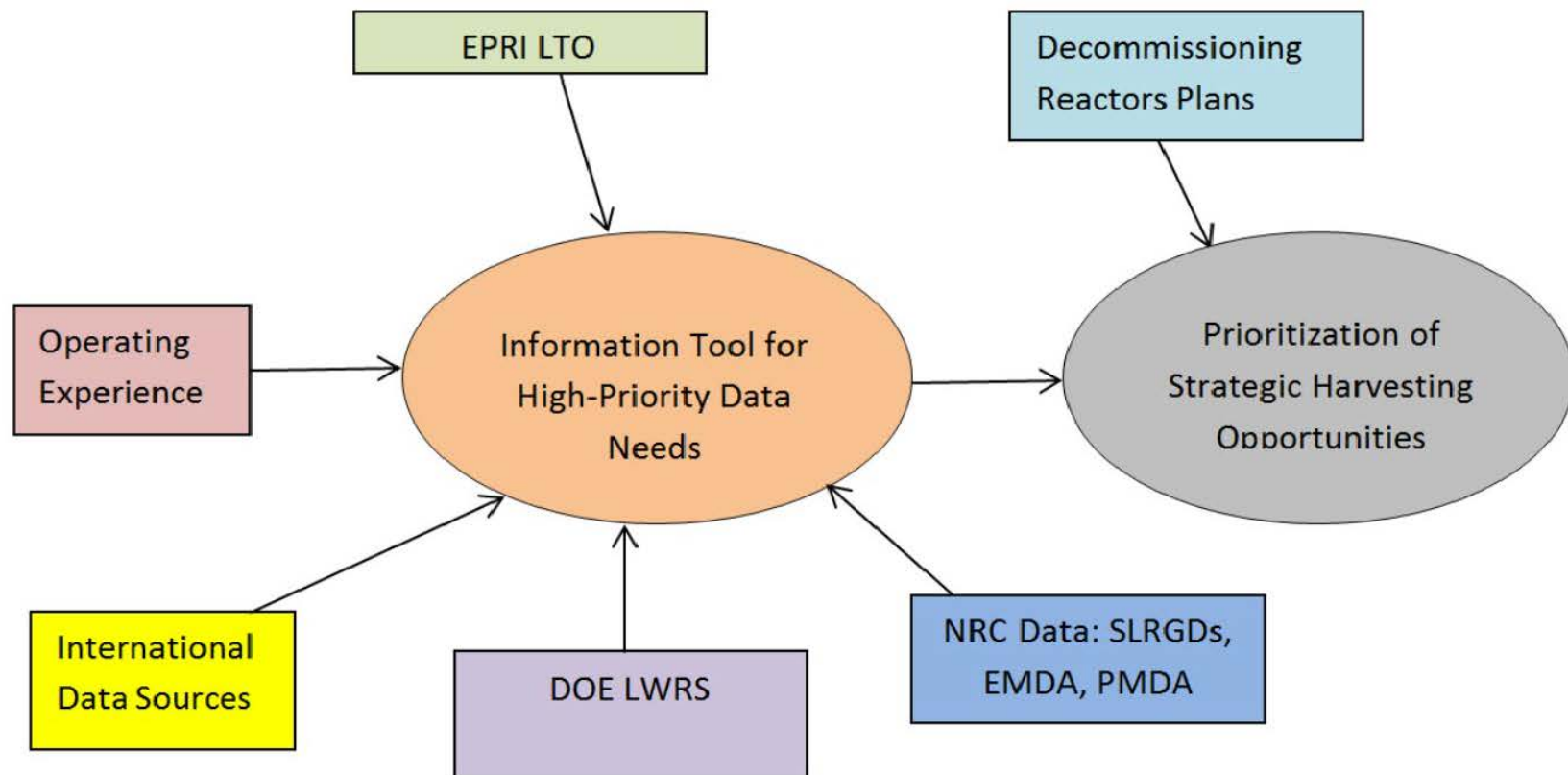
- Complete characterization of demonstration of RPV sections following annealing and reirradiation
- Complete development and testing of new advanced alloy with superior degradation resistance with ARRM partners

- Expanded Materials Degradation Assessment
- Model for transition temperature shifts in RPV steels

- Model for environmentally-assisted fatigue in LWR components
- Model for cable degradation
- Model for cast austenitic

