

**From:** [Hiser, Matthew](#)  
**To:** ["Dyle, Robin"](#)  
**Subject:** RE: RE: [External] RE: Ex-plant Materials Harvesting Workshop  
**Date:** Thursday, June 22, 2017 4:18:00 PM

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No worries, thanks Robin!

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**From:** Dyle, Robin [mailto:[rdyle@epri.com](mailto:rdyle@epri.com)]

**Sent:** Thursday, June 22, 2017 4:18 PM

**To:** Hiser, Matthew

**Subject:** [External\_Sender] RE: [External] RE: Ex-plant Materials Harvesting Workshop

Matt: I missed too much of the meeting to offer a legitimate critique. I'll leave the EPRI comments to Jean and Al.

Robin Dyle  
EPRI Nuclear Sector  
Office: 205-426-5371  
Cell:   (b)(6)

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**From:** Hiser, Matthew [mailto:[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)]

**Sent:** Thursday, June 22, 2017 2:20 PM

**To:** Bernhoft, Sherry <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>; Smith, Jean <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; Ahluwalia, Kawaljit <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard Reister' (<[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>) <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; 'leonardk@ornl.gov' <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; 'William F Zipp (Generation - 4)' <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>; 'Gerard P. Van Noordennen' <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>; 'Ramuhalli, Pradeep' (<[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>) <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; 'daniel.tello@canada.ca' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>; 'Uwe.Jendrich@grs.de' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; 'rachid.chaouadi@sckcen.be' <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; 'arait@criepi.denken.or.jp' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>; 'alpanfa@westinghouse.com' <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>; 'sokolovm@ornl.gov' <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; 'desire.ndomba@canada.ca' <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>; 'khuynh@aecl.ca' <[khuynh@aecl.ca](mailto:khuynh@aecl.ca)>; 'higuchi@criepi.denken.or.jp' <[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)>; 'kazunobu\_sakamoto@nsr.go.jp' <[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)>; 'chimi.yasuhiro@jaea.go.jp' <[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)>; 'Jackson, John Howard' <[john.jackson@inl.gov](mailto:john.jackson@inl.gov)>; 'Roussel Guy' <[guy.roussel@Bely.be](mailto:guy.roussel@Bely.be)>; 'john.wagner@inl.gov' <[john.wagner@inl.gov](mailto:john.wagner@inl.gov)>; 'Riccardella, Pete' <[Priccardella@Structint.com](mailto:Priccardella@Structint.com)>; 'RICHTER, Mark' <[mar@nei.org](mailto:mar@nei.org)>; Amberge, Kyle <[kamberge@epri.com](mailto:kamberge@epri.com)>; Moyer, Carol <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>; Oberson, Greg <[Greg.Oberson@nrc.gov](mailto:Greg.Oberson@nrc.gov)>; Audrain, Margaret <[Margaret.Audrain@nrc.gov](mailto:Margaret.Audrain@nrc.gov)>; Poehler, Jeffrey <[Jeffrey.Poehler@nrc.gov](mailto:Jeffrey.Poehler@nrc.gov)>; Hiser, Allen <[Allen.Hiser@nrc.gov](mailto:Allen.Hiser@nrc.gov)>; Yoo, Mark <[Mark.Yoo@nrc.gov](mailto:Mark.Yoo@nrc.gov)>; Koshy, Thomas <[Thomas.Koshy@nrc.gov](mailto:Thomas.Koshy@nrc.gov)>; Buford, Angela <[Angela.Buford@nrc.gov](mailto:Angela.Buford@nrc.gov)>; Sircar, Madhumita <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>  
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**Subject:** [External] RE: Ex-plant Materials Harvesting Workshop

I have received input from a couple participants. This is a gentle reminder to please provide any input on the report by next Friday, June 30.

Thanks!

