

From: Tregoning, Robert
Sent: Mon, 20 Jun 2016 09:06:53 -0400
To: Hiser, Matthew; Rao, Appajosula; Purtscher, Patrick
Cc: Frankl, Istvan
Subject: RE: NRC-NRAJ 2016 Materials Meeting Agenda.docx

However you guys want to divvy up the topics is fine with me.

Rob

From: Hiser, Matthew
Sent: Monday, June 20, 2016 9:03 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Rao, Appajosula <Appajosula.Rao@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: NRC-NRAJ 2016 Materials Meeting Agenda.docx

It looks like there are 3 topics that Sri, Pat, and I are involved with, so it might be good to split those amongst the three of us, so each person leads one topic. Here's what I see as the options based on current work assignments:

- IAD: Sri or Matt
- CASS: Pat or Sri
- Harvesting: Matt or Pat

Any other thoughts?

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: Tregoning, Robert
Sent: Monday, June 20, 2016 8:51 AM
To: Kirk, Mark <Mark.Kirk@nrc.gov>; Rao, Appajosula <Appajosula.Rao@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Rudland, David <David.Rudland@nrc.gov>
Subject: FW: NRC-NRAJ 2016 Materials Meeting Agenda.docx

All:

Attached is the draft agenda for the NRC/NRAJ meeting on August 8-9. Could you please review the agenda and let me know if you have any issues supporting the meeting? The idea is for each side to have a presentation on research activities associated with these topics and then have a discussion on ways to collaborate and share information related to the topic. Could you also let me know the following w.r.t. the agenda:

1. Will Mark lead the RPV discussion or will Matt or someone else lead this discussion?
2. Will Pat Purtscher lead the material harvesting discussion?
3. Who will lead the CASS discussion?

Thanks for your help,

Rob

From: Tregoning, Robert
Sent: Friday, June 17, 2016 8:36 AM
To: 坂本 一信 <kazunobu_sakamoto@nsr.go.jp>
Subject: NRC-NRAJ 2016 Materials Meeting Agenda.docx

Kazu:

Attached is a rough draft for our meeting agenda. I've developed this based on the topics that we agreed to last month in our email exchanges. I've tried to group the topics in ways that make sense and I've put some estimates for times as well as speakers. Here's what I think we need to agree on.

1. Do you agree with all the topics and the order of the topics?
2. Do you agree with the meeting starting and ending times on both days? We could start and end at whatever times are convenient for you.
3. Do you agree with the scheduled breaks and lunch times? We could make these shorter or longer depending on your needs.
4. Do you agree with the length of time devoted to each topic?

Please feel free to modify the attached agenda to address these four questions.

After we agree on the agenda topics and times, the final step will be to confirm the speakers on the NRC and NRAJ side. Please let me know who your speakers will be for each topic. I have put some ideas down for the NRC speakers but I will still need to confirm this.

As always, thank you for your help with this meeting.

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

Blackberry: [REDACTED] (b)(6)
fax: 301-415-6671

From: Rudland, David
Sent: Mon, 20 Jun 2016 09:01:00 -0400
To: Tregoning, Robert; Kirk, Mark; Rao, Appajosula; Hiser, Matthew
Cc: Frankl, Istvan
Subject: RE: NRC-NRAJ 2016 Materials Meeting Agenda.docx

Ok, well, I can give an update if needed

David L. Rudland, Ph.D.
Chief, Component Integrity Branch
Division of Engineering
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Mail Stop: TWF-10A36
11555 Rockville Pike
Rockville, MD 20852-2738
Office: (301) 415-1896
Cell: (b)(6)
Email: david.rudland@nrc.gov

From: Tregoning, Robert
Sent: Monday, June 20, 2016 9:00 AM
To: Rudland, David <David.Rudland@nrc.gov>; Kirk, Mark <Mark.Kirk@nrc.gov>; Rao, Appajosula <Appajosula.Rao@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: NRC-NRAJ 2016 Materials Meeting Agenda.docx

Dave:

I asked the Japanese about adding this to the agenda previously (twice in fact) and they don't want to add it because they won't have their experts at this meeting to support this topic. They also cited discussions with you on probabilistic codes at the PVP.

Rob

From: Rudland, David
Sent: Monday, June 20, 2016 8:57 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Kirk, Mark <Mark.Kirk@nrc.gov>; Rao, Appajosula <Appajosula.Rao@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: NRC-NRAJ 2016 Materials Meeting Agenda.docx

Rob

I think we need to add benchmarking on probabilistic codes. I know that we are pursuing both xLPR and Favor benchmarking with JNRA (through JAEA). A status and such would be nice at this meeting

Thanks
Dave

David L. Rudland, Ph.D.
Chief, Component Integrity Branch
Division of Engineering
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Mail Stop: TWF-10A36
11555 Rockville Pike
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Rob

From: Tregoning, Robert
Sent: Friday, June 17, 2016 8:36 AM

To: 坂本 一信 <kazunobu_sakamoto@nsr.go.jp>

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Kazu:

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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
Blackberry: [REDACTED] (b)(6)
fax: 301-415-6671

From: Moyer, Carol
Sent: Tue, 24 Oct 2017 19:20:40 +0000
To: Hiser, Matthew
Subject: RE: One more harvesting question

Hi Matt,

Thanks very much for this clarification.

What I sent back to Brian this morning said, "The workshop summary report will be distributed among meeting participants when finalized."

If I get another opportunity(!) to edit the response, I will change this to past tense, as you recommended.

Thanks again,
Carol

From: Hiser, Matthew
Sent: Tuesday, October 24, 2017 3:04 PM
To: Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: RE: One more harvesting question

Hi Carol,

I've had on my to-do list for the last couple weeks to send the email with the final workshop report. You probably saw that I just sent it ☺ Based on that, I'd suggest this language for the UNR response:

"The workshop summary was ~~finalized published~~ in September, 2017, and has been distributed (~~or, is being distributed?~~) to the meeting participants."

Thanks!
Matt

From: Moyer, Carol
Sent: Tuesday, October 24, 2017 7:56 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: One more harvesting question
Importance: High

Matt,

I am trying to finalize our response to the SLR UNR. Can you clear up a sentence for me?

Part of the paragraph on the harvesting workshop says:

The workshop was well-attended by representatives from DOE, EPRI, the U.S. industry, and international research organizations. Key insights from the workshop included the need for a clearly defined objective to justify the level of effort, and the benefit of early planning and engagement with the plant from which materials will be harvested. The workshop summary report will be distributed among meeting participants and is expected to be finalized by September, 2017. RES will be pursuing further engagement with interested workshop participants on two outstanding workshop action items: identifying data needs for harvesting and initially creating a 'sources of materials' information tool/database. This is discussed further under Subtask 2.B.

What should the highlighted sentence say now?

Steve's comment on this said: "IF: The draft was shared with the workshop participants on 5/31. The final report is dated 9/13/17."

So, can I change the sentence to past tense?

"The workshop summary was published in September, 2017, and has been distributed (or, is being distributed?) to the meeting participants."

Thanks!

-Carol

Carol Moyer
Sr. Materials Engineer
RES/DE/CMB
carol.moyer@nrc.gov
301-415-2153

From: Moyer, Carol
Sent: Thu, 30 Aug 2018 20:00:29 +0000
To: Hull, Amy; Hiser, Allen; Tregoning, Robert; amylubh@gmail.com
Subject: RE: PEO Sig Technical Issues (LTMD) UNR NRR-2017-008-Status, review of Tasks

All, (b)(6)
I'm very sorry, but I will be [REDACTED] on 9/7 and I forgot to mark it on my calendar. Can we meet Thurs., 9/6, at 8:00 or 11:00?

-Carol

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

From: Hull, Amy
Sent: Thursday, August 30, 2018 1:00 PM
To: Hiser, Allen; Tregoning, Robert; Moyer, Carol; amylubh@gmail.com
Subject: PEO Sig Technical Issues (LTMD) UNR NRR-2017-008-Status, review of Tasks
When: Friday, September 07, 2018 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-OWFN-11B06-12p

Rescheduled to Friday, September 07, 2018 9:00 AM-10:00 AM

08/28/2018 note – Carol just learned this morning that she has to brief Brian Thomas this Thurs. on SLR-related research at 1 PM (only time Brian was available) We apologize for any inconvenience but it should be interesting to hear the results from Carol's earlier briefing.

UNR NRR-2017-006: "Research Assistance on Potential Significant Technical Issues during the Subsequent Period of Extended Operation (PEO)"

Allen requested monthly meetings (informal status reviews with discussion) for work performed under NRR-2017-006 on research related to the four key materials challenges for the subsequent PEO. These concerns also all fall under the category of long term materials degradation (LTMD).

Meeting notes: The meeting in July addressed all NRR-2017-006 tasks, but focused on Task 2: harvesting ex-plant components (Rob Tregoning led Task 2 update).

<< File: final response enclosure NRR-2017-006 ML17227A485.pdf >> << File: final response memo NRR_2017-006 ML17227A484%2Epdf.pdf >> << File: UNR NRR-2017-006.pdf >>

From: Poehler, Jeffrey
Sent: Mon, 21 Mar 2016 11:30:36 -0400
To: Hiser, Matthew
Subject: RE: Placeholder for Harvesting WG

Yes

Jeffrey C. Poehler
Sr. Materials Engineer
NRR/DE/EVIB
(301) 415-8353

From: Hiser, Matthew
Sent: Monday, March 21, 2016 11:22 AM
To: Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>
Cc: Obodoako, Aloysius <Aloysius.Obodoako@nrc.gov>
Subject: RE: Placeholder for Harvesting WG

Yes – can you still make it?

From: Poehler, Jeffrey
Sent: Monday, March 21, 2016 11:16 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Placeholder for Harvesting WG

Is this meeting still on?

Jeffrey C. Poehler
Sr. Materials Engineer
NRR/DE/EVIB
(301) 415-8353

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

From: Hiser, Matthew
Sent: Tuesday, March 15, 2016 1:52 PM
To: Hiser, Matthew; Hull, Amy; Oberson, Greg; Collins, Jay; Litkett, Bernard; Tregoning, Robert;

Kalikian, Roger; Obodoako, Aloysius

Cc: Frankl, Istvan; Cumblidge, Stephen; McHale, John; Poehler, Jeffrey

Subject: Placeholder for Harvesting WG

When: Monday, March 21, 2016 1:30 PM-2:30 PM (UTC-05:00) Eastern Time (US & Canada).

Where: HQ-OWFN-09B02-12p

Hi All,

I apologize for the last-minute reschedule.

(b)(6)

Aloysius Obodoako recently joined CMB and will be taking the lead for this project (starting with this meeting), but he has [REDACTED] It looks like there is a time early next week that works well for almost everyone, so let's try for then.

Thanks!

Matt

From: Hiser, Matthew
Sent: Wed, 16 Mar 2016 13:11:56 +0000
To: Obodoako, Aloysius; Poehler, Jeffrey
Subject: RE: Placeholder for Harvesting WG

Yeah, let's do that - that way we can have input from PNNL as well hopefully...

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

From: Obodoako, Aloysius
Sent: Wednesday, March 16, 2016 8:58 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>
Subject: RE: Placeholder for Harvesting WG

(b)(6) Hey Matt, [REDACTED] Can we push the meeting back to next week?

Aloysius

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

From: "Hiser, Matthew" <Matthew.Hiser@nrc.gov>
Date: Wed, March 16, 2016 8:31 AM -0400
To: "Poehler, Jeffrey" <Jeffrey.Poehler@nrc.gov>
CC: "Obodoako, Aloysius" <Aloysius.Obodoako@nrc.gov>
Subject: RE: Placeholder for Harvesting WG

Hi Jeff,

(b)(6) [REDACTED] We appreciate you being able/willing to participate today.

Here's a call-in number:

Passcodes/Pin codes:

(b)(6) Participant passcode: [REDACTED]

For security reasons, the passcode will be required to join the conference.

Dial in numbers:

Country

Toll Numbers

Freephone/

Toll Free Number

USA

888-677-8615

Thanks!
Matt

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

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

From: Poehler, Jeffrey
Sent: Wednesday, March 16, 2016 8:26 AM
To: Hiser, Matthew
Subject: Tentative: Placeholder for Harvesting WG
When: Wednesday, March 16, 2016 10:00 AM-11:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-OWFN-09B02-12p

(b)(6) Matt, [REDACTED] I am working at home today. Can we
reschedule the meeting or can you set up a call in?

Thanks,

Jeff

From: Hiser, Matthew
Sent: Fri, 19 Feb 2016 12:49:43 +0000
To: Frankl, Istvan
Subject: RE: Placeholder for Harvesting WG

Hi Steve,

No, Aloysius and I were going to push it back – just not sure to when, but now I think we know.

Thanks!
Matt

Matthew Hiser

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

From: Frankl, Istvan
Sent: Thursday, February 18, 2016 4:54 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Placeholder for Harvesting WG

Matt,

Is this meeting still on? If so, I may not be able to attend it because it conflicts with the CIB/CMB status meeting with DE management.

Steve

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

From: Hiser, Matthew
Sent: Monday, December 14, 2015 2:29 PM
To: Hiser, Matthew; Hull, Amy; Oberson, Greg; Collins, Jay; Stevens, Gary; Litkett, Bernard; Tregoning, Robert; Kalikian, Roger
Cc: Frankl, Istvan; Cumblidge, Stephen
Subject: Placeholder for Harvesting WG
When: Wednesday, February 24, 2016 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-OWFN-09B06-12p

Rescheduling based on timeline for examples for this group to review and discuss.

From: Litkett, Bernard
Sent: Tue, 19 Jan 2016 16:03:27 -0500
To: Hiser, Matthew
Subject: RE: Placeholder for Harvesting WG

Hi Matt,

I have required training at the PDC on Feb 2, 3 and 4. I would need to talk to the instructor on Feb 2.

Bernie

From: Hiser, Matthew
Sent: Tuesday, January 19, 2016 3:47 PM
To: Litkett, Bernard <Bernard.Litkett@nrc.gov>
Subject: RE: Placeholder for Harvesting WG

Hi Bernie,

I know your calendar showed busy, but the next date that would work was two more weeks down the road. Since that time/date works for everyone else, I went with it – is that OK? Maybe you can call in or find a way to participate depending on what your conflict is?

Thanks!
Matt

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

From: Hiser, Matthew
Sent: Tuesday, January 19, 2016 3:44 PM
To: Hiser, Matthew; Hull, Amy; Oberson, Greg; Collins, Jay; Stevens, Gary; Litkett, Bernard; Tregoning, Robert; Kalikian, Roger
Cc: Frankl, Istvan; Cumblidge, Stephen
Subject: Placeholder for Harvesting WG
When: Wednesday, February 03, 2016 10:00 AM-11:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-OWFN-09B02-12p

After talking with PNNL, let's push back one more week so they have time to provide some examples for this group to review and discuss.

From: Audrain, Margaret
Sent: Tue, 14 Nov 2017 16:06:26 -0500
To: Frankl, Istvan; Purtscher, Patrick
Cc: Hiser, Matthew
Subject: RE: plan for meeting at ANL on harvesting

Steve,

I put in the emergent request. I used a placeholder date the second week of Dec.

Meg

From: Frankl, Istvan
Sent: Tuesday, November 14, 2017 3:36 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: plan for meeting at ANL on harvesting
Importance: High

Pat,

Did you align the harvesting scope with Matt and Meg?

If so, please add your trip to the list of emergent trip requests using the link below and clarify under justification that this is a date change with extension:

<G:\DE\CMB\Travel\FY18 RES-DE travel - CMB.xlsx>

Again, the justification needs to address specific regulatory objectives/scope that cannot be accomplished without the trip. A specific draft agenda would be helpful in drafting this justification. I assume ANL is not unique, so drafting a broader agenda/scope for the lab visits supporting the harvesting effort would be advantageous.

Meg,

Please also submit emergent trip request for this "one time" trip.