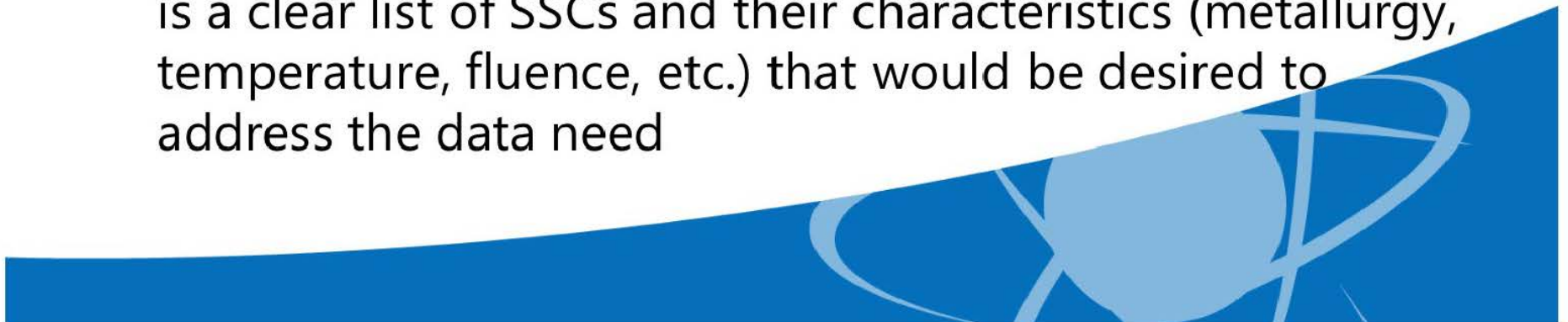
- Predictive capability for end of useful life for cable insulation
- New or improved NDE technologies for concrete and cable

The Vision: Integrated Aging Degradation Need/Resource Interrogatory Tool



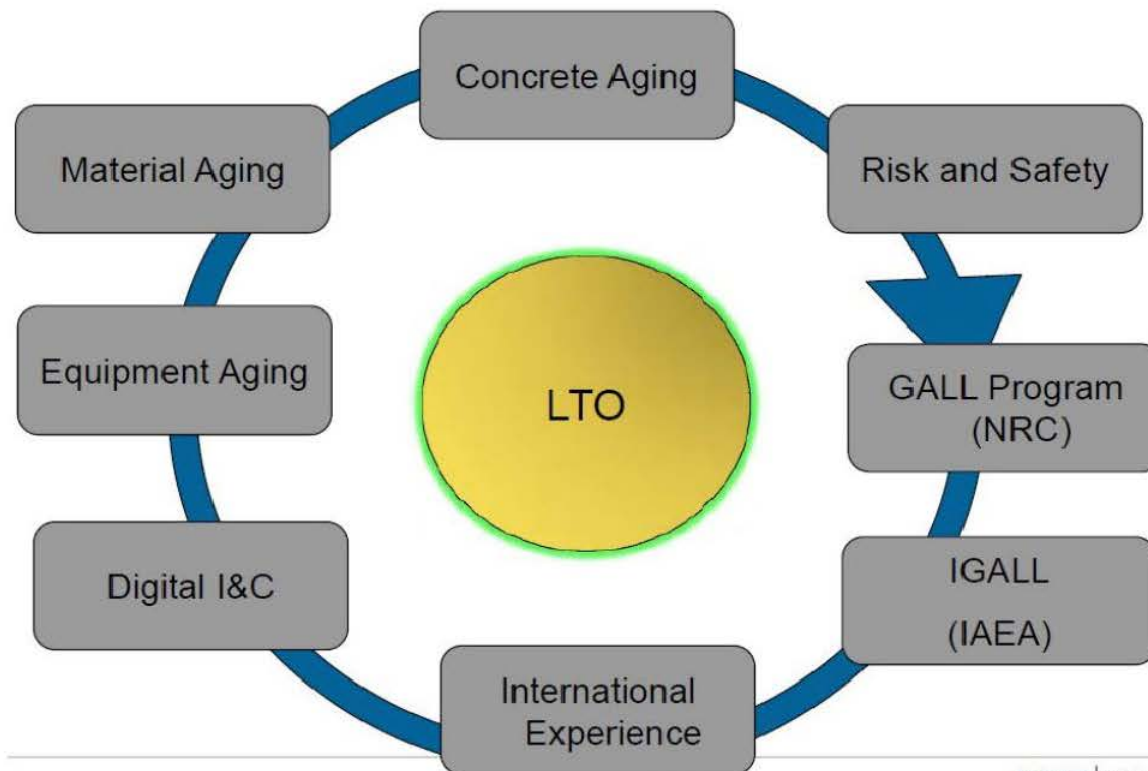
Implementation

- 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



Coordination with EPRI and DOE

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Stakeholder Engagement



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- SLR – subsequent license renewal
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Note to requester: Attachment is immediately following.