Matt

## **Matthew Hiser**

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

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**From:** Hiser, Matthew

**Sent:** Wednesday, May 31, 2017 4:21 PM

**To:** 'Bernhoft, Sherry' <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>; 'Jean Smith' <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; 'Ahluwalia, Kawaljit' <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard Reister' <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; 'leonardk@ornl.gov' <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; 'William F Zipp (Generation - 4)' <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>; 'Gerard P. Van Noordennen' <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>; 'Ramuhalli, Pradeep' <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; 'daniel.tello@canada.ca' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>; 'Uwe.Jendrich@grs.de' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; 'rachid.chaouadi@sckcen.be' <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; 'arait@criepi.denken.or.jp' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>; 'alpanfa@westinghouse.com' <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>; 'sokolovm@ornl.gov' <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; 'desire.ndomba@canada.ca' <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>; 'khuynh@aecl.ca' <[khuynh@aecl.ca](mailto:khuynh@aecl.ca)>; 'higuchi@criepi.denken.or.jp' <[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)>; 'kazunobu\_sakamoto@nsr.go.jp' <[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)>; 'chimi.yasuhiro@jaea.go.jp' <[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)>; 'Jackson, John Howard' <[john.jackson@inl.gov](mailto:john.jackson@inl.gov)>; 'Roussel Guy' <[guy.roussel@Belv.be](mailto:guy.roussel@Belv.be)>; 'john.wagner@inl.gov' <[john.wagner@inl.gov](mailto:john.wagner@inl.gov)>; 'Riccardella, Pete' <[Priccardella@Structint.com](mailto:Priccardella@Structint.com)>; 'RICHTER, Mark' <[mar@nei.org](mailto:mar@nei.org)>; 'Amberge, Kyle' <[kamberge@epri.com](mailto:kamberge@epri.com)>; Moyer, Carol <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>; Oberson, Greg <[Greg.Oberson@nrc.gov](mailto:Greg.Oberson@nrc.gov)>; Audrain, Margaret <[Margaret.Audrain@nrc.gov](mailto:Margaret.Audrain@nrc.gov)>; Poehler, Jeffrey <[Jeffrey.Poehler@nrc.gov](mailto:Jeffrey.Poehler@nrc.gov)>; Hiser, Allen <[Allen.Hiser@nrc.gov](mailto:Allen.Hiser@nrc.gov)>; Yoo, Mark <[Mark.Yoo@nrc.gov](mailto:Mark.Yoo@nrc.gov)>; Koshy, Thomas <[Thomas.Koshy@nrc.gov](mailto:Thomas.Koshy@nrc.gov)>; Buford, Angela <[Angela.Buford@nrc.gov](mailto:Angela.Buford@nrc.gov)>; Sircar, Madhumita <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>;  
**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>; Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>

**Subject:** RE: Ex-plant Materials Harvesting Workshop

Dear Workshop Participants:

I would like to share for your review and comment the workshop summary report (attached). In the report, we tried to capture as much of the discussion as possible, while focusing on the key takeaways that might be useful for all participants as they consider harvesting in the future. In particular, please review how your presentation and contribution to the discussion is characterized, in case you feel it should be clarified in any way. Feel free to provide additional references to previous research on harvested materials that should be captured in this report. Comments, edits, and suggestions on any other parts of the report are welcome.

**Please provide your input by June 30** at the latest and we will try to finalize the report by sometime in July.

As indicated in action items 4 and 5, we will be pursuing further coordination efforts on data needs for harvesting and a sources of materials database and welcome any other parties that may be interested in participating in these discussions.



Thank you once again for your participation and engagement in this workshop!

Thanks!

Matt

**Matthew Hiser**

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

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**From:** Hiser, Matthew

**Sent:** Friday, March 17, 2017 8:39 AM

**To:** 'Bernhoft, Sherry' <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>; 'Jean Smith' ([jmsmith@epri.com](mailto:jmsmith@epri.com)) <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; 'Ahluwalia, Kawaljit' <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard Reister' ([Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)) <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; 'leonardk@ornl.gov' <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; 'William F Zipp (Generation - 4)' <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>; 'Gerard P. Van Noordennen' <[gpyvannoordennen@energysolutions.com](mailto:gpyvannoordennen@energysolutions.com)>; 'Ramuhalli, Pradeep' ([Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)) <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; 'daniel.tello@canada.ca' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>; 'Uwe.Jendrich@grs.de' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; 'rachid.chaouadi@sckcen.be' <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; 'arait@criepi.denken.or.jp' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>; 'alpanfa@westinghouse.com' <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>; 'sokolovm@ornl.gov' <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; 'desire.ndomba@canada.ca' <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>; 'khuynh@aecl.ca' <[khuynh@aecl.ca](mailto:khuynh@aecl.ca)>; 'higuchi@criepi.denken.or.jp' <[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)>; 'kazunobu\_sakamoto@nsr.go.jp' <[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)>; 'chimi.yasuhiro@jaea.go.jp' <[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)>; 'Jackson, John Howard' <[john.jackson@inl.gov](mailto:john.jackson@inl.gov)>; 'Roussel Guy' <[guy.roussel@Belv.be](mailto:guy.roussel@Belv.be)>; 'john.wagner@inl.gov' <[john.wagner@inl.gov](mailto:john.wagner@inl.gov)>; 'Riccardella, Pete' <[Priccardella@Structint.com](mailto:Priccardella@Structint.com)>; 'RICHTER, Mark' <[mar@nei.org](mailto:mar@nei.org)>; 'Amberge, Kyle' <[kamberge@epri.com](mailto:kamberge@epri.com)>; 'Hull, Amy' <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>; 'Moyer, Carol' <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>; 'Oberson, Greg' <[Greg.Oberson@nrc.gov](mailto:Greg.Oberson@nrc.gov)>; 'Audrain, Margaret' <[Margaret.Audrain@nrc.gov](mailto:Margaret.Audrain@nrc.gov)>; 'Poehler, Jeffrey' <[Jeffrey.Poehler@nrc.gov](mailto:Jeffrey.Poehler@nrc.gov)>; 'Hiser, Allen' <[Allen.Hiser@nrc.gov](mailto:Allen.Hiser@nrc.gov)>; 'Yoo, Mark' <[Mark.Yoo@nrc.gov](mailto:Mark.Yoo@nrc.gov)>; 'Koshy, Thomas' <[Thomas.Koshy@nrc.gov](mailto:Thomas.Koshy@nrc.gov)>; 'Buford, Angela' <[Angela.Buford@nrc.gov](mailto:Angela.Buford@nrc.gov)>; 'Sircar, Madhumita' <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>;  
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**Subject:** RE: Ex-plant Materials Harvesting Workshop