Thanks,

Steve

From: Purtscher, Patrick
Sent: Tuesday, November 14, 2017 10:47 AM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: FW: plan for meeting at ANL on harvesting

Steve,

Here is the plan for what we will discuss with ANL for harvesting. It seems like the 2nd week of December will be the best time, but I am waiting on a firm date when they will be available.

Pat

BACKGROUND

March 2017 workshop –

- four main areas of consideration for extended service life: RPV, RVI, cables, & concrete
- feedback from workshop participants is that harvesting is expensive and time-consuming, need to focus on value (costs vs. benefits)

PNNL report –

- Lays out a systematic approach to optimize harvesting outcome by prioritizing needs and surveying available materials from decommissioning of plants, operating plants and previous harvesting programs

GOALS for ANL meeting

What does ANL have from past programs with NRC, DOE, or others

Examples:

- SGT program looked at tubes pulled from McGuire
- Omesh looked at CASS from Shippingport

Materials of interest don't have to be material from plant with extensive service history. Example is FAVOR code for RPV embrittlement. Results from modeling and simulations are dependent on input of the flaws that could be present from fabrication. Sections of old, thick ferritic steel welds from structures with similar acceptance criteria but were never put into service provided important inputs that permitted the computer code to be validated.

A good example of where harvesting is important would be how the BWRVIP is responding to NRC concern for IGSCC mitigation with on-line noble chemistry program. They harvested samples from all regions of operating BWRs to demonstrate the distribution of noble metal particles within the whole system. The presence of a pattern of small, discrete deposits of noble metal particles would indicate effective particle distribution to ideally impart good resistance to IGSCC. The individual samples by themselves were not that significant, but taken together, they show that there is effective mitigation in those areas of the system where inspection relief is being requested.

OUTCOME

We hope to assemble an inventory of available materials to consider for harvesting program like or in coordination with that in the INL NSUF Nuclear Fuels and Materials Library (NFML). Our emphasis is in the four areas outlined earlier, but not necessarily limited to those four. Future OpE can change the focus of harvesting needs very quickly.

Pat

From: Audrain, Margaret
Sent: Tue, 14 Nov 2017 15:56:52 -0500
To: Hiser, Matthew; Purtscher, Patrick
Subject: RE: plan for meeting at ANL on harvesting

Okay. I doubt it'll matter if it's off a day or two in the request.

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

From: "Hiser, Matthew" <Matthew.Hiser@nrc.gov>
Date: Tue, November 14, 2017 3:55 PM -0500
To: "Purtscher, Patrick" <Patrick.Purtscher@nrc.gov>, "Audrain, Margaret" <Margaret.Audrain@nrc.gov>
Subject: RE: plan for meeting at ANL on harvesting

(b)(6) Even if we don't have the exact day nailed down, we might want to put something in. Looking at the calendar, Steve's [REDACTED] is tomorrow...

From: Purtscher, Patrick
Sent: Tuesday, November 14, 2017 3:40 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: plan for meeting at ANL on harvesting

Not yet, I was waiting for our harvesting group meeting on Thursday to decide on the day for the harvesting meeting at ANL.

Pat

From: Frankl, Istvan
Sent: Tuesday, November 14, 2017 3:36 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
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From: Purtscher, Patrick
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Pat

From: Purtscher, Patrick
Sent: Tue, 14 Nov 2017 07:53:29 -0500
To: Hiser, Matthew
Subject: RE: plan for meeting at ANL on harvesting

Not yet. This is what we have. I will send it to Steve later this morning after I talk more to my contact at ANL regarding when we might come out to visit.

Pat

Meet with ANL to brief them on our plans for harvesting:

BACKGROUND

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A good example of where harvesting is important would be how the BWRVIP is responding to NRC concern for IGSCC mitigation with on-line noble chemistry program. They harvested samples from all regions of operating BWRs to demonstrate the distribution of noble metal particles within the whole system. The presence of a pattern of small, discrete deposits of noble metal particles would indicate effective particle distribution to ideally impart good resistance to IGSCC. The individual samples by themselves were not that significant, but taken together, they show that there is effective mitigation in those areas of the system where inspection relief is being requested.

OUTCOME

We hope to assemble an inventory of available materials to consider for harvesting program like or in coordination with that in the INL NSUF Nuclear Fuels and Materials Library (NFML). Our emphasis is in

the four areas outlined earlier, but not necessarily limited to those four. Future OpE can change the focus of harvesting needs very quickly.

Pat

From: Hiser, Matthew
Sent: Monday, November 13, 2017 4:45 PM
To: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: plan for meeting at ANL on harvesting

Hi Pat,

Did you send this to Steve?

Thanks!
Matt

From: Hiser, Matthew
Sent: Thursday, November 09, 2017 4:46 PM
To: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: plan for meeting at ANL on harvesting

Made a couple more changes (noted in red) to the outcome section of Pat's writeup...

From: Audrain, Margaret
Sent: Thursday, November 09, 2017 4:44 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: plan for meeting at ANL on harvesting

I like the edits Matt made and have no further comments.

Thanks!

Meg

From: Hiser, Matthew
Sent: Thursday, November 09, 2017 4:25 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: RE: plan for meeting at ANL on harvesting

Hi Pat,

I think your plan looks good to me. Hopefully it addresses what Steve was looking for.

I made some edits below and noted the biggest changes in red.

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: Purtscher, Patrick

Sent: Thursday, November 09, 2017 10:21 AM

To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>

Subject: plan for meeting at ANL on harvesting

Meet with ANL to brief them on our plans for harvesting:

BACKGROUND

March 2017 workshop –

- four main areas of consideration for extended service life: RPV, RVI, cables, & concrete
- **feedback from workshop participants is that harvesting is expensive and time-consuming, need to focus on value (costs vs. benefits)**

PNNL report –

- Lays out a **systematic approach** to optimize harvesting outcome by prioritizing needs and surveying available materials **from decommissioning plants, operating plants and previous harvesting programs**

GOALS for ANL meeting

What does ANL have from past programs with NRC, DOE, or others

Examples:

- SGT program looked at tubes pulled from McGuire
- Omesh looked at CASS from Shippingport

Materials of interest don't have to be material from plant with extensive service history. Example is FAVOR code for RPV embrittlement. Results from modeling and simulations are dependent on input of the flaws that could be present from fabrication. Sections of old, thick ferritic steel welds from structures with similar acceptance criteria but were never put into service provided important inputs that permitted the computer code to be validated.

A good example of where harvesting is important would be how the BWRVIP is responding to NRC concern for IGSCC mitigation with on-line noble chemistry program. They harvested samples from all regions of operating BWRs to demonstrate the distribution of noble metal particles within the whole system. The presence of a pattern of small, discrete deposits of noble metal particles would indicate **effective particle distribution to ideally impart** good resistance to IGSCC. The individual samples by themselves were not that significant, but taken together, they show that there is effective mitigation in those areas of the system where inspection relief is being requested.

OUTCOME

We hope to assemble an inventory of available materials to consider for harvesting program like **or in coordination with** that in **the INL NSUF Nuclear Fuels and Materials Library (NFML)**. Our emphasis is in the four areas outlined earlier, but not **necessarily** limited to those four. Future OpE can change the focus of harvesting needs very quickly.

From: Hiser, Matthew
Sent: Thursday, November 09, 2017 8:01 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: phone call with INL

Hi Pat,

They've all accepted the meeting. I need to set up a bridge line, so you'll see an update to the scheduler...

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: Purtscher, Patrick
Sent: Thursday, November 09, 2017 8:00 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: phone call with INL

What have you heard from INL about a phone call? I am working from home today but could call in.

Pat

From: Audrain, Margaret
Sent: Wed, 15 Nov 2017 10:23:09 -0500
To: Hiser, Matthew
Subject: RE: plan for meeting at ANL on harvesting

No idea

From: Hiser, Matthew
Sent: Wednesday, November 15, 2017 9:12 AM
To: Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: FW: plan for meeting at ANL on harvesting

Seriously.....

From: Frankl, Istvan
Sent: Tuesday, November 14, 2017 4:28 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: RE: plan for meeting at ANL on harvesting

He needs one, if he is extending his stay by one day (the extension is minor and will be approved but needs to be explained under justification).

Steve.

From: Hiser, Matthew
Sent: Tuesday, November 14, 2017 3:54 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: RE: plan for meeting at ANL on harvesting

Hi Steve,

Just wanted to check, does Pat need an "emergent trip request" since he'll already be at ANL for his SG projects?

Thanks!
Matt

From: Purtscher, Patrick
Sent: Tuesday, November 14, 2017 3:40 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: plan for meeting at ANL on harvesting

Not yet, I was waiting for our harvesting group meeting on Thursday to decide on the day for the harvesting meeting at ANL.

Pat

From: Frankl, Istvan
Sent: Tuesday, November 14, 2017 3:36 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: plan for meeting at ANL on harvesting
Importance: High

Pat,

Did you align the harvesting scope with Matt and Meg?

If so, please add your trip to the list of emergent trip requests using the link below and clarify under justification that this is a date change with extension:

<G:\DE\CMB\Travel\FY18 RES-DE travel - CMB.xlsx>

Again, the justification needs to address specific regulatory objectives/scope that cannot be accomplished without the trip. A specific draft agenda would be helpful in drafting this justification. I assume ANL is not unique, so drafting a broader agenda/scope for the lab visits supporting the harvesting effort would be advantageous.

Meg,

Please also submit emergent trip request for this "one time" trip.

Thanks,

Steve

From: Purtscher, Patrick
Sent: Tuesday, November 14, 2017 10:47 AM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: FW: plan for meeting at ANL on harvesting

Steve,

Here is the plan for what we will discuss with ANL for harvesting. It seems like the 2nd week of December will be the best time, but I am waiting on a firm date when they will be available.

Pat

BACKGROUND

March 2017 workshop –

- four main areas of consideration for extended service life: RPV, RVI, cables, & concrete
- feedback from workshop participants is that harvesting is expensive and time-consuming, need to focus on value (costs vs. benefits)

PNNL report –

- Lays out a systematic approach to optimize harvesting outcome by prioritizing needs and surveying available materials from decommissioning of plants, operating plants and previous harvesting programs

GOALS for ANL meeting

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Pat

Note to requester: Attachment is immediately following. The square with the red X in it at the top of the first email is the imbedded attached file (Power Point logo).

From: Hiser, Matthew
Sent: Fri, 13 Oct 2017 15:25:22 +0000
To: Hiser, Allen; Tregoning, Robert; Frankl, Istvan; Hull, Amy; Moyer, Carol; Purtscher, Patrick
Subject: RE: PLiM Discussions
Attachments: NRC PLiM slides on Harvesting final.pptx



Here are the Form 390-approved slides for the PLiM presentation.

I will email them (along with the paper if finished) by Wednesday to the PLiM email address.

Thanks!
Matt

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

From: Hiser, Allen
Sent: Wednesday, October 11, 2017 8:30 AM
To: Hiser, Allen; Hiser, Matthew; Tregoning, Robert; Frankl, Istvan; Hull, Amy; Moyer, Carol
Subject: FW: PLiM Discussions
When: Thursday, October 12, 2017 8:00 AM-9:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where:

Already have this meeting scheduled; I thought you were on original recipient list....

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

From: Hiser, Allen
Sent: Wednesday, October 04, 2017 1:56 PM
To: Hiser, Allen; Tregoning, Robert; Frankl, Istvan; Hull, Amy; Moyer, Carol
Subject: PLiM Discussions
When: Thursday, October 12, 2017 8:00 AM-9:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where:

I will also schedule time Wednesday; we can find a BC or SL office in TWFN for this.

Allen

Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

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

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

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

This presentation was prepared as an account of work sponsored by an agency of the U.S. Government. Neither the U.S. Government nor any agency thereof, nor any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for any third party's use, or the results of such use, of any information, apparatus, product, or process disclosed in this presentation [report], or represents that its use by such third party would not infringe privately owned rights. The views expressed in this paper are not necessarily those of the U.S. Nuclear Regulatory Commission.

Outline

- Background and Motivation
- NRC Harvesting Experience
- Recent NRC Activities
 - Criteria for Prioritizing Data Needs
 - Database for Sources of Materials
- Path Forward

Background and Motivation

- Recent trends in global nuclear industry:
 - Interest in extending nuclear power plant (NPP) lifespans
 - Numerous NPPs, both in U.S. and internationally, have announced plans to or already have shut down
- Limited budgets have restricted the resources available to support new research, including harvesting programs
 - Aligning interests and leveraging with other organizations is important to maximize value

NRC Harvesting Experience

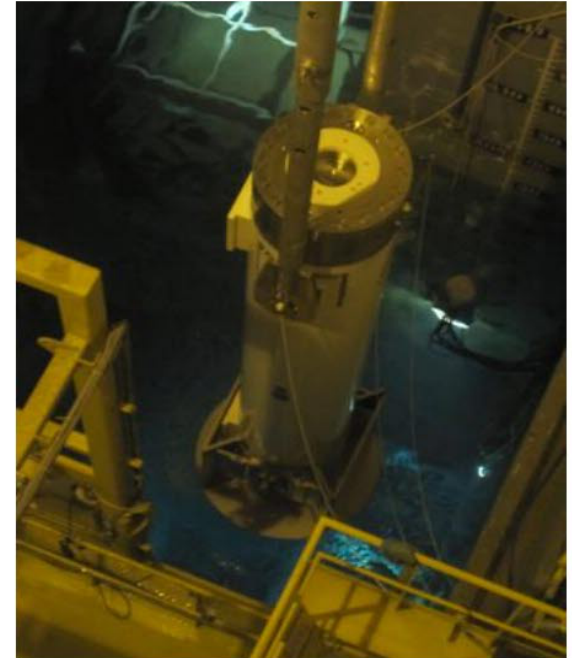
- NRC has participated in numerous harvesting programs over the years:
 - RPV, CRDM penetrations, RCS piping, RPV internals, neutron absorbers, and cables
 - From unfinished, operating ,and decommissioning plants in U.S. and internationally
- Significant value in using harvested components to confirm data from other research programs

Technical Lessons Learned

- Harvesting can provide highly representative aged materials for research
 - May be only practical source of representative aged materials
 - May be able to use limited harvested materials to validate larger accelerated aging data set
- Important to gain as much information as possible in advance before committing to specific harvesting project

Logistical Lessons Learned

- Harvesting is an expensive, time-consuming effort
- Leveraging resources with other research organizations helps mitigate cost challenges
- Transporting irradiated materials, particularly internationally, is cumbersome and time-consuming



Lifting operation for
irradiated materials
transport cask

Recent NRC Activities

- Strategic approach to materials harvesting
 - Due to limited opportunities, past harvesting efforts have generally been reactive to individual plants shutting down
- Prioritize the data needs best addressed by harvesting
- Workshop held in March 2017 at NRC HQ to discuss all aspects of harvesting with other interested stakeholders

Potential Criteria for Harvesting Prioritization

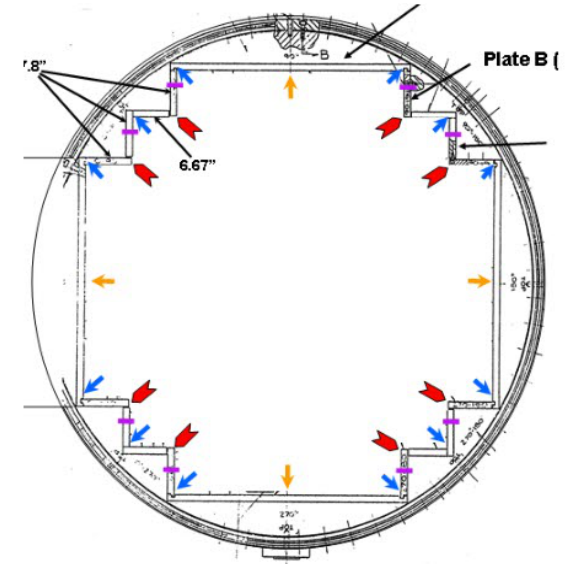
- Applicability of harvested material for addressing critical gaps
- Ease of laboratory replication of the degradation scenario
- Unique field aspects of degradation
- Fleet-wide vs. plant-specific applicability of data

Potential Criteria for Harvesting Prioritization

- Harvesting cost and complexity
- Availability of reliable in-service inspection (ISI) techniques for the material / component
- Availability of materials for harvesting
- Timeliness of the expected research results relative to the objective

Database for Sources of Materials

- NRC is pursuing the development of a database for sources of materials for harvesting
- Allow for aligning of high-priority data needs to the available sources of materials
- NRC is interested in engaging with other organizations in developing the database



Example of reactor
internals harvesting plan

Conclusion and Path Forward

- Harvesting can yield highly representative and valuable data on materials aging
- Data Needs Prioritization and Sources of Materials Database
- As specific harvesting opportunities are identified, NRC welcomes opportunities for cooperation and leveraging with other interested research organizations

From: Moyer, Carol
Sent: Mon, 16 Oct 2017 18:48:05 +0000
To: Hiser, Matthew
Subject: RE: PLiM Discussions

OK, that sounds reasonable. Please copy Steve and me on your transmitting email.