From: Tregoning, Robert
Sent: Thu, 8 Feb 2018 16:45:33 +0000
To: Purtscher, Patrick;Audrain, Margaret
Subject: Harvesting Jan 25 Meeting Summary and Path Forward.docx
Attachments: Harvesting Jan 25 Meeting Summary and Path Forward.docx

Pat/Meg:

Here are the minutes from last meeting. Let's use this to frame discussion for today's meeting.

Rob

Harvesting 1/25/2018 Meeting Summary / Path Forward

Harvesting

- Actions
 - ALL – do prioritization before next meeting: first ad hoc, then by using criteria
 - Next, socialize with NRR and NRO technical staff to solicit additional ideas for harvesting and a path to staff consensus on prioritized list
 - Pat - ANL spreadsheet
 - Send requested NRC revisions to ANL
 - Contact PNNL / Pradeep
 - Matt – columns in INL database
 - Identified corresponding columns in INL database to ANL spreadsheet - see column headings shaded green in attached Excel spreadsheet
 - Pat / Meg – follow-up with INL NFML as-needed
 - Pat / Meg – follow-up on RIC poster as needed (per forwarded emails)
- Boneyards
 - ANL – Pat and Meg
 - Visit complete, input complete pending tweaks to spreadsheet
 - PNNL – Pat coordinate with Pradeep
 - Meg and Eric to visit in spring during regular PWSCC meetings
 - Contacts: Pradeep Ramuhalli, Steve Doctor
 - ORNL – Meg
 - Meg to visit in April during ICG-EAC travel
 - Contacts: Mikhail Sokolov and Tom Rosseel
 - Battelle - Matt
 - Matt to visit in June during EWI training in Columbus
 - Contacts: Bruce Young, Paul Scott
- Prioritization table
 - Latest version attached to email. Use in advance of next meeting and determine future use of table/criteria for prioritization
 - Engage staff in NRR/NRO/RES for socialization / feedback
- RIC
 - E-Poster – with division management for approval (emails forwarded to Pat and Meg)
 - Bilaterals – how much to support each country?
- PNNL report
 - With NRR for review

From: Hiser, Matthew
Sent: Fri, 26 Aug 2016 14:30:13 +0000
To: Tregoning, Robert
Subject: Harvesting Material Availability

Hi Rob,

I'll take on the investigation of materials at decommissioning plants per Bob's suggestion yesterday. I'll talk to Steve on Monday.

Thanks!
Matt

Subject: Harvesting Meeting Prep / Alignment
Location: HQ-TWFFN-10A73-8p

Start: Wed 5/16/2018 10:00 AM
End: Wed 5/16/2018 11:00 AM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: RES_DE_CMB Branch Calendar

Required Attendees Purtscher, Patrick; Tregoning, Robert; Audrain, Margaret

Resources: HQ-TWFFN-10A73-8p

Prep / Alignment for meeting with electrical / concrete folks the following day.

Subject: Harvesting Meeting Prep / Alignment
Location: T10D40

Start: Tue 5/15/2018 3:30 PM
End: Tue 5/15/2018 4:30 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Hiser, Matthew

Required Attendees Purtscher, Patrick; Tregoning, Robert; Audrain, Margaret

Prep / Alignment for meeting with electrical / concrete folks the following day.

From: Obodoako, Aloysius
Sent: Tue, 15 Mar 2016 08:53:37 -0400
To: Hiser, Matthew
Subject: Harvesting Meeting Tomorrow Discussion

Let me know when you are in the office and free to talk.

Aloysius Obodoako, P.E.
Materials Engineer
U.S. Nuclear Regulatory Commission
RES/DE/CMB
Office location: TWFN-10B31
Office phone: (301)-415-2889
Email: Aloysius.Obodoako@nrc.gov

From: Tregoning, Robert
Sent: Thu, 5 Apr 2018 12:00:59 +0000
To: Audrain, Margaret; Purtscher, Patrick
Subject: harvesting meeting

Guys:

(b)(6)

I'm going to be [REDACTED] this afternoon and will miss the meeting. I think you should have it and we should continue to press forward with finishing the PNNL report and populating the ex-plant database. We've heard now from ORNL but should start planning to get PNNL contributions and also finalizing the ANL contributions using the extra data fields that we wanted to add. I also got some information from Battelle yesterday which I will forward.

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

Note to requester: Attachment is immediately following.

From: Hiser, Matthew
Sent: Fri, 29 Jan 2016 15:05:29 +0000
To: Frankl, Istvan;Hull, Amy
Subject: Harvesting One Pager
Attachments: Harvesting One Pager.docx

Hi Steve and Amy,

Please find attached the one-pager on the harvesting project to help facilitate transition with Aloysius.