Dear Workshop Participants:

I have attached a list of participants in last week's workshop, along with their email for contact. Also, I have not received any concerns from the presenters regarding sharing slides, so feel free to share the slides, which are available on Google Drive: <https://drive.google.com/open?id=0B5DWMLch5YSXcnpZZ0JOS055QUU>.

We hope to share a detailed workshop summary report in the next two months.

Thanks!

Matt

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**From:** Hiser, Matthew

**Sent:** Friday, March 10, 2017 7:03 AM

**To:** 'Bernhoft, Sherry' <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>; 'Jean Smith ([jmsmith@epri.com](mailto:jmsmith@epri.com))' <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; 'Ahluwalia, Kawaljit' <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard Reister ([Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov))' <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; 'leonardk@ornl.gov' <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; 'William F Zipp (Generation - 4)' <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>; 'Gerard P. Van Noordennen' <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>; 'Ramuhalli, Pradeep ([Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov))' <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; 'daniel.tello@canada.ca' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>; 'Uwe.Jendrich@grs.de' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; 'rachid.chaouadi@sckcen.be' <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; 'arait@criepi.denken.or.jp' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>; 'alpanfa@westinghouse.com' <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>; 'sokolovm@ornl.gov' <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; 'desire.ndomba@canada.ca' <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>; 'khuynh@aecl.ca' <[khuynh@aecl.ca](mailto:khuynh@aecl.ca)>; 'higuchi@criepi.denken.or.jp' <[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)>; 'kazunobu\_sakamoto@nsr.go.jp' <[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)>; 'chimi.yasuhiro@jaea.go.jp' <[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)>; 'Jackson, John Howard' <[john.jackson@inl.gov](mailto:john.jackson@inl.gov)>; 'Roussel Guy' <[guy.roussel@Belv.be](mailto:guy.roussel@Belv.be)>; 'john.wagner@inl.gov' <[john.wagner@inl.gov](mailto:john.wagner@inl.gov)>; 'Riccardella, Pete' <[Priccardella@Structint.com](mailto:Priccardella@Structint.com)>; 'RICHTER, Mark' <[mar@nei.org](mailto:mar@nei.org)>; 'Amberge, Kyle' <[kamberge@epri.com](mailto:kamberge@epri.com)>; 'Hull, Amy' <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>; 'Moyer, Carol' <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>; 'Oberson, Greg' <[Greg.Oberson@nrc.gov](mailto:Greg.Oberson@nrc.gov)>; 'Audrain, Margaret' <[Margaret.Audrain@nrc.gov](mailto:Margaret.Audrain@nrc.gov)>; 'Poehler, Jeffrey' <[Jeffrey.Poehler@nrc.gov](mailto:Jeffrey.Poehler@nrc.gov)>; 'Hiser, Allen' <[Allen.Hiser@nrc.gov](mailto:Allen.Hiser@nrc.gov)>; 'Yoo, Mark' <[Mark.Yoo@nrc.gov](mailto:Mark.Yoo@nrc.gov)>; 'Koshy, Thomas' <[Thomas.Koshy@nrc.gov](mailto:Thomas.Koshy@nrc.gov)>; 'Buford, Angela' <[Angela.Buford@nrc.gov](mailto:Angela.Buford@nrc.gov)>; 'Sircar, Madhumita' <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>;  
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**Subject:** RE: Ex-plant Materials Harvesting Workshop

Dear Workshop Participants:

Thank you for attending and participating in the workshop this week. I appreciate your active participation in what was a very interesting and informative discussion. I hope you were able to come away from the meeting with a better understanding of how to approach harvesting and what to expect in terms of cost, schedule, complexity, challenges, etc.

NRC will be developing a workshop summary report to be shared among meeting participants. We have also placed all of the presentations into a Google Drive folder for sharing among meeting participants (<https://drive.google.com/open?id=0B5DWMLch5YSXcnpZZ0JOS055QUU>).