Thanks,
Carol

From: Hiser, Matthew
Sent: Monday, October 16, 2017 2:45 PM
To: Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: RE: PLiM Discussions

No, maybe I'll send the slides now (they're ready and approved) and mention in that email that the paper should hopefully come by Friday.

From: Moyer, Carol
Sent: Monday, October 16, 2017 2:43 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: PLiM Discussions

OK. Have you given anyone at PLiM a heads up that the paper will be a couple of days late?

From: Hiser, Matthew
Sent: Monday, October 16, 2017 2:40 PM
To: Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: RE: PLiM Discussions

Yes, I am hoping to get it to technical staff for review by tomorrow, then hopefully quick concurrence and email it to PLiM by Friday.

I am working off this guidance: Per IAEA:

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.

I'll email the slides by Wednesday.

Thanks!
Matt

From: Moyer, Carol
Sent: Monday, October 16, 2017 2:38 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: PLiM Discussions

Hi Matt,

Steve just asked me – What is the status on a Harvesting paper? Are you writing one? (I would say it is not required, but if you have decided to do it, OK.)

Thanks,
Carol

From: Hiser, Matthew
Sent: Friday, October 13, 2017 11:25 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: PLiM Discussions

<< File: NRC PLiM slides on Harvesting final.pptx >>

Here are the Form 390-approved slides for the PLiM presentation.

I will email them (along with the paper if finished) by Wednesday to the PLiM email address.

Thanks!
Matt

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To: Hiser, Allen; Hiser, Matthew; Tregoning, Robert; Frankl, Istvan; Hull, Amy; Moyer, Carol

Subject: FW: PLiM Discussions

When: Thursday, October 12, 2017 8:00 AM-9:30 AM (UTC-05:00) Eastern Time (US & Canada).

Where:

Already have this meeting scheduled; I thought you were on original recipient list....

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From: Hiser, Allen

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Subject: PLiM Discussions

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Where:

I will also schedule time Wednesday; we can find a BC or SL office in TWFN for this.

Allen

Note to requester: Attachment is immediately following.

From: Hiser, Matthew
Sent: Wed, 25 Oct 2017 12:25:08 +0000
To: Frankl, Istvan
Subject: RE: PLiM Paper
Attachments: IAEA PLiM Hiser 10-25-2017 tracked changes.docx

Hi Steve,

Chris had just one comment that led to few changes in section 6 of the paper (attached). If those changes are fine with you, I'll have Cassandra update the version in ADAMS and email the paper in to PLiM.

Thanks!
Matt

From: Frankl, Istvan
Sent: Friday, October 20, 2017 5:27 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: PLiM Paper
Importance: High

Thanks, Matt.

Great paper! I have only a few minor editorial changes in the attachment.

The fonts look tiny (size 10) though. I assume you followed the formatting guidance for PLiM papers.

Steve

From: Hiser, Matthew
Sent: Friday, October 20, 2017 2:26 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: PLiM Paper

Hi Steve,

I've attached the PLiM harvesting paper (adapted from previous poster and slides). This has been reviewed by Rob and technical staff and all comments incorporated.

I've sent this to Gracie to start the concurrence package that can be signed on Monday, but wanted to share with you today in case that might expedite things on Monday. The deadline for PLiM papers was Wednesday (two days ago), so I'd like to get it approved and submitted ASAP. (I'm not too worried about the paper being late given the extremely short timeframe we were given about the possibility of a paper just 10 days ago).

Thanks!

Matt

HARVESTING OF AGED MATERIALS FROM OPERATING AND DECOMMISSIONING NUCLEAR POWER PLANTS

M. Hiser, P. Purtscher, A. B. Hull, R. Tregoning

U. S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research
Washington, DC

Email: matthew.hiser@nrc.gov

P. Ramuhalli

Pacific Northwest National Laboratory
Richland, WA, USA

Abstract

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

1. BACKGROUND

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

2. NRC EXPERIENCE WITH HARVESTING

NRC has significant experience with harvesting plant components and performing research on harvested materials to address technical issues. This experience includes a range of components from plants in various stages of operation both in the U.S. and internationally. Some of the harvesting projects that the NRC has participated in have studied the following materials or components:

- RPV materials from the decommissioned Gundremmingen plant to study fluence rate effects on RPV embrittlement [3],
- Cast austenitic stainless steel (CASS) materials from the decommissioned Shippingport reactor. to study CASS thermal embrittlement [4],
- RPV materials from the unfinished or never-operated Shoreham and Midland plants to improve understanding of flaw distributions for RPV embrittlement concerns [5-6],
- RPV head control rod drive mechanism penetrations from the operating North Anna and Davis-Besse plants to study primary water stress corrosion cracking (PWSCC) of nickel alloys and the effectiveness of non-destructive evaluation (NDE) methods [8-12],
- Reactor coolant system (RCS) piping nozzle weld materials from the operating V.C. Summer plant to study PWSCC of nickel alloys [11-12],

- Reactor internals materials from the decommissioned Jose Cabrera (known as Zorita) plant to study high-fluence irradiation effects on stainless steel reactor internals materials [13],
- Aluminum-based neutron-absorbing materials from the decommissioned Zion plant to study degradation in the spent fuel pool environment [14],
- Electrical cables from the decommissioned Zion and Crystal River plants to investigate cable degradation [15],
- Electrical bus ducts from the decommissioned Zion plant to study high-energy arc faults in electrical enclosures [16].

As illustrated by these programs, NRC's experience is that harvesting has contributed significantly to improved understanding of important technical issues for nuclear safety. For RPV materials, harvesting has increased knowledge of embrittlement mechanisms and the underlying flaw distributions in the RPV to allow reduction in unnecessary conservatism. For nickel alloys, harvesting has improved understanding of PWSCC and the development of acceptable inspection intervals, while also increasing confidence in the ability of NDE methods to detect and characterize flaws. Finally, recent work on electrical enclosures has helped to identify a potential new safety issue associated with high-energy arc faults in electrical components containing aluminum [16].

3. NRC PERSPECTIVE AND LESSONS LEARNED FROM HARVESTING ACTIVITIES

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

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

Pragmatically, harvesting can be expensive, complex, and time-consuming; therefore, focusing on technical needs of high importance will help ensure good value. Likewise, leveraging and cooperation among multiple organizations helps to mitigate cost challenges. It is also quite challenging to transport irradiated materials, particularly internationally, so minimizing or avoiding transportation of irradiated materials is highly recommended.

4. NRC ACTIVITIES ON HARVESTING

NRC is potentially interested in harvesting materials to assess age-related degradation in the four technical areas identified previously: RPV embrittlement, IAD of RPV internals and primary components, concrete structures and containment degradation, and electrical cable aging [2]. The focus is to understand the impact of extended plant operation on material behavior, including the effects of higher fluences and longer exposures to aging conditions.

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

5. PRIORITIZATION OF DATA NEEDS BEST ADDRESSED BY HARVESTING

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

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

- Applicability of harvested material for addressing critical gaps
 - Harvesting to address critical gaps should be prioritized over less essential technical gaps
- Ease of laboratory replication of the degradation scenario
 - 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.
- Unique field aspects of degradation
 - For example, 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.
- Fleet-wide vs. plant-specific applicability of data
 - 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.
- 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.
- Availability of reliable inspection methods for the degradation scenario
 - If mature inspection methods exist and are easy to apply to monitor degradation, harvesting may be less valuable. If inspection methods do not exist, harvesting may be essential to ensure confidence in the assessment of age-related degradation in that particular component.
- Timeliness of the expected research 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.

The above potential criteria provide a systematic approach for prioritizing harvesting data needs. Different organizations may weigh these criteria differently, but the criteria are intended to be comprehensive. NRC is interested in engaging with other organizations to further refine these criteria, use them to prioritize data needs for harvesting, and ultimately identify areas of common interest that may provide optimal harvesting opportunities.

6. DATABASE OF SOURCES OF MATERIALS FOR HARVESTING

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

7. CONCLUSIONS

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

REFERENCES

- [1] REMER, S. J., "NRC Commissioner Briefing on Subsequent License Renewal," NRC Commission meeting on April 26, 2017, <https://www.nrc.gov/reading-rm/doc-collections/commission/slides/2017/20170426/remer-20170426.pdf>.
- [2] U.S. NUCLEAR REGULATORY COMMISSION, "Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor Subsequent License Renewal," SECY-14-0016, 2014, <https://www.nrc.gov/docs/ML1405/ML14050A306.pdf>.
- [3] HAWTHORNE, J.R., HISER, A.L., "Experimental Assessments of Gundremmingen RPV Archive Material for Fluence Rate Effects Studies," NUREG/CR-5201 (MEA-2286), U.S. Nuclear Regulatory Commission, October 1988.
- [4] CHOPRA, O.K., SHACK, W.J., "Mechanical Properties of Thermally Aged Cast Stainless Steels from Shippingport Reactor Components," NUREG/CR-6275 (ANL-94/37), U.S. Nuclear Regulatory Commission, April 1995.
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- [8] CUMBLIDGE, S.E., ET AL., "Nondestructive and Destructive Examination Studies on Removed-from-Service Control Rod Drive Mechanism Penetrations," NUREG/CR-6996, U.S. Nuclear Regulatory Commission, July 2009.
- [9] CUMBLIDGE, S.E., ET AL., "Evaluation of Ultrasonic Time-of-Flight Diffraction Data for Selected Control Rod Drive Nozzles from Davis Besse Nuclear Power Plant," PNNL-19362, Pacific Northwest National Laboratory, April 2011.
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- [12] ALEXANDREANU, B., CHOPRA, O.K., SHACK, W.J., "Crack Growth Rates and Metallographic Examinations of Alloy 600 and Alloy 82/182 from Field Components and Laboratory Materials Tested in PWR Environments," NUREG/CR-6964 (ANL-07/12), U.S. Nuclear Regulatory Commission, May 2008.
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- [14] U.S. NUCLEAR REGULATORY COMMISSION, "Acquisition and Testing of Zion Spent Fuel Pool Neutron Absorber Materials," Addendum to Memorandum of Understanding between NRC and EPRI, 2014, <https://www.nrc.gov/docs/ML1501/ML15015A021.pdf>.
- [15] FIFIELD, L.S., "Status Report and Research Plan for Cables Harvested from Crystal River Unit 3 Nuclear Generating Plant," PNNL-25833, September 2016.
- [16] GIITTER, J. G., "Path Forward for Regulatory Treatment of High-Energy Arcing Fault Tests Results that Involve Aluminum," Internal NRC memo, March 2016, <https://www.nrc.gov/docs/ML1606/ML16064A250.pdf>.

Note to requester: Attachment is immediately following.

From: Frankl, Istvan
Sent: Fri, 20 Oct 2017 15:26:43 -0600
To: Hiser, Matthew
Subject: RE: PLiM Paper
Attachments: IAEA PLiM Hiser 10-20-2017 (IF).docx
Importance: High

Thanks, Matt.

Great paper! I have only a few minor editorial changes in the attachment.

The fonts look tiny (size 10) though. I assume you followed the formatting guidance for PLiM papers.

Steve

From: Hiser, Matthew
Sent: Friday, October 20, 2017 2:26 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: PLiM Paper

Hi Steve,

I've attached the PLiM harvesting paper (adapted from previous poster and slides). This has been reviewed by Rob and technical staff and all comments incorporated.

I've sent this to Gracie to start the concurrence package that can be signed on Monday, but wanted to share with you today in case that might expedite things on Monday. The deadline for PLiM papers was Wednesday (two days ago), so I'd like to get it approved and submitted ASAP. (I'm not too worried about the paper being late given the extremely short timeframe we were given about the possibility of a paper just 10 days ago).

Thanks!
Matt

HARVESTING OF AGED MATERIALS FROM OPERATING AND DECOMMISSIONING NUCLEAR POWER PLANTS

M. Hiser, P. Purtscher, A. B. Hull, R. Tregoning

U. S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research
Washington, DC

Email: matthew.hiser@nrc.gov

P. Ramuhalli

Pacific Northwest National Laboratory
Richland, WA, USA

Abstract

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

1. BACKGROUND

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

2. NRC EXPERIENCE WITH HARVESTING

NRC has significant experience with harvesting plant components and performing research on harvested materials to address technical issues. This experience includes a range of components from plants in various stages of operation both in the U.S. and internationally. Some of the harvesting projects that the NRC has participated in have studied the following materials or components:

- RPV materials from the decommissioned Gundremmingen plant to study fluence rate effects on RPV embrittlement [3],
- Cast austenitic stainless steel (CASS) materials from the decommissioned Shippingport reactor. to study CASS thermal embrittlement [4],
- RPV materials from the unfinished or never-operated Shoreham and Midland plants to improve understanding of flaw distributions for RPV embrittlement concerns [5-6],
- RPV head control rod drive mechanism penetrations from the operating North Anna and Davis-Besse plants to study primary water stress corrosion cracking (PWSCC) of nickel alloys and the effectiveness of non-destructive evaluation (NDE) methods [8-12],
- Reactor coolant system (RCS) piping nozzle weld materials from the operating V.C. Summer plant to study PWSCC of nickel alloys [11-12],

- Reactor internals materials from the decommissioned Jose Cabrera (known as Zorita) plant to study high-fluence irradiation effects on stainless steel reactor internals materials [13],
- Aluminum-based neutron-absorbing materials from the decommissioned Zion plant to study degradation in the spent fuel pool environment [14],
- Electrical cables from the decommissioned Zion and Crystal River plants to investigate cable degradation [15],
- Electrical bus ducts from the decommissioned Zion plant to study high-energy arc faults in electrical enclosures [16].

As illustrated by these programs, NRC's experience is that harvesting has contributed significantly to improved understanding of important technical issues for nuclear safety. For RPV materials, harvesting has increased knowledge of embrittlement mechanisms and the underlying flaw distributions in the RPV to allow reduction in unnecessary conservatism. For nickel alloys, harvesting has improved understanding of PWSCC and the development of acceptable inspection intervals, while also increasing confidence in the ability of NDE methods to detect and characterize flaws. Finally, recent work on electrical enclosures has helped to identify a potential new safety issue associated with high-energy arc faults in electrical components containing aluminum [16].

3. NRC PERSPECTIVE AND LESSONS LEARNED FROM HARVESTING ACTIVITIES

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

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

Pragmatically, harvesting can be expensive, complex, and time-consuming; therefore, focusing on technical needs of high importance will help ensure good value. Likewise, leveraging and cooperation among multiple organizations helps to mitigate cost challenges. It is also quite challenging to transport irradiated materials, particularly internationally, so minimizing or avoiding transportation of irradiated materials is highly recommended.

4. NRC ACTIVITIES ON HARVESTING

NRC is potentially interested in harvesting materials to assess age-related degradation in the four technical areas identified previously: ~~reactor pressure vessel (RPV)~~ embrittlement, ~~IAD~~ irradiation-assisted degradation of ~~RPV~~ reactor internals and primary components, concrete structures and containment degradation, and electrical cable aging [2]. The focus is to understand the impact of extended plant operation on material behavior, including the effects of higher fluences and longer exposures to aging conditions.