Thanks!
Matt

Strategic Approach to Ex-Plant Harvesting (1/29/2016)

Background

- Understanding the causes and control of degradation mechanisms forms the basis for developing aging management programs (AMPs) to ensure the functionality and safety margins of NPP systems, structures, and components (SSC). The resolution to these issues should provide reasonable assurance of safe operation of the components in the scope of license renewal during the subsequent period of extended operation.
- In many cases, the scientific basis for understanding and predicting long-term environmental degradation behavior of materials in NPPs is incomplete. A strategic approach to examination and testing of materials and components from decommissioned reactors can dramatically increase our knowledge-acquisition rate in this very important area.
- This project to develop a strategic approach to ex-plant harvesting was originally conceived and initiated through the NRC's Long-Term Research Program (LTRP).

Facts

- A task order (NRC-HQ-25-14-D-0001 Task Order Number NRC-HQ-60-15-T-0023) was placed with Pacific Northwest National Lab (PNNL) in September 2015 to support NRC in developing a strategic approach to ex-plant harvesting. Task 1 focuses on a scoping study to pull in information from other sources (EMDA, GALL, ASME code, etc.) to populate an information tool that will allow the prioritization of harvesting opportunities.
- An internal NRC working group consisting of staff from RES and NRR was formed to advise the strategic harvesting effort.
- NRR/DLR staff and management have expressed strong support and interest in this project and intend to develop a user need request to support this effort in the context of SLR.

Status

- Under Task 1 of the task order, PNNL is currently working on developing examples for dissimilar metal welds and cables of what type of information will be captured and how it will be presented.
- The working group has met once in December and has another meeting scheduled for February to review some information put together by PNNL.

Next Steps

- By mid-February, PNNL should provide examples for dissimilar metal welds and cables in the information tool. This will allow NRC (likely through working group) to review what type of information will be captured and how it will be presented.
- NRC staff should work with PNNL to organize a public workshop to discuss the topic of ex-plant harvesting and engage relevant stakeholders, particularly EPRI, industry, and DOE that can help provide information and cooperation in these efforts.
- RES staff should work with NRR staff to develop an updated UNR incorporating this strategic harvesting effort.

From: Moyer, Carol
Sent: Tue, 26 Sep 2017 11:52:18 +0000
To: Frankl, Istvan
Cc: Hull, Amy;Hiser, Matthew
Subject: Harvesting poster abstract
Attachments: Harvesting poster abstract_cem.docx

Note to requester: Attachment is immediately following.

Steve,

The attached abstract is for a RIC poster on harvesting. Please edit it, if necessary.

I am planning to go to the Standards Forum this morning, so if this needs changes, please feel free to make them.

At the Standards Forum, I will mention that we are starting to look at standards for AM, including having participated in an ANSI collaborative program kick-off. I will not specifically "plug" the public meeting that we are planning for this fall, since we do not have full management buy-in on that just yet.

Carol

**TECHNICAL POSTER/TABLETOP PRESENTATION TOPIC
AND DESCRIPTION**

Poster/Tabletop Title:

Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Poster/Tabletop Topic and Description:

In the U.S. nuclear industry today, there are some nuclear power plants (NPPs) that are prematurely ceasing operation, while other plant operators are making plans to extend operating lifespans through subsequent license renewal (SLR) from 60 to 80 years. Extending plant operation raises technical issues that may require further research on aging mechanisms to reduce uncertainties associated with material performance. Decommissioning plants provide opportunities for harvesting components that have been aged in representative light water reactor (LWR) environments.

The NRC has recently undertaken an effort, with the assistance of Pacific Northwest National Laboratory (PNNL), to develop a strategic approach to harvesting aged materials from NPPs. The work will identify criteria to consider when prioritizing the data needs for harvesting. The NRC is interested in engaging with other organizations to prioritize data needs for harvesting, to share information about harvested materials and those that may become available, and to identify areas of common interest. The poster will give an overview of NRC findings and recommendations related to harvesting of components and material specimens from operating nuclear power plants and those undergoing decommissioning.

Poster/Tabletop Presenter:

- Matthew Hiser, Materials Engineer, RES/DE/CMB, phone: 301-415-2454, email: Matthew.Hiser@nrc.gov

Subject: Harvesting Prioritization
Location: Kenn's office

Start: Mon 9/24/2018 2:30 PM
End: Mon 9/24/2018 3:00 PM

Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Hiser, Matthew

Required Attendees Miller, Kenneth A

Sure, I'll have to run quickly over to OWFN for a meeting at 3:00, but this should work.