I have laid out the action items and planned next steps to address each item below:

1. Sharing workshop slides (Ahluwalia)
  - a. **Next step:** Presenters, please reply to this email if you have any concerns with meeting participants sharing your slides with colleagues or other organizations. If I don't hear from you, we'll assume you're OK with sharing.
2. MRP-320 (Product ID: 1022866) on harvesting from MRP-227 inspections
  - a. Available to public for fee
3. Cable surveillance programs in Germany
  - a. **Next step:** GRS (Jendrich) to inquire with cable colleagues and share
4. Sources of Materials database
  - a. **Next step:** Opportunities presented in this meeting to be documented in workshop summary.
  - b. **Next step:** AECL, CNSC, NRC, PNNL, INL NSUF interested in database development.



Any other parties interested?

5. Prioritized data needs

a. **Next step:** Smaller group meetings to prioritize data needs of interest

i. Material / component of interest, purpose, intended outcome

b. Idea: survey of participants at Environmental Degradation conference

6. EPRI report on SFP liner boric acid transport through concrete

a. NRC (Sircar) to contact EPRI if needed

7. Harvested Materials Research Results

a. **Next step:** A section of the workshop summary report to cover references from previous harvested materials research

b. Use references from EMDA as starting point

c. **Next step:** Please send any references to harvested materials research that should be included and its outcome to Matt Hiser.

Please feel free to contact me with any questions or suggestions for documenting the workshop and the next steps moving forward.

Thanks!

Matt

**Matthew Hiser**

Materials Engineer

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**From:** Hiser, Matthew

**Sent:** Friday, March 03, 2017 8:22 AM

**To:** 'Bernhoft, Sherry' <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>; 'Jean Smith' <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; 'Ahluwalia, Kawaljit' <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard Reister' <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; 'leonardk@ornl.gov' <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; 'William F Zipp (Generation - 4)' <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>; 'Gerard P. Van Noordennen' <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>; 'Ramuhalli, Pradeep' <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; 'daniel.tello@canada.ca' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>; 'Uwe.Jendrich@grs.de' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; 'rachid.chaouadi@sckcen.be' <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; 'arait@criepi.denken.or.jp' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>; 'alpanfa@westinghouse.com' <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>; 'sokolovm@ornl.gov' <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; 'desire.ndomba@canada.ca' <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>; 'khuyinh@aecl.ca' <[khuyinh@aecl.ca](mailto:khuyinh@aecl.ca)>; 'higuchi@criepi.denken.or.jp' <[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)>; 'kazunobu\_sakamoto@nsr.go.jp' <[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)>; 'chimi.yasuhiro@jaea.go.jp' <[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)>; 'Jackson, John Howard' <[john.jackson@inl.gov](mailto:john.jackson@inl.gov)>; 'Roussel Guy' <[guy.roussel@Bely.be](mailto:guy.roussel@Bely.be)>; 'john.wagner@inl.gov' <[john.wagner@inl.gov](mailto:john.wagner@inl.gov)>; 'Riccardella, Pete' <[Priccardella@Structint.com](mailto:Priccardella@Structint.com)>; 'RICHTER, Mark' <[mar@nei.org](mailto:mar@nei.org)>

**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>

**Subject:** RE: 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 final workshop agenda as well as 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. If you have not yet responded, please let me know if you plan to join for the dinner with other workshop participants, so I can make the appropriate reservation.

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

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**From:** [Rosseel, Thomas M.](#)  
**To:** [Gerard P. Van Noordennen](#)  
**Cc:** [Hiser, Matthew](#)  
**Subject:** [External\_Sender] Re: Ex-plant Materials Harvesting Workshop  
**Date:** Friday, June 23, 2017 11:17:26 AM  
**Attachments:** [image001.jpg](#)

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Thanks Gerry.

Tom

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**From:** Gerard Van Noordennen <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>  
**Date:** Friday, June 23, 2017 at 10:06 AM  
**To:** "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>, "[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Subject:** RE: Ex-plant Materials Harvesting Workshop

Tom,  
I concur with your changes.  
Gerry van Noordennen  
Vice President Regulatory Affairs  
*EnergySolutions*

ES - 8



151 Lafayette Drive, Suite 201  
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Office: 865-481-6319  
Cell: (b)(6)  
[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)

---

**From:** Rosseel, Thomas M. [<mailto:rosseeltm@ornl.gov>]  
**Sent:** Wednesday, June 21, 2017 4:35 PM  
**To:** Hiser, Matthew  
**Cc:** Gerard P. Van Noordennen  
**Subject:** Re: Ex-plant Materials Harvesting Workshop  
Matt,

I have a few minor changes to the report. However since I suggested some changes in Session 4 (Harvesting Experience), page 12, in the paragraph summarizing Gerry's discussion of the Zion harvesting effort, I have copied Gerry on this message for his review and concurrence.