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

5. PRIORITIZATION OF DATA NEEDS BEST ADDRESSED BY HARVESTING

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

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

- Applicability of harvested material for addressing critical gaps
 - Harvesting to address critical gaps should be prioritized over less essential technical gaps
- Ease of laboratory replication of the degradation scenario
 - 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.
- Unique field aspects of degradation
 - For example, 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.
- Fleet-wide vs. plant-specific applicability of data
 - 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.
- 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 ~~RPVreactor~~ internals or the RPV.
- Availability of reliable inspection methods for the degradation scenario
 - If mature inspection methods exist and are easy to apply to monitor degradation, harvesting may be less valuable. If inspection methods do not exist, harvesting may be essential to ensure confidence in the assessment of age-related degradation in that particular component.
- Timeliness of the expected research 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.

The above potential criteria provide a systematic approach for prioritizing harvesting data needs. Different organizations may weigh these criteria differently, but the criteria are intended to be comprehensive. NRC is interested in engaging with other organizations to further refine these criteria, use them to prioritize data needs for harvesting, and ultimately identify areas of common interest that may provide optimal harvesting opportunities.

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

REFERENCES

- [1] REMER, S. J., "NRC Commissioner Briefing on Subsequent License Renewal," NRC Commission meeting on April 26, 2017, <https://www.nrc.gov/reading-rm/doc-collections/commission/slides/2017/20170426/remer-20170426.pdf>.
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From: Hiser, Matthew
Sent: Mon, 23 Oct 2017 11:26:20 +0000
To: Frankl, Istvan
Subject: RE: PLiM Paper

Hi Steve,

Thank you for the speedy review! Yeah, I followed the PLiM style guide – quite small font for sure!

I accepted your edits and the package is on your desk to sign.

Thanks!
Matt

Matthew Hiser

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

From: Frankl, Istvan
Sent: Friday, October 20, 2017 5:27 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: PLiM Paper
Importance: High

Thanks, Matt.

Great paper! I have only a few minor editorial changes in the attachment.

The fonts look tiny (size 10) though. I assume you followed the formatting guidance for PLiM papers.

Steve

From: Hiser, Matthew
Sent: Friday, October 20, 2017 2:26 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: PLiM Paper

Hi Steve,

I've attached the PLiM harvesting paper (adapted from previous poster and slides). This has been reviewed by Rob and technical staff and all comments incorporated.

I've sent this to Gracie to start the concurrence package that can be signed on Monday, but wanted to share with you today in case that might expedite things on Monday. The deadline for PLiM papers was Wednesday (two days ago), so I'd like to get it approved and submitted ASAP. (I'm not too worried about the paper being late given the extremely short timeframe we were given about the possibility of a paper just 10 days ago).

Thanks!

Matt

From: Frankl, Istvan
Sent: Wed, 25 Oct 2017 08:42:08 -0400
To: Hiser, Matthew
Subject: RE: PLiM Paper

Matt,

Yes, I am OK with the changes.

Thanks,

Steve

From: Hiser, Matthew
Sent: Wednesday, October 25, 2017 8:25 AM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: PLiM Paper

Hi Steve,

Chris had just one comment that led to few changes in section 6 of the paper (attached). If those changes are fine with you, I'll have Cassandra update the version in ADAMS and email the paper in to PLiM.

Thanks!
Matt

From: Frankl, Istvan
Sent: Friday, October 20, 2017 5:27 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: PLiM Paper
Importance: High

Thanks, Matt.

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Steve

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Thanks!

Matt

From: Moyer, Carol
Sent: Wed, 25 Oct 2017 13:04:56 +0000
To: Hiser, Matthew
Subject: RE: PLiM Slides Submission

Matt,

Thanks for a copy of your paper. I'm really sorry that I didn't get around to a proper review of the draft, and I hope you got good input from others.

Carol

From: Hiser, Matthew
Sent: Wednesday, October 25, 2017 8:51 AM
To: 'PLIM2@iaea.org' <PLIM2@iaea.org>
Cc: Hiser, Allen <Allen.Hiser@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; 'KRIVANEK, Robert' <R.Krivanek@iaea.org>; 'KANG, Ki-Sig' <K.S.Kang@iaea.org>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: PLiM Slides Submission

Dear PLiM Organizers,

I have attached the paper entitled: "Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants." I apologize for the delay in sending this paper due to the limited time that we learned a paper/presentation would be accepted.

Thanks!
Matt

From: Hiser, Matthew
Sent: Monday, October 16, 2017 4:58 PM
To: PLIM2@iaea.org
Cc: Hiser, Allen <Allen.Hiser@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; KRIVANEK, Robert <R.Krivanek@iaea.org>; KANG, Ki-Sig <K.S.Kang@iaea.org>
Subject: PLiM Slides Submission

Dear PLiM Organizers,

I have attached the slides for the presentation entitled: "Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants." An accompanying paper should be sent on a slight delay by this Friday.

Thanks!
Matt

Matthew Hiser

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

Matthew.Hiser@nrc.gov

From: Moyer, Carol
Sent: Mon, 16 Oct 2017 18:54:09 +0000
To: Frankl, Istvan
Cc: Hull, Amy;Hiser, Matthew
Subject: RE: PLiM Slides

Hi Steve,

Thanks for the review of slides. I have asked the AAs to put them in ADAMS and to prep the concurrence package.

Matt will submit the slides on harvesting, probably today. His paper is drafted, and it will be coming to you soon for review in hopes of getting it to the conference organizers by the end of this week. He will let them know about the slight delay.

Carol

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

From: Frankl, Istvan
Sent: Monday, October 16, 2017 2:36 PM
To: Moyer, Carol <Carol.Moyer@nrc.gov>
Cc: Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: PLiM Slides
Importance: High

Thanks, Carol.

Nice slides for SLR. I have no further comments or revisions.

Please get the concurrence package to me ASAP today.

By the way, Chris already approved Form 390 for the harvesting slides last week.

What is the status with the paper?

Thanks,

Steve

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

From: Moyer, Carol
Sent: Monday, October 16, 2017 1:42 PM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: PLiM Slides

Steve,

The slides for the RES paper on SLR for the 4th PLiM conference are attached, for your review. A Form 390 for the slides is also attached.

Carol Moyer

Sr. Materials Engineer
RES/DE/CMB
carol.moyer@nrc.gov
301-415-2153

From: Warren, Brenett
Sent: Tue, 30 Jan 2018 15:21:34 +0000
To: Hiser, Matthew; Moyer, Carol
Cc: Frankl, Istvan; Hull, Amy; RICMST Resource
Subject: RE: Poster 6 has wrong information: QTE Comments Digital ePosters
Importance: High

Good Morning Matthew,

Correction, "you guys would be responsible for submitting rewrites and posters etc., to QTE. Please be aware that you don't have a large window of time. Refer to RIC Central as the final poster will be due in approximately 2 weeks to our contractor. Please move swiftly.

Thanks,

Brenett (Bren) W. Warren

Program Specialist
Information Technology and Infrastructure Services Branch
Program Management, Policy Development and Analysis
Office of Nuclear Reactor Regulation
NRR/DMPS/RISB
Location: O13D5
301-415-3114
Brenett.Warren@nrc.gov



Follow us on Twitter @nrcgov_ric

From: Hiser, Matthew
Sent: Tuesday, January 30, 2018 10:15 AM
To: Moyer, Carol <Carol.Moyer@nrc.gov>; Warren, Brenett <Brenett.Warren@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>
Subject: RE: Poster 6 has wrong information: QTE Comments Digital ePosters

Here you go Carol!

From: Moyer, Carol
Sent: Tuesday, January 30, 2018 9:59 AM
To: Warren, Brenett <>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Hiser, Matthew

<Matthew.Hiser@nrc.gov>

Subject: FW: Poster 6 has wrong information: QTE Comments Digital ePosters

Hello, Bren,

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Thank you,
Carol

Carol Moyer
Sr. Materials Engineer
RES/DE/CMB
carol.moyer@nrc.gov
301-415-2153

From: Hull, Amy

Sent: Tuesday, January 30, 2018 9:37 AM

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

Subject: FW: Poster 6 has wrong information: QTE Comments Digital ePosters

From: RICMST Resource

Sent: Friday, December 08, 2017 12:26 PM

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

Cc: RICMST Resource <RICMST.Resource@nrc.gov>

Subject: FW: Poster 6 has wrong information: QTE Comments Digital ePosters

Good Afternoon Amy,

Please review the edited recommendations from QTE. Indicate whether or not you accept their recommended changes.

Thanks,

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

From: Warren, Brenett

Sent: Thursday, December 07, 2017 12:55 PM

To: QTE Resource <QTE.Resource@nrc.gov>

Cc: RICMST Resource <RICMST.Resource@nrc.gov>

Subject: FW: Poster 6 has wrong information: QTE Comments Digital ePosters

Importance: High

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Program Management, Policy Development and Analysis
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301-415-3114
Brenett.Warren@nrc.gov



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From: Hull, Amy

Sent: Thursday, December 07, 2017 11:44 AM

To: Warren, Brenett <Brenett.Warren@nrc.gov>; RICMST Resource <RICMST.Resource@nrc.gov>

Cc: Oberson, Greg <Greg.Oberson@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>

Subject: Poster 6 has wrong information: QTE Comments Digital ePosters

Importance: High

Hi Brenett,

Please correct the following ---

6 RES—Evaluation of Additive Manufacturing of Metallic Parts via Direct Metal Laser Melting

~~Recent plans to shut down a number of nuclear power plants provide opportunities for harvesting components that were exposed to light-water reactor environments. Harvesting can provide highly representative aged materials for research and, in some cases, may be the only practical source of representative aged materials to address high-priority issues. Harvesting can be expensive and time consuming, which makes it essential to focus on technical needs with the highest importance and to cooperate with multiple organizations whenever possible to optimally leverage resources. The NRC is interested in engaging with other organizations to prioritize data needs for harvesting, identify areas of common interest, and develop a database for sources of materials for harvesting.~~

-

It should read---

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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.

From: Moyer, Carol
Sent: Wednesday, December 06, 2017 6:13 PM
To: Hull, Amy <Amy.Hull@nrc.gov>
Subject: FW: QTE Comments Digital ePosters
Importance: High

Amy,
Have you had a chance to look at this mark-up of the RIC poster abstracts? There is a title for a poster on AM, but the text is about harvesting. (There is also one on harvesting, about harvesting – so it's not as simple as 2 descriptions being swapped.) Your text on the AM poster seems to have been lost.

Carol

From: Oberson, Greg
Sent: Monday, December 04, 2017 2:32 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: FW: QTE Comments Digital ePosters

Hello,
Please respond to the action.

Thanks,
Greg

From: RICMST Resource
Sent: Monday, December 04, 2017 11:34 AM
To:
Subject: QTE Comments Digital ePosters

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If you have further questions please contact Bren Warren at 301-415-3114 or via email at RICMST.Resource@nrc.gov or Brenett.Warren@nrc.gov.

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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From: Warren, Brenett
Sent: Wed, 31 Jan 2018 12:10:04 +0000
To: Moyer, Carol
Cc: Frankl, Istvan; Hull, Amy; Hiser, Matthew
Subject: RE: Poster 6 has wrong information: QTE Comments Digital ePosters

Good Morning Carol,

You as the creator of the poster should submit to QTE. You should cc RICMST when you submit your information to them for level 1 review.

Thanks,

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

From: Moyer, Carol
Sent: Tuesday, January 30, 2018 9:59 AM
To: Warren, Brenett <Brenett.Warren@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: FW: Poster 6 has wrong information: QTE Comments Digital ePosters

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Thank you,
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RES/DE/CMB
carol.moyer@nrc.gov
301-415-2153

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Cc: RICMST Resource <RICMST.Resource@nrc.gov>
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Please review the edited recommendations from QTE. Indicate whether or not you accept their recommended changes.

Thanks,

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



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From: Warren, Brenett
Sent: Thursday, December 07, 2017 12:55 PM
To: QTE Resource <QTE.Resource@nrc.gov>
Cc: RICMST Resource <RICMST.Resource@nrc.gov>
Subject: FW: Poster 6 has wrong information: QTE Comments Digital ePosters
Importance: High

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Information Technology and Infrastructure Services Branch
Program Management, Policy Development and Analysis
Office of Nuclear Reactor Regulation
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Brenett.Warren@nrc.gov



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From: Hull, Amy
Sent: Thursday, December 07, 2017 11:44 AM
To: Warren, Brenett <Brenett.Warren@nrc.gov>; RICMST Resource <RICMST.Resource@nrc.gov>
Cc: Oberson, Greg <Greg.Oberson@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew

<Matthew.Hiser@nrc.gov>

Subject: Poster 6 has wrong information: QTE Comments Digital ePosters

Importance: High

Hi Brenett,

Please correct the following ---

6 RES—Evaluation of Additive Manufacturing of Metallic Parts via Direct Metal Laser Melting
Recent plans to shut down a number of nuclear power plants provide opportunities for harvesting components that were exposed to light-water reactor environments. Harvesting can provide highly representative aged materials for research and, in some cases, may be the only practical source of representative aged materials to address high-priority issues. Harvesting can be expensive and time consuming, which makes it essential to focus on technical needs with the highest importance and to cooperate with multiple organizations whenever possible to optimally leverage resources. The NRC is interested in engaging with other organizations to prioritize data needs for harvesting, identify areas of common interest, and develop a database for sources of materials for harvesting.

-

It should read---

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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.

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Sent: Wednesday, December 06, 2017 6:13 PM

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

Subject: FW: QTE Comments Digital ePosters

Importance: High

Amy,

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Carol

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Sent: Monday, December 04, 2017 2:32 PM

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

Subject: FW: QTE Comments Digital ePosters

Hello,
Please respond to the action.

Thanks,
Greg

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To:

Subject: QTE Comments Digital ePosters

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Thank you,

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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:
Attachment is
immediately following.

From: Hiser, Matthew
Sent: Tue, 30 Jan 2018 15:14:46 +0000
To: Moyer, Carol; Warren, Brenett
Cc: Frankl, Istvan; Hull, Amy
Subject: RE: Poster 6 has wrong information: QTE Comments Digital ePosters
Attachments: NRC 1102 - Harvesting.pdf

Here you go Carol!

From: Moyer, Carol
Sent: Tuesday, January 30, 2018 9:59 AM
To: Warren, Brenett <Brenett.Warren@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
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Office of Nuclear Reactor Regulation

NRR/DMPs/RISB

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Brenett.Warren@nrc.gov



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Thank you,

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



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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.

Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

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

Recent plans to shut down a number of nuclear power plants (NPPs) provide opportunities for harvesting components that were exposed to light water reactor (LWR) environments. Harvesting can provide highly representative aged materials for research and, in some cases, may be the only practical source of representative aged materials to address high-priority issues. Harvesting can be expensive and time-consuming, which makes it essential to focus on technical needs with the highest importance and cooperate with multiple organizations whenever possible to optimally leverage resources. NRC is interested in engaging with other organizations to prioritize data needs for harvesting, identify areas of common interest, and develop a database for sources of materials for harvesting.

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	Matthew Hiser	Materials Engineer	Division of Engineering	RES		<input type="button" value="+"/> <input type="button" value="-"/>

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: Frankl, Istvan
Sent: Tue, 3 Apr 2018 19:56:06 +0000
To: Iyengar, Raj;Hiser, Allen;Alley, David;Rudland, David;Tregoning, Robert;Ruffin, Steve
Cc: Focht, Eric;Audrain, Margaret;Hull, Amy;Moyer, Carol;Hiser, Matthew
Subject: RE: Potential Topics for Materials Exchange Meeting May 22-26

Allen et al.

We have three more topics to offer from RES/DE:

1. Harvesting – Current plans and activities - Lead: M. Hiser (15 mins.)
2. IAD – confirmatory testing plans – Lead: R. Tregoning (15 mins.)
3. PWSCC Crack Growth – Current research plans and results – Lead: M. Audrain (10 -15 mins.)

Thanks,

Steve F.

From: Frankl, Istvan
Sent: Monday, April 02, 2018 6:52 PM
To: Iyengar, Raj <Raj.Iyengar@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>; Alley, David <David.Alley@nrc.gov>; Rudland, David <David.Rudland@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Ruffin, Steve <Steve.Ruffin@nrc.gov>
Cc: Focht, Eric <Eric.Focht@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: RE: Potential Topics for Materials Exchange Meeting May 22-26

Allen et al.

I would like to propose three more topics from RES/DE:

- 1) Review of Additive Manufacturing for Reactor Materials and Components - NRC Efforts with RES support – NRO lead: J. Burke, RES lead: A. Hull (Considering the eventual merger of NRR and NRO) (15 mins)
- 2) Status Update on the PWSCC Initiation Program – Lead: E. Focht (15 mins.)
- 3) Status of Subsequent License Renewal (SLR) Confirmatory Research – Lead: C. Moyer (10 -15 mins.)

Thanks,

Steve F.

From: Iyengar, Raj
Sent: Friday, March 30, 2018 11:31 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>; Alley, David <David.Alley@nrc.gov>; Rudland, David <David.Rudland@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Frankl, Istvan

<Istvan.Frankl@nrc.gov>; Ruffin, Steve <Steve.Ruffin@nrc.gov>

Subject: RE: Potential Topics for Materials Exchange Meeting May 22-26

Allen et al.

I made some edits in the attached document.

Time-permitting and if you all agree, I would like to propose two short overview topics:

- 1) Materials/Comp Int for Advanced non-light waters - NRC Efforts – Lead; Matt M. with RES support (Considering the eventual merger of NRR and NRO) (15 mins)
- 2) Overview of RES Support in Materials and Comp. INT for Operating Reactors (15 mins)

Raj

From: Hiser, Allen

Sent: Thursday, March 29, 2018 1:17 PM

To: Alley, David <David.Alley@nrc.gov>; Rudland, David <David.Rudland@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Ruffin, Steve <Steve.Ruffin@nrc.gov>

Subject: Potential Topics for Materials Exchange Meeting May 22-26

Importance: High

We need to identify topics for the May 22-24 materials exchange meeting with industry – all day May 22 and 23, until noon on the 24th.

We may have additional meetings with the industry on Monday the 21st (PFM and the RES TLR on exclusion of embrittlement effects with $\Delta T < 25^{\circ}\text{F}$) and the afternoon of Thursday the 24th (RES fluence program status).

I have attached the 2017 NRC topic list (with initial deletions) and the 2017 final agenda (with initial deletions) from the meeting last year. The latter provides the list of industry program status reports. Please share with your staff as you consider appropriate

Please identify any additions or deletions by noon on Tuesday (April 3), along with appropriate staff contacts/presenters. .

I would like to get the agenda pinned down with industry by the end of next week.

Allen

From: Sircar, Madhumita
Sent: Fri, 17 Feb 2017 14:33:58 -0500
To: Brady, Bennett;Hiser, Matthew
Subject: RE: Prep for Division Director/Deputy Director Quarterly Interface Meeting

Bennett,
I am okay if you prefer to reorganize the sequence to put the slides on harvesting in the same place.

Thanks,
Mita Sircar
Tel: 301-415-1804

From: Brady, Bennett
Sent: Friday, February 17, 2017 2:19 PM
To: Sircar, Madhumita <Madhumita.Sircar@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Prep for Division Director/Deputy Director Quarterly Interface Meeting

Thank you, Mita, for getting your slides to me promptly.
Hope you had a good meeting.

Matt and Mita

Matt Hiser has some slides on Harvesting Workshop which I suggested he mention and Mita has slides on the contract. Should I arrange the slides so that you two are talking in sequence?

Bennett

From: Sircar, Madhumita
Sent: Friday, February 17, 2017 1:28 PM
To: Brady, Bennett <Bennett.Brady@nrc.gov>
Subject: RE: Prep for Division Director/Deputy Director Quarterly Interface Meeting

Bennett,

Please find attached the slides on radiation effects on concrete.
I can give a separate briefing to George Wilson if he wants.

Thanks,
Mita Sircar
Tel: 301-415-1804

From: Brady, Bennett
Sent: Monday, February 13, 2017 5:30 PM

To: Sircar, Madhumita <Madhumita.Sircar@nrc.gov>

Subject: RE: Prep for Division Director/Deputy Director Quarterly Interface Meeting

Thank you, Mita,

Your slides should be just a little bit more than a status update that I usually ask for since George Wilson is new to our work. I will tell George that he can get a private briefing by the staff members if he would like.

Bennett

From: Sircar, Madhumita

Sent: Sunday, February 12, 2017 9:27 PM

To: Brady, Bennett <Bennett.Brady@nrc.gov>

Subject: Re: Prep for Division Director/Deputy Director Quarterly Interface Meeting

Bennett,

I will be out to ASME meeting From Feb 13-15. I'll review and send the update (if any) on Feb 17th.

Thanks,

Mita

From: Brady, Bennett

Sent: Monday, January 23, 2017 2:31 PM

To: Morey, Dennis; Medoff, James; Douth, Clifford; Buford, Angela; Sadollah, Mohammad; Ray, Sheila; Hull, Amy; Bloom, Steven; Moyer, Carol; Litkett, Bernard; Hiser, Allen; Jones, Heather; Billoch, Araceli; Gettys, Evelyn; Wallace, Jay; Murdock, Darrell; Sircar, Madhumita; Philip, Jacob; Hardgrove, Matthew; Zimmerman, Jacob; Hiser, Matthew; Mathew, Roy; Koshy, Thomas; Davidson, Evan; Wong, Albert; Rudland, David; Tregoning, Robert; Yoo, Mark; Brittner, Donald

Subject: Prep for Division Director/Deputy Director Quarterly Interface Meeting

When: Monday, February 13, 2017 1:00 PM-2:30 PM.

Where: HQ-OWFN-11B04-25p

Presenters at the November 9 Quarterly Interface Meeting please update your slides to only include news or activities since the November meeting and bring copies with you.

Note to requester: The attachments are immediately following. The small boxes with the red X in them are the imbedded attachments (the Power Point logos).

From: Hiser, Matthew
Sent: Thu, 3 Nov 2016 18:24:11 +0000
To: Brady, Bennett
Cc: Frankl, Istvan
Subject: RE: Prep meeting for NRR/DE, NRR/DLR, RES/DE Division Director/Deputy Division Director Quarterly Interface Meeting
Attachments: DLR-RES Quarterly Meeting November 2016 IAD.pptx, DLR-RES Quarterly Meeting November 2016 Harvesting.pptx



Hi Bennett,

Please find attached my slides on IAD and harvesting.

Thanks!
Matt

Matthew Hiser

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

Matthew.Hiser@nrc.gov

From: Hiser, Matthew
Sent: Monday, October 31, 2016 2:31 PM
To: Brady, Bennett <Bennett.Brady@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: Prep meeting for NRR/DE, NRR/DLR, RES/DE Division Director/Deputy Division Director Quarterly Interface Meeting

<< File: DLR-RES-DE Quarterly Meeting November 2016.pptx >>

Hi Bennett,

Please find attached my updates for the IAD UNR work on slides 17-20.

Thanks!
Matt

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

From: Brady, Bennett

Sent: Friday, October 28, 2016 5:35 PM

To: Iyengar, Raj; Sircar, Madhumita; Doult, Clifford; Sadollah, Mohammad; Hardgrove, Matthew; Hiser, Matthew

Subject: FW: Prep meeting for NRR/DE, NRR/DLR, RES/DE Division Director/Deputy Division Director Quarterly Interface Meeting

When: Tuesday, November 01, 2016 9:15 AM-10:45 AM (UTC-05:00) Eastern Time (US & Canada).

Where: HQ-OWFN-14D03-27p

Please provide me your slides for our prep meeting Tuesday for the Quarterly Interface Meeting of Division Directors and Deputy Division Directors of DE/NRR, DLR/NRR, and DE/RES. Keep it short – only a status update since the meeting in August.

Thanks,

Bennett

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

From: Brady, Bennett

Sent: Wednesday, October 05, 2016 1:44 PM

To: Bloom, Steven; Wittick, Brian; Morey, Dennis; Medoff, James; Doult, Clifford; Sadollah, Mohammad; Ray, Sheila; Iyengar, Raj; Litkett, Bernard; Hiser, Allen; Hull, Amy; Wong, Albert; Jones, Heather; Burton, William; Billoch, Araceli; Gettys, Evelyn; Wallace, Jay; Murdock, Darrell; Sircar, Madhumita; Philip, Jacob; Hardgrove, Matthew; Mathew, Roy; Koshy, Thomas; Hiser, Matthew; Davidson, Evan; Tregoning, Robert; Yoo, Mark

Subject: Prep meeting for NRR/DE, NRR/DLR, RES/DE Division Director/Deputy Division Director Quarterly Interface Meeting

When: Tuesday, November 01, 2016 9:15 AM-10:45 AM (UTC-05:00) Eastern Time (US & Canada).

Where: HQ-OWFN-14D03-27p

<< File: DLR-RES-DE Quarterly Meeting August 2016.pptx >>

All,

This is a meeting to prepare for the November 9 Quarterly Division Director/Deputy Division Director Interface Meeting on the status and user need requests for SLR.

Attached are the slides from our last quarterly meeting in August. For those of you who will be presenting (Raj, Bennett, Jake, Mita, Mo, Matt Hardgrove, and Matt Hiser) on the status of your projects, this meeting should be an update of what you presented last time. One or two slides, at most, on completed milestones, status, issues, etc., would

be appropriate. Please let me know if you will not be able to attend and who will be presenting for you.

Please send me your slides by Friday, October 28.

Thank you.

Ex-Plant Harvesting

- Two primary activities:
 - Contract with PNNL to develop strategic approach to harvesting
 - Deliverable in early 2017 will identify key factors to consider for harvesting and analyze those factors for some potential harvesting scenarios
 - Cables, high-fluence internals, CASS, dissimilar metal welds
 - Approach can then be applied by NRC staff to other harvesting options
 - Ex-Plant Materials Harvesting Workshop
 - Planned for March 7-8, 2016 at NRC HQ
 - Expect domestic and international participation
 - Researchers, regulators, utilities, and decommissioning companies
 - Developing agenda and contacting presenters/participants
- Task on harvesting expected in SLR UNR

IAD Background

- **Issue:** Neutron irradiation of stainless steel reactor vessel internals components may cause embrittlement, cracking and void swelling
 - Irradiation-assisted degradation of core internals identified as a high-priority knowledge gap in the EMDA report and SECY/SRM for SLR
 - MRP-227-A guidance addresses operation up to 60 years, but proposed generic guidance to the end of SLR period is not expected until after 2019.
- **Objective:** Develop a confirmatory technical basis to support NRC regulatory decision-making for SLR
- Work in this area is supported by UNR NRR-2012-008: Environmentally Assisted Degradation of LWR Internal Components
 - Task 1: Investigate void swelling
 - Task 2: Monitor industry activities associated with IAD

IAD Activities



- Research Activities:
 - Independent research focused on SS plate, welds, and cast austenitic stainless steel (CASS)
 - Cooperative research focused on ex-plant materials from Zorita
 - Data shared with industry, but independent confirmatory analyses to be performed by NRC
- RES activities focus on high-fluence materials
 - Most representative of SLR operation and void swelling is most likely
 - In cooperation with industry and other partners to perform expensive, time-consuming research
- New UNR under development with NRR staff
 - Final iteration with RES and NRR staff before starting NRR concurrence
 - Tasks on void swelling, monitoring industry activities, and support for ASME code case on IASCC crack growth disposition curves

IAD Projects Overview

Project	Scope	Testing Location	Cooperation
CASS and Welds Gap Analysis	Literature review to update guidance and address neutron and thermal effects	ANL	Independent
Irradiation of CASS to 3 dpa and Testing	Testing of irradiated CASS materials to observe effects of thermal and neutron embrittlement	ANL	Independent
ZIRP	Plate material as-received: 10, 25, 50 dpa	Studsvik	EPRI, SSM, CSN, MHI, AXPO, Tractebel, Ringhals
Zorita Welds at Studsvik	Weld/HAZ material as-received: 2 dpa	Studsvik	EPRI
Zorita Welds at Halden	Weld/HAZ material as-received and with further irradiation: 1, 2, 4, 6, 8 dpa	Halden	HRP members / EPRI
Zorita at ANL	Plate material as-received: 5-50 dpa; Weld/HAZ material: 1 dpa	ANL	Independent
High Fluence Plate	Plate material with further irradiation: 65, 80 dpa	TBD	EPRI, DOE

Current Status and Path Forward



Project	Current Status	Path Forward
CASS and Welds Gap Analysis	NUREG/CR-4513, Rev. 2 published June 2016	Complete
Irradiation of CASS to 3 dpa and Testing	Testing in progress at ANL	Reporting in early 2017
ZIRP	Testing nearing completion	Reporting from EPRI/Studsvik in 2017
Zorita Welds at Studsvik	Testing in progress	Reporting from EPRI/Studsvik in 2018
Zorita Welds at Halden	Irradiation set to begin in early 2017 – some uncertainty with recent events at Halden	Testing planned in 2019/2020 following irradiation
Zorita at ANL	Materials expected to arrive at ANL in December	Testing to begin in FY17
High Fluence Plate	In discussions with EPRI and DOE to cooperate on irradiation and testing program	Establish cooperative program with EPRI and DOE

From: Moyer, Carol
Sent: Tue, 7 Mar 2017 16:02:28 +0000
To: Frankl, Istvan; Hull, Amy
Cc: Hiser, Matthew
Subject: RE: question --- Sherry's presentation: Ex-Plant Harvesting Workshop EPRI 3-7-2017.pptx

Here is the link:

<https://drive.google.com/drive/folders/0B5DWMLch5YSXcnpZZ0JOS055QUU?usp=sharing>

From: Frankl, Istvan
Sent: Tuesday, March 07, 2017 11:01 AM
To: Hull, Amy <Amy.Hull@nrc.gov>
Cc: Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: question --- Sherry's presentation: Ex-Plant Harvesting Workshop EPRI 3-7-2017.pptx

Amy,

I remember seeing a link but couldn't find it in the emails I got from Rob.

I am sure Matt can send you the link.

Thanks,

Steve

From: Hull, Amy
Sent: Tuesday, March 07, 2017 8:53 AM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: question --- Sherry's presentation: Ex-Plant Harvesting Workshop EPRI 3-7-2017.pptx

Do you have the link that Rob mentioned for the slides? Neither Carol nor I have it.

From: Moyer, Carol
Sent: Tuesday, March 07, 2017 8:46 AM
To: Hull, Amy <Amy.Hull@nrc.gov>
Subject: FW: Ex-Plant Harvesting Workshop EPRI 3-7-2017.pptx

From: Bernhoft, Sherry [<mailto:sbernhoft@epri.com>]
Sent: Friday, March 03, 2017 7:34 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Smith, Jean <jmsmith@epri.com>; Ahluwalia, Kawaljit <kahluwal@epri.com>; Dyle, Robin <rdyle@epri.com>; richard.reister@nuclear.energy.gov; Tregoning,

Robert <Robert.Tregoning@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: [External_Sender] Ex-Plant Harvesting Workshop EPRI 3-7-2017.pptx

Matt

Attached is the EPRI presentation for Session 1 next week.

Please let me know if you have any questions,

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

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From: Hiser, Matthew
Sent: Tue, 4 Apr 2017 15:50:41 +0000
To: Hull, Amy; Purtscher, Patrick
Subject: RE: question about strategic harvesting -- is it OK with authors to have all presentations on internal NRC Sharepoint?

Thanks Amy ☺

From: Hull, Amy
Sent: Tuesday, April 04, 2017 11:50 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: question about strategic harvesting -- is it OK with authors to have all presentations on internal NRC Sharepoint?