Best regards,

Tom

Thomas M. Rosseel, Ph. D.  
Past Chair, International Committee on Irradiated Concrete and  
Materials Aging and Degradation, Deputy Pathway Lead  
Light Water Reactor Sustainability Program  
Materials, Science and Technology Division  
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PO Box 2008  
Oak Ridge, TN 37831  
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[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)

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**From:** "[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Date:** Wednesday, May 31, 2017 at 4:20 PM

**To:** Sherry Bernhoft <[sbernhof@epri.com](mailto:sbernhof@epri.com)>, Robin Dyle <[rdyle@epri.com](mailto:rdyle@epri.com)>, "Jean Smith ([jmsmith@epri.com](mailto:jmsmith@epri.com))" <[jmsmith@epri.com](mailto:jmsmith@epri.com)>, "Ahluwalia, Kawaljit" <[kahluwal@epri.com](mailto:kahluwal@epri.com)>, Richard Reister <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>, "Leonard, Keith J." <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>, "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>, "William F Zipp (Generation - 4)" <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>, Gerard Van Noordennen <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>, "Ramuhalli, Pradeep" <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>, "[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)" <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>, "[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)" <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>, "[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)" <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>, "Arai, Taku" <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>, "[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)" <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>, Mikhail Sokolov <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>, "[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)" <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>, "[khuynh@aecl.ca](mailto:khuynh@aecl.ca)" <[khuynh@aecl.ca](mailto:khuynh@aecl.ca)>, "[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)" <[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)>, "[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)" <[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)>, "[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)" <[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)>, "Jackson, John Howard" <[john.jackson@inl.gov](mailto:john.jackson@inl.gov)>, 'Roussel Guy' <[guy.roussel@Belv.be](mailto:guy.roussel@Belv.be)>, "[john.wagner@inl.gov](mailto:john.wagner@inl.gov)" <[john.wagner@inl.gov](mailto:john.wagner@inl.gov)>, "Riccardella, Pete" <[Priccardella@Structint.com](mailto:Priccardella@Structint.com)>, "RICHTER, Mark" <[mar@nei.org](mailto:mar@nei.org)>, "Amberge, Kyle" <[kamberge@epri.com](mailto:kamberge@epri.com)>, "[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)" <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>, Greg Oberson <[Greg.Oberson@nrc.gov](mailto:Greg.Oberson@nrc.gov)>, "Audrain, Margaret" <[Margaret.Audrain@nrc.gov](mailto:Margaret.Audrain@nrc.gov)>, "Poehler, Jeffrey" <[Jeffrey.Poehler@nrc.gov](mailto:Jeffrey.Poehler@nrc.gov)>, "Hiser, Allen" <[Allen.Hiser@nrc.gov](mailto:Allen.Hiser@nrc.gov)>, "Yoo, Mark" <[Mark.Yoo@nrc.gov](mailto:Mark.Yoo@nrc.gov)>, "Koshy, Thomas" <[Thomas.Koshy@nrc.gov](mailto:Thomas.Koshy@nrc.gov)>, "Buford, Angela" <[Angela.Buford@nrc.gov](mailto:Angela.Buford@nrc.gov)>, "Sircar, Madhumita" <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>

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**Subject:** RE: Ex-plant Materials Harvesting Workshop

Dear Workshop Participants:

I would like to share for your review and comment the workshop summary report (attached). In the report, we tried to capture as much of the discussion as possible, while focusing on the key takeaways that might be useful for all participants as they consider harvesting in the future. In particular, please review how your presentation and contribution to the discussion is characterized, in case you feel it should be clarified in any way. Feel free to provide additional references to previous research on harvested materials that should be captured in this report. Comments, edits, and suggestions on any other parts of the report are welcome.

**Please provide your input by June 30** at the latest and we will try to finalize the report by sometime in July.

As indicated in action items 4 and 5, we will be pursuing further coordination efforts on data needs for harvesting and a sources of materials database and welcome any other parties that may be interested in participating in these discussions.

Thank you once again for your participation and engagement in this workshop!

Thanks!