I am going to go ahead with loading to the Sharepoint Site then.

From: Hiser, Matthew
Sent: Tuesday, April 04, 2017 11:48 AM
To: Hull, Amy <Amy.Hull@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: question about strategic harvesting -- is it OK with authors to have all presentations on internal NRC Sharepoint?

Hi Amy,

Yes, sharing within NRC is no problem. The question was about sharing with other organizations that didn't participate in the workshop.

The workshop summary is something I hope to begin working on this week...

Thanks!
Matt

From: Hull, Amy
Sent: Tuesday, April 04, 2017 11:47 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: question about strategic harvesting -- is it OK with authors to have all presentations on internal NRC Sharepoint?

(I remember that you needed to find out if there were constraints on which presentations could not be seen by non-attendees.) What is the status of the workshop summary?

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 new SLR UNR that will replace NRR-2010-006.

- Final deliverable expected by early 2017. Final report publication will wait until after harvesting workshop in March.
- Workshop held on March 7-8. Good frank discussion with external parties from DOE, EPRI, and international stakeholders on benefits and challenges of harvesting.
- CMB staff will prepare workshop summary report and followup on action items with interested workshop attendees focused on a database for sources of materials and prioritizing data needs for harvesting.

Amy B. Hull, Ph.D

Senior Materials Engineer
RES/DE/CMB (office T10-D49)
US Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, Maryland 20852
Telephone: (301) 415-2435
FAX: 301-415-6671
e-mail: amy.hull@nrc.gov

From: Snail, Malika
Sent: Thu, 23 Feb 2017 09:21:09 -0500
To: Hiser, Matthew
Subject: RE: Quick Brief for Brian Thomas

You are welcome.

From: Hiser, Matthew
Sent: Thursday, February 23, 2017 9:20 AM
To: Snail, Malika <Malika.Snail@nrc.gov>
Subject: RE: Quick Brief for Brian Thomas

Thank you ☺

From: Snail, Malika
Sent: Thursday, February 23, 2017 9:20 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Quick Brief for Brian Thomas

Done.

From: Hiser, Matthew
Sent: Thursday, February 23, 2017 9:09 AM
To: Snail, Malika <Malika.Snail@nrc.gov>
Subject: Quick Brief for Brian Thomas

Hi Malika,

Could you schedule a 15-minute briefing with Brian Thomas on the topic of "Harvesting Workshop" for sometime next week?

Attendees should be myself, Rob Tregoning, Steve Frankl, and Brian. It looks like we might all be free on Thursday, March 2 between 9:30 and 10:00.

Thanks!
Matt

Matthew Hiser

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

From: Hiser, Matthew
Sent: Mon, 9 Jan 2017 13:17:28 +0000
To: Tregoning, Robert
Subject: RE: RE: [External] RE: Final agenda for Harvesting workshop

I was going to add that we'll need that list of visitors at a minimum for registering them with security...

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: Monday, January 09, 2017 8:14 AM
To: Bernhoft, Sherry <sbernhoft@epri.com>
Cc: Dyle, Robin <rdyle@epri.com>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: RE: [External] RE: Final agenda for Harvesting workshop

Sherry:

Since this is a closed meeting and we're inviting people to attend, we hadn't planned on having a pre-registration. I agree that it would be good, however, to put together a list of planned attendees to circulate in advance of the meeting. We'll make sure to do 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

From: Bernhoft, Sherry [<mailto:sbernhoft@epri.com>]
Sent: Monday, January 09, 2017 8:09 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Dyle, Robin <rdyle@epri.com>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: [External_Sender] RE: [External] RE: Final agenda for Harvesting workshop

Sounds good and thanks

Will there be some type of pre-registration? Not a necessary but I am curious who all may be attending. I talked with some folks at Westinghouse (on concrete aging) right before the holiday break and mentioned this upcoming workshop. I am not sure if they contacted you since they are interested.

Sherry Bernhoft
Electric Power Research Institute
EPRI, Senior Program Manager
1300 West WT Harris Boulevard | Charlotte, NC 28262
704.595.2740 (office)

(b)(6)

(cell)
Email: sbernhof@epri.com
www.epri.com

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From: Tregoning, Robert [<mailto:Robert.Tregoning@nrc.gov>]
Sent: Monday, January 09, 2017 6:00 AM
To: Bernhoft, Sherry <sbernhof@epri.com>
Cc: Dyle, Robin <rdyle@epri.com>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: [External] RE: Final agenda for Harvesting workshop

Sherry:

The announcement and agenda that I sent you previously are the latest ones. I've attached both again FYI. The announcement won't change further. The final agenda is still evolving. We won't have a final agenda until we identify all the speakers and titles of talks. I'm shooting for the end of January to pin down most of these details.

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: Bernhoft, Sherry [<mailto:sbernhof@epri.com>]
Sent: Sunday, January 08, 2017 9:55 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Dyle, Robin <rdyle@epri.com>
Subject: [External_Sender] Final agenda for Harvesting workshop

Rob

Hope you are off to a good start for the New Year

Do you have the final announcement and agenda for the Harvesting Workshop?

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

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From: Hiser, Matthew
Sent: Tue, 21 Nov 2017 20:34:26 +0000
To: Tregoning, Robert; Audrain, Margaret; Purtscher, Patrick
Subject: RE: RE: ANL Harvesting Trip

Yeah, I think that's something we should clarify with Yiren. My assumption is that it means some amount of unirradiated materials from the same heat is available at ANL.

From: Tregoning, Robert
Sent: Tuesday, November 21, 2017 3:16 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: RE: ANL Harvesting Trip

Matt:

Thanks for providing and I think that this is a really good start and contains a lot of useful information. What I'm not clear about is the last column "availability of archive material". What does this specifically mean? Does it mean that there is more material than just the specimens reported? If so, what's the form, quantity, and dose level of this other material?

Thanks,

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: Tuesday, November 21, 2017 10:59 AM
To: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: FW: RE: ANL Harvesting Trip

Sharing this spreadsheet from Yiren at ANL (Rob wasn't on the initial email chain). It's probably a good initial stab at what ANL has available in terms of irradiated materials.

From: Chen, Yiren [mailto:yiren_chen@anl.gov]
Sent: Friday, November 17, 2017 11:12 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>;

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

Subject: [External_Sender] RE: ANL Harvesting Trip

Meg, and Pat,

I think you can contact Ken for SG materials.

Recently, Ken and I also compiled a list of irradiated materials available at Argonne. Please see the attached excel file. I still need to improve this table to include more details about their heat treatment conditions and actual doses. Most of these samples are small TEM disks and miniature tensile samples (gauge section: 0.3x0.06x0.03"), but we do have a few 1/4T-CT samples left from previous programs.

Please let me know what we can help with this effort.

Thanks,

Yiren

From: Audrain, Margaret
Sent: Fri, 17 Nov 2017 11:53:20 -0500
To: Hiser, Matthew; Purtscher, Patrick
Subject: RE: RE: ANL Harvesting Trip

Does anyone know Ken's email? And is there anyone else I should add, Pat?

I'd like to get this out by 2 or so.

Thanks,

Meg

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

From: "Hiser, Matthew" <Matthew.Hiser@nrc.gov>
Date: Fri, November 17, 2017 11:22 AM -0500
To: "Chen, Yiren" <yiren_chen@anl.gov>, "Audrain, Margaret" <Margaret.Audrain@nrc.gov>, "Purtscher, Patrick" <Patrick.Purtscher@nrc.gov>
Subject: RE: RE: ANL Harvesting Trip

Thanks Yiren!

My mistake – I didn't mean to include you on that email. Meg will probably be sending an email later today to you and Bogdan about this effort. Sorry for the oversight, but thank you for your quick response!

From: Chen, Yiren [mailto:yiren_chen@anl.gov]
Sent: Friday, November 17, 2017 11:12 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: [External_Sender] RE: ANL Harvesting Trip

Meg, and Pat,

I think you can contact Ken for SG materials.

Recently, Ken and I also compiled a list of irradiated materials available at Argonne. Please see the attached excel file. I still need to improve this table to include more details about their heat treatment conditions and actual doses. Most of these samples are small TEM disks and miniature tensile samples (gauge section: 0.3x0.06x0.03"), but we do have a few 1/4T-CT samples left from previous programs.

Please let me know what we can help with this effort.

Thanks,

Yiren

From: Hiser, Matthew [mailto:Matthew.Hiser@nrc.gov]
Sent: Friday, November 17, 2017 7:52 AM
To: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>

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

Subject: FW: ANL Harvesting Trip

FYI – Sri is OK with us reaching out to Yiren. Here's Yiren's email address: yiren_chen@anl.gov.

Pat, if you want to add any other input to my edits of Meg's email, then Meg can hopefully shoot it out today. Who would be the right contact for her to send this email to in the SG world at ANL?

Thanks!

Matt

From: Rao, Appajosula

Sent: Friday, November 17, 2017 6:17 AM

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

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

Subject: RE: ANL Harvesting Trip

Matt:

That is fine with me.

Sri

From: Hiser, Matthew

Sent: Thursday, November 16, 2017 2:52 PM

To: Rao, Appajosula <Appajosula.Rao@nrc.gov>

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

Subject: FW: ANL Harvesting Trip

Hi Sri,

As part of this harvesting effort, we are looking at having Meg and Pat visit ANL next month to discuss what materials may be available in their "boneyard" of materials from past testing programs. We are planning to reach out to Meg's PI Bogdan who works on PWSCC and Pat's PI in the steam generator area. We'd also like to reach out to Yiren for information on irradiated materials.

This is not expected to involve a large level of effort, but is designed to identify any low-hanging fruit in terms of previously harvested materials that may be available or of interest for future work.

I just wanted to make you aware that we were planning to make this outreach to ANL and confirm that you are OK with us contacting Yiren similar to Bogdan and the ANL SG staff.

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: Tregoning, Robert
Sent: Thu, 24 May 2018 16:03:33 +0000
To: Hiser, Matthew
Subject: RE: Re: Baffle Bolts

My take would be that we're trying to confirm the industry's postulated failure mechanism so that we can ensure that their AMP is effective and appropriate. Like you said, this is cheap to do. I'm curious if maybe chloride plays a role in the cracking and would want to try to look into that a bit more. Would be good to get Sri's help with that....

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

From: Hiser, Matthew
Sent: Thursday, May 24, 2018 10:54 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Re: Baffle Bolts

OK, so you're looking at the need (or demand) as for baffle bolt issues specifically – I had been thinking more about how baffle bolt materials could be used for broader high fluence IAD / void swelling purposes.

That's a good point – I think we should turn the crank on baffle bolt issues from a demand perspective. It's tricky based on what you think for regulatory considerations in terms of current aging management practices. But the cost/complexity should be relatively simple and cheap since they're already harvested and in some cases sitting in a hot cell!

From: Tregoning, Robert
Sent: Thursday, May 24, 2018 10:49 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Re: Baffle Bolts

Not a big deal but I disagree; failed baffle bolts are just a particular RPI of great interest given the OpE so it that sense they are a "demand" that we would want to do some unique things with then other RPIs. The "supply" is the population of failed BFBs or in this case DC Cook, IP2, etc....

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission

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

From: Hiser, Matthew
Sent: Thursday, May 24, 2018 9:04 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Re: Baffle Bolts

Hi Rob,

That's a good point, although baffle bolts themselves would be more on the supply side I think. The harvesting priority list would be the demand side of what technical needs could be filled by the baffle bolt materials (i.e., highly irradiated stainless steel materials). I think they would fit with this need:

Need Description	Purpose / Testing Planned	Technical Knowledge Gained
METALS		
High fluence reactor internals	Void swelling, mechanical properties, IASCC	Likely extent of void swelling in PWRs during extended operation and impact on cracking

Meg and I had talked last week about her filling in the table based on the meeting you guys had previously "exercising" the criteria. I'll check with her on where that stands...

Thanks!
Matt

From: Tregoning, Robert
Sent: Thursday, May 24, 2018 8:34 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Re: Baffle Bolts

Matt:

Thanks for this. Do you think we should specifically add BFBs to our metals harvesting priority list and fill out the ranking information?

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: Wednesday, May 23, 2018 1:20 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: FW: Re: Baffle Bolts

From: Jackson, John Howard [<mailto:john.jackson@inl.gov>]
Sent: Tuesday, May 15, 2018 5:43 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: [External_Sender] Re: Baffle Bolts

Matt,

Probably next week. I'm in Wisconsin at a workshop until Friday.

In short, we're in the process of putting together the Transfer of Title documents with Westinghouse and Entergy. We will be getting all of the 347 SS bolts but not the 316 SS bolts (because they are unwilling to share the CMTR for the 316 SS).

-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

On Tue, May 15, 2018 at 2:15 PM, Hiser, Matthew <Matthew.Hiser@nrc.gov> wrote:

Hi John,

I hope you are doing well!

I wanted to touch base with you on the status of the baffle bolts at Westinghouse from Indian Point and DC Cook. Is there a good time for you this week or next?

Thanks!

Matt

From: Hiser, Matthew
Sent: Fri, 17 Feb 2017 20:20:08 +0000
To: Purtscher, Patrick
Subject: RE: RE: Draft slides

Hi Pat,

Have you seen anything from Pradeep on this?

Thanks!
Matt

From: Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]
Sent: Monday, February 13, 2017 10:55 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: [External_Sender] RE: Draft slides

Patrick,

Thank you for the feedback. I need to work on these - let me make those changes and re-send this week. Perhaps we can connect later this week or next week on the phone, if needed?

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: Purtscher, Patrick [Patrick.Purtscher@nrc.gov]
Received: Monday, 13 Feb 2017, 7:49AM
To: Ramuhalli, Pradeep [Pradeep.Ramuhalli@pnnl.gov]
CC: Hiser, Matthew [Matthew.Hiser@nrc.gov]
Subject: FW: RE: Draft slides

Hi Pradeep,

Thank you for sharing these slides. We've attached a PP that we are distributing to speakers and attendees describing the workshop overall as well as expectations for each session. We just developed this in the past few days, and are starting to distribute now. Please take a look for your awareness.

These slides are a good starting point, but are a little too broad for the sessions we're envisioning.

For the first presentation in session 2, focus on capturing Section 3.3 from the draft report you sent a couple days ago. So focus on the criteria for prioritizing harvesting data needs and the examples that PNNL analyzed in the report: CASS, cables, DMWs, internals. We are planning a very short NRC slot in session 2 to cover more comprehensively NRC's data needs for harvesting; we want you to cover the criteria and 4 examples and we'll lay out the whole range of high-priority data needs for metals, cables, and concrete. The current draft of our slides is attached for your awareness. Plus, we don't want to explicitly focus on SLR, but talk about long-term operation.

From the slides you have now for session 2, here are some suggestions:

- I would delete slide 2 because it is high-level and should be captured in Session 1.
- Keep slide 3 to capture briefly Ch. 2 ideas: why do harvesting, which leads to prioritization criteria
- Add a slide to capture Section 3.1/3.2 on lit review / basis for information
- Add slide or two on criteria: why these criteria, how are they applied/used
- Add several slides going through examples (maybe 1 slide/example) and how criteria led to an outcome
 - In other words, explain why we're interested in harvesting cables, CASS, and internals, but not DM welds so much
- That's it!

For session 5 slides, put the focus on Section 4.2 from your report with references to 4.1 (harvesting experience) as needed to explain why we'd like various pieces of information for harvesting planning.

Suggestions on specific slides:

- Delete slides 11/12 – don't need to cover info tool in this presentation
- Maybe 1 or 2 background slides referring to harvesting experience (Ch. 4.1) in general
- Focus several slides on Section 4.2 going in-depth on what information is needed for harvesting planning
 - This presentation sets the stage in Session 5 for a discussion of harvesting plans from the various participants, so we want to thoroughly systematically lay out what information we think is helpful for informed decision-making

Thanks!

Matt and Pat

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: Hull, Amy
Sent: Wed, 4 Nov 2015 11:23:03 -0500
To: Hiser, Matthew
Subject: RE: RE: Ex-plant harvesting information tool

Thanks Matt !