Matt

**Matthew Hiser**

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

---

**From:** Hiser, Matthew

**Sent:** Friday, March 17, 2017 8:39 AM

**To:** 'Bernhoft, Sherry' <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>; 'Jean Smith' <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; 'Ahluwalia, Kawaljit' <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard Reister' <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; 'Leonardk@ornl.gov' <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; 'William F Zipp (Generation - 4)' <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>; 'Gerard P. Van Noordennen' <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>; 'Ramuhalli, Pradeep' <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; 'Daniel Tello' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>; 'Uwe Jendrich' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; 'Rachid Chaouadi' <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; 'Arait' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>; 'Alpanfa' <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>; 'Sokolovm' <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; 'Desire Ndomba' <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>; 'Khuyinh@aecl.ca' <[khuyinh@aecl.ca](mailto:khuyinh@aecl.ca)>; 'Higuchi' <[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)>; 'Kazunobu Sakamoto' <[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)>; 'Chimi Yasuhiro' <[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)>; 'Jackson, John Howard' <[john.jackson@inl.gov](mailto:john.jackson@inl.gov)>; 'Roussel Guy' <[guy.roussel@Belv.be](mailto:guy.roussel@Belv.be)>; 'John Wagner' <[john.wagner@inl.gov](mailto:john.wagner@inl.gov)>; 'Riccardella, Pete' <[Priccardella@Structint.com](mailto:Priccardella@Structint.com)>; 'RICHTER, Mark' <[mar@nei.org](mailto:mar@nei.org)>; 'Amberge, Kyle' <[kamberge@epri.com](mailto:kamberge@epri.com)>; 'Hull, Amy' <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>; 'Moyer, Carol' <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>; 'Oberson, Greg' <[Greg.Oberson@nrc.gov](mailto:Greg.Oberson@nrc.gov)>; 'Audrain, Margaret' <[Margaret.Audrain@nrc.gov](mailto:Margaret.Audrain@nrc.gov)>; 'Poehler, Jeffrey' <[Jeffrey.Poehler@nrc.gov](mailto:Jeffrey.Poehler@nrc.gov)>; 'Hiser, Allen' <[Allen.Hiser@nrc.gov](mailto:Allen.Hiser@nrc.gov)>; 'Yoo, Mark' <[Mark.Yoo@nrc.gov](mailto:Mark.Yoo@nrc.gov)>; 'Koshy, Thomas' <[Thomas.Koshy@nrc.gov](mailto:Thomas.Koshy@nrc.gov)>; 'Buford, Angela' <[Angela.Buford@nrc.gov](mailto:Angela.Buford@nrc.gov)>; 'Sircar, Madhumita' <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>; 'Tregoning, Robert' <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; 'Purtscher, Patrick' <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; 'Frankl, Istvan' <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>

**Subject:** RE: Ex-plant Materials Harvesting Workshop

Dear Workshop Participants:

I have attached a list of participants in last week's workshop, along with their email for contact. Also, I have not received any concerns from the presenters regarding sharing slides, so feel free to share the slides, which are available on Google Drive: <https://drive.google.com/open?id=0B5DWMLch5YSXcnpZZ0JOS055QUU>.

We hope to share a detailed workshop summary report in the next two months.

Thanks!

Matt

---

**From:** Hiser, Matthew

**Sent:** Friday, March 10, 2017 7:03 AM

**To:** 'Bernhoft, Sherry' <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>; 'Jean Smith' <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; 'Ahluwalia, Kawaljit' <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard

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<[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; '[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>;  
'[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; '[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)'  
<[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; '[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>;  
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<[Angela.Buford@nrc.gov](mailto:Angela.Buford@nrc.gov)>; 'Sircar, Madhumita' <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>  
**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Purtscher, Patrick  
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**Subject:** RE: Ex-plant Materials Harvesting Workshop

Dear Workshop Participants:

Thank you for attending and participating in the workshop this week. I appreciate your active participation in what was a very interesting and informative discussion. I hope you were able to come away from the meeting with a better understanding of how to approach harvesting and what to expect in terms of cost, schedule, complexity, challenges, etc.

NRC will be developing a workshop summary report to be shared among meeting participants. We have also placed all of the presentations into a Google Drive folder for sharing among meeting participants (<https://drive.google.com/open?id=0B5DWMLch5YSXcnpZZ0JOS055QUU>).

I have laid out the action items and planned next steps to address each item below:

1. Sharing workshop slides (Ahluwalia)
  - a. **Next step:** Presenters, please reply to this email if you have any concerns with meeting participants sharing your slides with colleagues or other organizations. If I don't hear from you, we'll assume you're OK with sharing.
2. MRP-320 (Product ID: 1022866) on harvesting from MRP-227 inspections
  - a. Available to public for fee
3. Cable surveillance programs in Germany
  - a. **Next step:** GRS (Jendrich) to inquire with cable colleagues and share
4. Sources of Materials database
  - a. **Next step:** Opportunities presented in this meeting to be documented in workshop summary.
  - b. **Next step:** AECL, CNSC, NRC, PNNL, INL NSUF interested in database development. Any other parties interested?
5. Prioritized data needs



- a. **Next step:** Smaller group meetings to prioritize data needs of interest
  - i. Material / component of interest, purpose, intended outcome
- b. Idea: survey of participants at Environmental Degradation conference
- 6. EPRI report on SFP liner boric acid transport through concrete
  - a. NRC (Sircar) to contact EPRI if needed
- 7. Harvested Materials Research Results
  - a. **Next step:** A section of the workshop summary report to cover references from previous harvested materials research
  - b. Use references from EMDA as starting point
  - c. **Next step:** Please send any references to harvested materials research that should be included and its outcome to Matt Hiser.