From: Hiser, Matthew
Sent: Wednesday, November 04, 2015 10:56 AM
To: Hull, Amy <Amy.Hull@nrc.gov>
Subject: FW: RE: Ex-plant harvesting information tool

From: Ramuhalli, Pradeep [<mailto:Pradeep.Ramuhalli@pnnl.gov>]
Sent: Friday, October 30, 2015 11:29 AM
To: Hiser, Matthew
Subject: [External_Sender] RE: Ex-plant harvesting information tool

Matt,

I missed that. PNNL and ORNL will be open on Veteran's day. Let me check with ORNL on availability the day before or after.

Have a good weekend!

With best regards,

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

From: Hiser, Matthew [<mailto:Matthew.Hiser@nrc.gov>]
Sent: Friday, October 30, 2015 7:06 AM
To: Ramuhalli, Pradeep
Subject: RE: Ex-plant harvesting information tool

Hi Pradeep,

I just noticed this meeting is on Veteran's Day. Not sure if PNNL and ORNL are open that day, but NRC is closed. Personally, I could still call in, but I'm not sure about Amy...

Hope the meetings this week went well – I'll talk to Amy when she's back next week!

Thanks!
Matt

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

From: Ramuhalli, Pradeep [<mailto:Pradeep.Ramuhalli@pnnl.gov>]
Sent: Thursday, October 29, 2015 12:50 PM
To: Ramuhalli, Pradeep; Hiser, Matthew; Fifield, Leo S; Keith Leonard (leonardk@ornl.gov) (leonardk@ornl.gov); T. M. Rosseel (rosseeltm@ornl.gov); Hull, Amy
Cc: Knobbs, Katie
Subject: FW: Ex-plant harvesting information tool
When: Wednesday, November 11, 2015 10:00 AM-11:00 AM (UTC-08:00) Pacific Time (US & Canada).
Where: 866-528-1882; Conference ID:

(b)(6)

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

From: Ramuhalli, Pradeep [<mailto:Pradeep.Ramuhalli@pnnl.gov>]
Sent: Tuesday, October 27, 2015 5:48 PM
To: Ramuhalli, Pradeep; Fifield, Leo S; Keith Leonard (leonardk@ornl.gov) (leonardk@ornl.gov); T. M. Rosseel (rosseeltm@ornl.gov); Hull, Amy
Cc: Knobbs, Katie
Subject: [External_Sender] Ex-plant harvesting information tool
When: Wednesday, November 11, 2015 10:00 AM-11:00 AM (UTC-08:00) Pacific Time (US & Canada).
Where: 866-528-1882; Conference ID:

(b)(6)

Sorry – moving to 1 pm ET to accommodate schedules.

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[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](#)

(b)(6)

Conference ID:

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

[OC][1033]I

From: Tregoning, Robert
Sent: Tue, 21 Feb 2017 05:48:41 -0600
To: Hiser, Matthew; Purtscher, Patrick
Subject: RE: RE: Ex-plant Materials Harvesting Workshop

No prior communication....

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, February 17, 2017 7:46 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: FW: RE: Ex-plant Materials Harvesting Workshop

Have we had any prior contact with Bel V? We'll add this to the agenda for Tuesday morning planning meeting...

From: Roussel Guy [<mailto:guy.roussel@Belv.be>]
Sent: Friday, February 17, 2017 7:02 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: [External_Sender] RE: Ex-plant Materials Harvesting Workshop

Dear Matt,

As you probably know, Bel V which the Technical Support Organization of the Belgian Nuclear Safety Authorities (FANC) showed their interest in attending the upcoming Ex-plant Materials Harvesting Workshop on March 7-8. I'm informing you herewith that I will attend the workshop as a representative of my organization.

I'll send you next Monday a scanned copy of passport.

Best regards,

Guy

Guy Roussel
Structural integrity expert
Bel V

From: Hiser, Matthew [<mailto:Matthew.Hiser@nrc.gov>]

Sent: mercredi 15 février 2017 16:47

To: Dyle, Robin; Jean Smith (jmsmith@epri.com); Ahluwalia, Kawaljit; Richard Reister (Richard.Reister@nuclear.energy.gov); 'leonardk@ornl.gov'; 'Rosseel, Thomas M.'; 'William F Zipp (Generation - 4)'; 'Gerard P. Van Noordennen'; Ramuhalli, Pradeep (Pradeep.Ramuhalli@pnnl.gov); 'daniel.tello@canada.ca'; 'Uwe.Jendrich@grs.de'; Chaouadi Rachid; 'arait@criepi.denken.or.jp'; 'alpanfa@westinghouse.com'; 'sokolovm@ornl.gov'; 'desire.ndomba@canada.ca'; 'khuynh@aecl.ca'; 'higuchi@criepi.denken.or.jp'; 'kazunobu_sakamoto@nsr.go.jp'; 'chimi.yasuhiro@jaea.go.jp'; 'leo.fifield@pnnl.gov'

Cc: Tregoning, Robert; Purtscher, Patrick

Subject: Ex-plant Materials Harvesting Workshop

Dear Harvesting Workshop Attendees:

You are receiving this email because I have you recorded as attending the upcoming Ex-plant Materials Harvesting Workshop on March 7-8 at USNRC headquarters in Rockville, MD. I have attached the workshop introduction slides that cover meeting logistics, motivation, approach, expected outcome, and session expectations. We are hoping these slides provide a common vision for the workshop that will allow for a focused, productive discussion.

The workshop will be held in NRC's Three White Flint North (3WFN) building, which is directly adjacent to the White Flint Metro station, in room 1C3 on the first floor. I have attached a map of the local area showing the Metro station and the 3WFN building.

The workshop is scheduled to start at 8:00 on Tuesday, March 7. I recommend planning to arrive at 3WFN around 7:30-7:45 in order to go through security to enter the building.

I would like to request input from attendees on two items:

1. We are making reservations at a nearby restaurant for dinner on Tuesday, March 7. Please let me know if you plan to join for the dinner with other workshop participants, so I can make the appropriate reservation.
2. If you are traveling from outside the U.S., please be sure to bring two forms of ID (passport and a second photo ID). Also, please email me a scanned copy of your passport if possible. This will speed the security check-in process.

Thank you for your participation in the workshop. We are looking forward to the discussion and engagement and appreciate your contribution to a productive and interesting meeting!

Please let me know if you have any questions.

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: Tregoning, Robert
Sent: Thu, 23 Feb 2017 06:52:18 -0600
To: Hiser, Matthew
Subject: RE: RE: Ex-plant Materials Harvesting Workshop

Do you want to get back to Rich or do you want me to?

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

From: Hiser, Matthew
Sent: Thursday, February 23, 2017 7:31 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: RE: Ex-plant Materials Harvesting Workshop

LOL... If we keep Mark Kirk (I haven't contacted Mark yet) and add this guy, we'll be at 33 total...

From: Tregoning, Robert
Sent: Wednesday, February 22, 2017 4:43 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: FW: RE: Ex-plant Materials Harvesting Workshop

Will this ever end?

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: Reister, Richard [<mailto:Richard.Reister@nuclear.energy.gov>]
Sent: Wednesday, February 22, 2017 3:59 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: [External_Sender] RE: Ex-plant Materials Harvesting Workshop

Matt/Rob:

It turns out the new LWRS TIO Director, John Wagner, will be in DC on other business the same week as this workshop and John would like to attend primarily to here directly from and interact with the various NRC folks involved in LTO issues. I know this workshop in invitation only and there is limited space. Would it be OK to invite John to the workshop? I think it would a good opportunity for John.

Thanks, Rich

From: Hiser, Matthew [<mailto:Matthew.Hiser@nrc.gov>]
Sent: Wednesday, February 15, 2017 10:47 AM
To: Dyle, Robin <rdyle@epri.com>; Jean Smith (jmsmith@epri.com) <jmsmith@epri.com>; Ahluwalia, Kawaljit <kahluwal@epri.com>; Reister, Richard <Richard.Reister@nuclear.energy.gov>; 'leonardk@ornl.gov' <leonardk@ornl.gov>; 'Rosseel, Thomas M.' <rosseeltm@ornl.gov>; 'William F Zipp (Generation - 4)' <william.f.zipp@dom.com>; 'Gerard P. Van Noordennen' <gpvannoordennen@energysolutions.com>; Ramuhalli, Pradeep <pradeep.ramuhalli@pnnl.gov>; 'daniel.tello@canada.ca' <daniel.tello@canada.ca>; 'Uwe.Jendrich@grs.de' <Uwe.Jendrich@grs.de>; 'rachid.chaouadi@sckcen.be' <rachid.chaouadi@sckcen.be>; 'arait@criepi.denken.or.jp' <arait@criepi.denken.or.jp>; 'alpanfa@westinghouse.com' <alpanfa@westinghouse.com>; 'sokolovm@ornl.gov' <sokolovm@ornl.gov>; 'desire.ndomba@canada.ca' <desire.ndomba@canada.ca>; 'khuynh@aecl.ca' <khuynh@aecl.ca>; 'higuchi@criepi.denken.or.jp' <higuchi@criepi.denken.or.jp>; 'kazunobu_sakamoto@nsr.go.jp' <kazunobu_sakamoto@nsr.go.jp>; 'chimi.yasuhiro@jaea.go.jp' <chimi.yasuhiro@jaea.go.jp>; Fifield, Leonard S <leonard.fifield@pnnl.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: Ex-plant Materials Harvesting Workshop

Dear Harvesting Workshop Attendees:

You are receiving this email because I have you recorded as attending the upcoming Ex-plant Materials Harvesting Workshop on March 7-8 at USNRC headquarters in Rockville, MD. I have attached the workshop introduction slides that cover meeting logistics, motivation, approach, expected outcome, and session expectations. We are hoping these slides provide a common vision for the workshop that will allow for a focused, productive discussion.

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1. We are making reservations at a nearby restaurant for dinner on Tuesday, March 7. Please let me know if you plan to join for the dinner with other workshop participants, so I can make the appropriate reservation.
2. If you are traveling from outside the U.S., please be sure to bring two forms of ID (passport and a second photo ID). Also, please email me a scanned copy of your passport if possible. This will speed the security check-in process.

Thank you for your participation in the workshop. We are looking forward to the discussion and engagement and appreciate your contribution to a productive and interesting meeting!

Please let me know if you have any questions.

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: Tregoning, Robert
Sent: Wed, 25 Jan 2017 16:43:32 -0500
To: Hiser, Matthew; Purtscher, Patrick
Subject: RE: RE: Harvesting Workshop

Sounds good....

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

From: Hiser, Matthew
Sent: Wednesday, January 25, 2017 4:40 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: RE: Harvesting Workshop

OK, I'll swing by tomorrow to discuss the bridge line option. I talked to Greg the other day about the workshop and he suggested a webinar so others could see slides and hear discussion...

I guess they have flush travel budgets up north. I know he mentioned at least one was a "director" of some kind (higher level manager was the impression), so I wonder how much of this is some of them looking for a good reason to head south on official business.

From: Tregoning, Robert
Sent: Wednesday, January 25, 2017 4:27 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: RE: Harvesting Workshop

I think 1 with 2 being the absolute maximum. We don't have the space to support more and just let him know that. Before we get back to him, let's chat if we want to offer up wider attendance through a bridgeline connection. We've talked about this for NRC folks but this may not be a good strategy if there end up being a lot of people on the bridge.....

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

From: Hiser, Matthew

Sent: Wednesday, January 25, 2017 4:24 PM

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

Subject: RE: RE: Harvesting Workshop

Yeah, as I mentioned in my other email, I was shocked when he said 5 people. He kind of noticed my surprise and asked if it was OK. I mentioned that we were trying to keep the total participants to around 30 to foster good discussion, but didn't feel like I could just say no. I mentioned we were expecting more like 2 or 3 from Canada and we might have issues with space, but asked him to send the names and we would get back to him about numbers if we couldn't accommodate 5... So I think there's still an opening to diplomatically try to scale them back.

Matt

From: Tregoning, Robert

Sent: Wednesday, January 25, 2017 4:17 PM

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

Subject: FW: RE: Harvesting Workshop

Wow, this is way too many people coming from Canada, especially when it's not even clear what may be applicable to U.S. LWRs, certainly concrete and cables, but beyond this..... Does it make sense for us to politely get them to limit participation to just 1 or 2 people at most? Maybe the others could listen in on a bridgeline....

RT

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

From: Tello, Daniel (CNSC/CCSN) [<mailto:daniel.tello@canada.ca>]

Sent: Wednesday, January 25, 2017 4:07 PM

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

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

Ndomba, Désiré (CNSC/CCSN) <desire.ndomba@canada.ca>; Karen Huynh (khuynh@aecl.ca)

<khuynh@aecl.ca>

Subject: [External_Sender] RE: Harvesting Workshop

Hi Matt,

As discussed, there will be 3 organizations attending from Canada. Below are the names of the individuals, titles and organizations.

1. Daniel Tello – Senior Research Program Officer, Canadian Nuclear Safety Commission (CNSC)
2. Désiré Ndomba – Technical Specialist, Canadian Nuclear Safety Commission (CNSC)
3. Karen Huynh – Federal Science & Technology Manager, Atomic Energy of Canada Limited (AECL)
4. Gina Strati – Program Director: Energy, Canadian Nuclear Laboratories (CNL)
5. Lori Walters – Mechanical R&D Engineer, Canadian Nuclear Laboratories (CNL)

Regards,
Dan

Daniel Tello

*Senior Research Program Officer
Regulatory Research and Evaluation Division
Canadian Nuclear Safety Commission / Government of Canada
daniel.tello@canada.ca / Tel: 613-995-2609*

*Agent principal du programme de recherche
Division de la recherche en réglementation et de l'évaluation
Commission canadienne de sûreté nucléaire / Gouvernement du Canada
daniel.tello@canada.ca / Tél: 613-995-2609*

From: Tello, Daniel (CNSC/CCSN)
Sent: January-18-17 12:04 PM
To: 'Hiser, Matthew'
Cc: Tregoning, Robert; Purtscher, Patrick
Subject: RE: Harvesting Workshop

Hi Matt,

Thank you for the additional information. We would be willing to present what 'harvesting' research we are doing here in Canada.

I'll discuss with my team and we can then discuss further with you.

Regards,
Dan

Daniel Tello

*Senior Research Program Officer
Regulatory Research and Evaluation Division
Canadian Nuclear Safety Commission / Government of Canada
daniel.tello@canada.ca / Tel: 613-995-2609*

*Agent principal du programme de recherche
Division de la recherche en réglementation et de l'évaluation
Commission canadienne de sûreté nucléaire / Gouvernement du Canada
daniel.tello@canada.ca / Tél: 613-995-2609*

From: Hiser, Matthew [<mailto:Matthew.Hiser@nrc.gov>]
Sent: January-17-17 11:52 AM
To: Tello, Daniel (CNSC/CCSN)
Cc: Tregoning, Robert; Purtscher, Patrick
Subject: Harvesting Workshop

Hello Daniel:

Thank you for reaching out to me about CNSC's interest in the workshop we are hosting here at NRC. As we discussed, NRC would certainly be interested in attendance and participation by CNSC and other Canadian organizations. We are planning for the workshop to include presentations as well as significant time for open discussion among attendees.

I have attached a condensed version of the agenda which includes the titles of each session. We are hoping to have at least one international presentation in each session. If CNSC or another Canadian organization is interested in presenting, we will certainly try to include them on the agenda if possible.

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: Thu, 26 Jan 2017 15:23:22 +0000
To: Tregoning, Robert; Purtscher, Patrick
Subject: RE: Re: Harvesting Workshop

Sounds good – just wanted to forward his response...

From: Tregoning, Robert
Sent: Thursday, January 26, 2017 10:23 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Re: Harvesting Workshop

Let's see who else we hear from on this and then figure out best way forward. If it's a cacophony that's one thing; if it's just Tom perhaps we should dig further to find out what his concerns are....