Please feel free to contact me with any questions or suggestions for documenting the workshop and the next steps moving forward.

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)

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**From:** Hiser, Matthew

**Sent:** Friday, March 03, 2017 8:22 AM

**To:** 'Bernhoft, Sherry' <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>; 'Jean Smith' <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; 'Ahluwalia, Kawaljit' <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard Reister' <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; 'leonardk@ornl.gov' <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; 'William F Zipp (Generation - 4)' <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>; 'Gerard P. Van Noordennen' <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>; 'Ramuhalli, Pradeep' <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; 'daniel.tello@canada.ca' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>; 'Uwe.Jendrich@grs.de' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; 'rachid.chaouadi@sckcen.be' <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; 'arait@criepi.denken.or.jp' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>; 'alpanfa@westinghouse.com' <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>; 'sokolovm@ornl.gov' <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; 'desire.ndomba@canada.ca' <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>; 'khuynh@aecl.ca' <[khuynh@aecl.ca](mailto:khuynh@aecl.ca)>; 'higuchi@criepi.denken.or.jp' <[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)>; 'kazunobu\_sakamoto@nsr.go.jp' <[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)>; 'chimi.yasuhiro@jaea.go.jp' <[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)>; 'Jackson, John Howard' <[john.jackson@inl.gov](mailto:john.jackson@inl.gov)>; 'Roussel Guy' <[guy.roussel@Belv.be](mailto:guy.roussel@Belv.be)>; 'john.wagner@inl.gov' <[john.wagner@inl.gov](mailto:john.wagner@inl.gov)>; 'Riccardella, Pete' <[Priccardella@Structint.com](mailto:Priccardella@Structint.com)>; 'RICHTER, Mark' <[mar@nei.org](mailto:mar@nei.org)>

**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>

**Subject:** RE: 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 final workshop agenda as well as 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.

If you have not yet responded, please let me know if you plan to join for the dinner with other workshop participants, so I can make the appropriate reservation.

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](mailto:Matthew.Hiser@nrc.gov)



**From:** [Hiser, Matthew](#)  
**To:** "RICHTER, Mark"  
**Subject:** RE: RE: Ex-plant Materials Harvesting Workshop  
**Date:** Friday, June 30, 2017 8:38:16 AM  
**Attachments:** [image001.jpg](#)

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Thanks Mark! I think the focus on clearly defining the need for harvesting was clearly expressed at the workshop and well-documented in this report.

Thanks!

Matt

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**From:** RICHTER, Mark [mailto:mar@nei.org]  
**Sent:** Thursday, June 29, 2017 4:19 PM  
**To:** Hiser, Matthew  
**Subject:** [External\_Sender] RE: Ex-plant Materials Harvesting Workshop

Matt:

I generically support the concept of harvesting only if there is a clear need for data that might be derived. In the current financial environment, there is not a lot of support for "nice to have" or "it may be needed later" activities and the associated cost.

**Mark A. Richter, Ph.D.** | Senior Project Manager-Fuel and Decommissioning Programs

Nuclear Energy Institute | 1201 F Street, NW, Suite 1100 | Washington, DC 20004

P: 202.739.8106 M: [REDACTED] E: [mar@nei.org](mailto:mar@nei.org)

[nei.org](http://nei.org)

(b)(6)

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**From:** Hiser, Matthew [mailto:Matthew.Hiser@nrc.gov]  
**Sent:** Thursday, June 22, 2017 3:20 PM  
**To:** 'Bernhoft, Sherry'; 'Dyle, Robin'; 'Jean Smith ([jmsmith@epri.com](mailto:jmsmith@epri.com))'; 'Ahluwalia, Kawaljit'; 'Richard Reister ([Richard.Reister@nuclear.energy.gov](mailto: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](mailto:Pradeep.Ramuhalli@pnnl.gov))'; 'daniel.tello@canada.ca'; 'Uwe.Jendrich@grs.de'; 'rachid.chaouadi@sckcen.be'; 'arait@criepi.denken.or.jp'; 'alpanfa@westinghouse.com'; 'sokolovm@ornl.gov'; 'desire.ndomba@canada.ca'; 'khuyinh@aecl.ca'; 'higuchi@criepi.denken.or.jp'; 'kazunobu\_sakamoto@nsr.go.jp'; 'chimi.yasuhiro@jaea.go.jp'; 'Jackson, John Howard'; 'Roussel Guy'; 'john.wagner@inl.gov'; 'Riccardella, Pete'; RICHTER, Mark; 'Amberge, Kyle'; Moyer, Carol; Oberson, Greg; Audrain, Margaret; Poehler, Jeffrey; Hiser, Allen; Yoo, Mark; Koshy, Thomas; Buford, Angela; Sircar, Madhumita

**Cc:** Tregoning, Robert; Purtscher, Patrick; Frankl, Istvan; Hull, Amy

**Subject:** RE: Ex-plant Materials Harvesting Workshop

I have received input from a couple participants. This is a gentle reminder to please provide any input on the report by next Friday, June 30.