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

From: Hiser, Matthew
Sent: Thursday, January 26, 2017 10:20 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: FW: Re: Harvesting Workshop

From: Rosseel, Thomas M. [<mailto:rosseeltm@ornl.gov>]
Sent: Thursday, January 26, 2017 10:19 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: [External_Sender] Re: Harvesting Workshop

Hi Matt,

I am not inclined to sign the consent form.

Tom

From: "Matthew.Hiser@nrc.gov" <Matthew.Hiser@nrc.gov>
Date: Wednesday, January 25, 2017 at 3:38 PM
To: Richard Reister <Richard.Reister@nuclear.energy.gov>, "T. M. Rosseel" <rosseeltm@ornl.gov>, Sherry Bernhoft <sbernhof@epri.com>, Robin Dyle <rdyle@epri.com>
Cc: "Tregoning, Robert" <Robert.Tregoning@nrc.gov>, "Purtscher, Patrick" <Patrick.Purtscher@nrc.gov>
Subject: Harvesting Workshop

DOE and EPRI Colleagues,

Thank you for participating in the discussion last week on the harvesting workshop sessions 3 and 4. We are making good progress on identifying speakers for the workshop. I wanted to bring a couple items to your attention and request your feedback:

1. We were thinking of doing a video recording of the workshop, simply to capture the discussion and action items to help with the meeting summary. We didn't have any other purpose other than to maximize documentation of the discussion for the benefit of the participants. When I reached out to the NRC A/V folks, I was advised that all speakers would need to sign the NRC multimedia consent form (attached). Please take a look at this form and let us know if your speakers are comfortable with it. If not, we may not be able to take advantage of recording the workshop.
2. Could DOE and EPRI identify their planned speakers for each session? We're hoping to have the agenda and speakers firmed up by next week. As you know, there are slots for DOE and EPRI in each session.

Thanks and please let me know if you have any questions.
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, 25 Jan 2017 21:15:24 +0000
To: Tregoning, Robert;Purtscher, Patrick
Subject: RE: RE: Harvesting Workshop

Hi Rob and Pat,

I just wanted to follow up on this email. I spoke with Dan Tello at CNSC yesterday and was surprised to hear their interest in sending 5 people from 3 different Canadian organizations!

They seemed interested in presenting on their work harvesting cables and concrete. I explained to him the focus of the different sessions we are planning. I suggested they present in Session 3 on Sources of Materials and perhaps they could briefly touch on their broader harvesting perspective, but focus on their plans in terms of sources of materials for other interested parties.

Thanks!
Matt

From: Tello, Daniel (CNSC/CCSN) [mailto:daniel.tello@canada.ca]
Sent: Wednesday, January 25, 2017 4:07 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Ndomba, Désiré (CNSC/CCSN) <desire.ndomba@canada.ca>; Karen Huynh (khuyh@aecl.ca) <khuyh@aecl.ca>
Subject: [External_Sender] RE: Harvesting Workshop

Hi Matt,

As discussed, there will be 3 organizations attending from Canada. Below are the names of the individuals, titles and organizations.

1. Daniel Tello – Senior Research Program Officer, Canadian Nuclear Safety Commission (CNSC)
2. Désiré Ndomba – Technical Specialist, Canadian Nuclear Safety Commission (CNSC)
3. Karen Huynh – Federal Science & Technology Manager, Atomic Energy of Canada Limited (AECL)
4. Gina Strati – Program Director: Energy, Canadian Nuclear Laboratories (CNL)
5. Lori Walters – Mechanical R&D Engineer, Canadian Nuclear Laboratories (CNL)

Regards,
Dan

Daniel Tello

Senior Research Program Officer
Regulatory Research and Evaluation Division
Canadian Nuclear Safety Commission / Government of Canada

daniel.tello@canada.ca / Tel: 613-995-2609

*Agent principal du programme de recherche
Division de la recherche en réglementation et de l'évaluation
Commission canadienne de sûreté nucléaire / Gouvernement du Canada
daniel.tello@canada.ca / Tél: 613-995-2609*

From: Tello, Daniel (CNSC/CCSN)
Sent: January-18-17 12:04 PM
To: 'Hiser, Matthew'
Cc: Tregoning, Robert; Purtscher, Patrick
Subject: RE: Harvesting Workshop

Hi Matt,

Thank you for the additional information. We would be willing to present what 'harvesting' research we are doing here in Canada.

I'll discuss with my team and we can then discuss further with you.

Regards,
Dan

Daniel Tello

*Senior Research Program Officer
Regulatory Research and Evaluation Division
Canadian Nuclear Safety Commission / Government of Canada
daniel.tello@canada.ca / Tel: 613-995-2609*

*Agent principal du programme de recherche
Division de la recherche en réglementation et de l'évaluation
Commission canadienne de sûreté nucléaire / Gouvernement du Canada
daniel.tello@canada.ca / Tél: 613-995-2609*

From: Hiser, Matthew [<mailto:Matthew.Hiser@nrc.gov>]
Sent: January-17-17 11:52 AM
To: Tello, Daniel (CNSC/CCSN)
Cc: Tregoning, Robert; Purtscher, Patrick
Subject: Harvesting Workshop

Hello Daniel:

Thank you for reaching out to me about CNSC's interest in the workshop we are hosting here at NRC. As we discussed, NRC would certainly be interested in attendance and participation by CNSC and other Canadian organizations. We are planning for the workshop to include presentations as well as significant time for open discussion among attendees.

I have attached a condensed version of the agenda which includes the titles of each session. We are hoping to have at least one international presentation in each session. If CNSC or another Canadian organization is interested in presenting, we will certainly try to include them on the agenda if possible.

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: Tue, 31 Jan 2017 16:06:12 +0000
To: Frankl, Istvan
Subject: RE: Re: Harvesting Workshop Announcement

Hi Steve,

I will be sending emails today to several presenters and attach these slides for their awareness when preparing for the workshop. These were also sent yesterday to DOE/EPRI for info / comment. Haven't heard anything back yet.

Thanks!
Matt

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

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

From: Frankl, Istvan
Sent: Tuesday, January 31, 2017 11:04 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Re: Harvesting Workshop Announcement

Thanks, Matt.

Have you already shared these slides with prospective presenters? As discussed, this would be useful in focusing and "framing" the presentations.

Steve

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

From: Hiser, Matthew
Sent: Tuesday, January 31, 2017 10:06 AM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: FW: Re: Harvesting Workshop Announcement

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

From: Hiser, Matthew
Sent: Tuesday, January 31, 2017 9:39 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Re: Harvesting Workshop Announcement

Thanks Rob! I made your suggested changes and will use the attached slides in communication with speakers...

From: Hiser, Matthew
Sent: Tue, 31 Jan 2017 14:38:40 +0000
To: Tregoning, Robert; Purtscher, Patrick
Subject: RE: Re: Harvesting Workshop Announcement
Attachments: Ex-Plant Materials Harvesting Workshop.pptx

Note to requester: The attachment is immediately following.

Thanks Rob! I made your suggested changes and will use the attached slides in communication with speakers...

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

From: Tregoning, Robert
Sent: Tuesday, January 31, 2017 9:27 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Re: Harvesting Workshop Announcement

Kill the subbullets on FOIA and proprietary information. I don't think we need to alarm people about FOIA. If they decide to present something proprietary to this audience without marking it thus, that's their fault :). You might also add the meeting location and the Marriot as the closest hotel (within walking distance) to the NRC. You could also mention that we're right at the White Flint Metro stop....

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

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

From: Hiser, Matthew
Sent: Tuesday, January 31, 2017 9:23 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Re: Harvesting Workshop Announcement

That's a good idea - I added a slide on meeting logistics and also mention the GoToMeeting / recording... Any thoughts or comments?

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

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

From: Tregoning, Robert
Sent: Tuesday, January 31, 2017 8:30 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Re: Harvesting Workshop Announcement

Maybe we can add this to the slides...

Robert Tregoning
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fax: 301-415-6671

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

From: Purtscher, Patrick
Sent: Tuesday, January 31, 2017 8:24 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Re: Harvesting Workshop Announcement

Should we emphasis that this is a closed meeting?

Pat

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

From: Tregoning, Robert
Sent: Tuesday, January 31, 2017 8:20 AM
To: Arai, Taku <arait@criepi.denken.or.jp>; Sadao Higuchi <higuchi@criepi.denken.or.jp>
Cc: Soneda, Naoki <soneda@criepi.denken.or.jp>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: FW: Re: Harvesting Workshop Announcement

Dr. Arai and Dr. Higuchi:

Thank you for your interest and willingness to participate in the workshop. I have attached the workshop announcement and condensed agenda along with a few slides describing the motivation for the workshop and the expectations for each session. The workshop is divided into 5 sessions, each with a combination of presentations and discussion:

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

We would like to invite you to present in any of Sessions 2, 3, or 4. For session 3, we are looking for brief 5-10 minute presentations, so just a few slides at most on sources of materials. For sessions 2 and 4, the presentations are anticipated to be longer, perhaps 20-30 minutes, covering data needs best addressed through harvesting (session 2) and lessons learned from previous harvesting experience (session 4).

Please let me know if you would be able to participate and which sessions you would be willing to support, along with presentation titles. We will look forward to your participation and contribution to the workshop!

Warm regards,

Rob

Robert Tregoning
Technical Advisor for Materials

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11545 Rockville Pike
Rockville, MD 20852-2738
ph: 301-415-2324
fax: 301-415-6671

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

From: Soneda, Naoki [<mailto:soneda@criepi.denken.or.jp>]
Sent: Monday, January 30, 2017 8:38 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Arai, Taku <arait@criepi.denken.or.jp>; Sadao Higuchi <higuchi@criepi.denken.or.jp>
Subject: [External_Sender] Re: Harvesting Workshop Announcement

Dear Rob,

Sorry for my late response. I talked to several stakeholders about our presentation at the workshop. At this point of time, it looks we should make a presentation in Session I on the motivation for harvesting. CRIEPI has a lot of experiences on characterizing materials from nuclear reactors. We would like to talk about our motivation for harvesting in light of such experiences.

I learned that I need to stay within Japan during that week, and Dr. Taku Arai and Dr. Sadao Higuchi will participate the workshop from CRIEPI. These two people are deeply involved in the discussions on future possible researches of decommissioned materials in Japan, even though such discussions are still in a very early stage. So I think they can contribute to discussions in other sessions as well.

I would appreciate if you could provide me with any new information about the workshop so that my colleagues can start preparing for the workshop. You can find their e-mail addresses in the Cc: fields of this message.

Best regards,
Naoki

Tregoning, Robert wrote on 2017/01/04 20:40:

> Naoki:

>

> That sounds great. I look forward to hearing from you.

>

> Regards,

>

> Rob

>

> -----Original Message-----

> From: Soneda, Naoki [<mailto:soneda@criepi.denken.or.jp>]

> Sent: Tuesday, January 03, 2017 7:01 PM

> To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Matthew

> <Matthew.Hiser@nrc.gov>

> Cc: Rosseel, Thomas M. <rosseeltm@ornl.gov>; Sokolov, Mikhail A.

> <sokolovm@ornl.gov>; Arai, Taku <arait@criepi.denken.or.jp>; 坂本 一信

> <kazunobu_sakamoto@nsr.go.jp>

> Subject: [External_Sender] Re: Harvesting Workshop Announcement

>

> Rob,

>

> Thank you for the information. The end of January is a good target because I will have time to discuss several people who are interested in working on harvesting activities. Let's keep in touch.

>
> Best regards,
> Naoki
>
> Tregoning, Robert wrote on 2017/01/03 21:23:
>> Naoki:
>>
>> Thank you for your reply and interest in the workshop. We would certainly like CRIEPI to attend and hopefully participate in the workshop. We're just now starting to planning the talks for the individual sessions so there is certainly time for you to discuss with your colleagues the contribution that you would like to propose. I am hoping that we can have the titles and speakers for all the talks confirmed by the end of January. We will certainly be in contact with you during this planning period. Please let me know if you have any other questions in the interim.
>>
>> Warm regards,
>>
>> Rob
>>
>> -----Original Message-----
>> From: Soneda, Naoki [<mailto:soneda@criepi.denken.or.jp>]
>> Sent: Monday, December 26, 2016 1:49 AM
>> To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Matthew
>> <Matthew.Hiser@nrc.gov>
>> Cc: Rosseel, Thomas M. <rosseeltm@ornl.gov>; Sokolov, Mikhail A.
>> <sokolovm@ornl.gov>; Arai, Taku <arait@criepi.denken.or.jp>; 坂本 一信
>> <kazunobu_sakamoto@nsr.go.jp>
>> Subject: [External_Sender] Re: Harvesting Workshop Announcement
>>
>> Dear Rob,
>>
>> Thank you very much for your response. We am now discussing with our Japanese colleagues on the session where we can make a contribution. I would appreciate if you could allow us some more time. In any case, CRIEPI would like to participate the workshop if it is acceptable with you.
>>
>> At this moment, I have no idea about the organizations, other than NRA, which are interested in participating.
>>
>> Best regards,
>> Naoki
>>
>> Tregoning, Robert wrote on 2016/12/20 23:47:
>>> Dear Dr. Sonada:
>>>
>>> Thank you so much for your email and your inquiry about the harvesting workshop. I apologize for not responding to you sooner, but last week was very busy for me. 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
>>>
>>> Do you have a particular session in mind where you would like to make a presentation? If so, can you please send me a proposed title?
>>>

>>> Also, we are trying to keep the workshop participation fairly small to make sure that we can have meaningful discussion. I've been in contact with Kazu Sakamoto from NRAJ and want to make sure that we work together to get the right organizations from Japan to participate. Can you tell me what other organizations are interested in participating?

>>>

>>> Thank you again for your interest. I'm hoping that the workshop will be successful for all participants. I hope you and your family have a Happy Holidays and a prosperous New Year as well.

>>>

>>> 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

>>>

>>>

>>> -----Original Message-----

>>> From: Soneda, Naoki [<mailto:soneda@criepi.denken.or.jp>]

>>> Sent: Wednesday, December 14, 2016 4:18 AM

>>> To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Matthew

>>> <Matthew.Hiser@nrc.gov>

>>> Cc: Rosseel, Thomas M. <rosseeltm@ornl.gov>; Sokolov, Mikhail A.

>>> <sokolovm@ornl.gov>; Arai, Taku <arait@criepi.denken.or.jp>

>>> Subject: [External_Sender] Harvesting Workshop Announcement

>>>

>>> Dear Dr. Tregoning and Dr. Hiser,

>>>

>>> Dr. Rosseel of ORNL kindly let me know that the USNRC is organizing a material harvesting workshop in March, and I am writing you to ask if there is any chance for us to participate and contribute, somehow, to the workshop.

>>>

>>> We, CRIEPI, are working with Tom and Dr. Sokolov of ORNL on the characterization of RPV materials from Zion Unit 1 under the US-Japan collaboration. We also have some discussions in Japan about materials harvesting from decommissioned Japanese LWRs because some of the Japanese utilities decided permanent shutdown of some of the old LWRs. So, materials harvesting is becoming a hot topic in Japan, and we are very much interested in participating in the workshop.

>>>

>>> I would appreciate if our participation in the workshop is acceptable with the USNRC, and if so, please let me know your current idea about the scope of the workshop so that we can discuss how we can contribute to the workshop.

>>>

>>> I would like to send at least one researcher from CRIEPI, but some people from other organizations in Japan may also like to participate.

>>>

>>> I look forward to hearing from you.

>>>

>>> Best regards,

>>> Naoki

>>>

>>> --

>>> ---

>>> Naoki Soneda, Dr.
>>> Director, Materials Science Research Laboratory CRIEPI
>>> 2-6-1 Nagasaka, Yokosuka-shi, Kanagawa 240-0196
>>> Phone: 070-6568-9287
>>> Fax: 046-856-5571
>>> E-mail: soneda@criepi.denken.or.jp

>>>

>> --

>> ---

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>

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E-mail: soneda@criepi.denken.or.jp

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