Thanks!

Matt

**Matthew Hiser**

Materials Engineer

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[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

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**From:** Hiser, Matthew  
**Sent:** Wednesday, May 31, 2017 4:21 PM  
**To:** 'Bernhoft, Sherry' <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>; 'Jean Smith ([jmsmith@epri.com](mailto:jmsmith@epri.com))' <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; 'Ahluwalia, Kawaljit' <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard Reister ([Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov))' <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>;

'leonardk@ornl.gov' <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; 'William F Zipp (Generation - 4)' <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>; 'Gerard P. Van Noordennen' <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>; 'Ramuhalli, Pradeep ([Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov))' <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; 'daniel.tello@canada.ca' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>; 'Uwe.Jendrich@grs.de' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; 'rachid.chaouadi@sckcen.be' <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; 'arait@criepi.denken.or.jp' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>; 'alpanfa@westinghouse.com' <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>; 'sokolovm@ornl.gov' <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; 'desire.ndomba@canada.ca' <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>; 'khuynh@aecl.ca' <[khuynh@aecl.ca](mailto:khuynh@aecl.ca)>; 'higuchi@criepi.denken.or.jp' <[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)>; 'kazunobu\_sakamoto@nsr.go.jp' <[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)>; 'chimi.yasuhiro@jaea.go.jp' <[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)>; 'Jackson, John Howard' <[john.jackson@inl.gov](mailto:john.jackson@inl.gov)>; 'Roussel Guy' <[guy.roussel@Belv.be](mailto:guy.roussel@Belv.be)>; 'John.wagner@inl.gov' <[john.wagner@inl.gov](mailto:john.wagner@inl.gov)>; 'Riccardella, Pete' <[Priccardella@Structint.com](mailto:Priccardella@Structint.com)>; 'RICHTER, Mark' <[mar@nei.org](mailto:mar@nei.org)>; 'Amberge, Kyle' <[kamberge@epri.com](mailto:kamberge@epri.com)>; 'Moyer, Carol' <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>; 'Oberson, Greg' <[Greg.Oberson@nrc.gov](mailto:Greg.Oberson@nrc.gov)>; 'Audrain, Margaret' <[Margaret.Audrain@nrc.gov](mailto:Margaret.Audrain@nrc.gov)>; 'Poehler, Jeffrey' <[Jeffrey.Poehler@nrc.gov](mailto:Jeffrey.Poehler@nrc.gov)>; 'Hiser, Allen' <[Allen.Hiser@nrc.gov](mailto:Allen.Hiser@nrc.gov)>; 'Yoo, Mark' <[Mark.Yoo@nrc.gov](mailto:Mark.Yoo@nrc.gov)>; 'Koshy, Thomas' <[Thomas.Koshy@nrc.gov](mailto:Thomas.Koshy@nrc.gov)>; 'Buford, Angela' <[Angela.Buford@nrc.gov](mailto:Angela.Buford@nrc.gov)>; 'Sircar, Madhumita' <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>;  
**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>; Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>

**Subject:** RE: Ex-plant Materials Harvesting Workshop

Dear Workshop Participants:

I would like to share for your review and comment the workshop summary report (attached). In the report, we tried to capture as much of the discussion as possible, while focusing on the key takeaways that might be useful for all participants as they consider harvesting in the future. In particular, please review how your presentation and contribution to the discussion is characterized, in case you feel it should be clarified in any way. Feel free to provide additional references to previous research on harvested materials that should be captured in this report. Comments, edits, and suggestions on any other parts of the report are welcome.

**Please provide your input by June 30** at the latest and we will try to finalize the report by sometime in July.

As indicated in action items 4 and 5, we will be pursuing further coordination efforts on data needs for harvesting and a sources of materials database and welcome any other parties that may be interested in participating in these discussions.

Thank you once again for your participation and engagement in this workshop!

Thanks!

Matt

**Matthew Hiser**

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

---

**From:** Hiser, Matthew

**Sent:** Friday, March 17, 2017 8:39 AM



**To:** 'Bernhoft, Sherry' <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>; 'Jean Smith' ([jmsmith@epri.com](mailto:jmsmith@epri.com))' <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; 'Ahluwalia, Kawaljit' <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard Reister' ([Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov))' <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; 'leonardk@ornl.gov' <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; 'William F Zipp (Generation - 4)' <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>; 'Gerard P. Van Noordennen' <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>; 'Ramuhalli, Pradeep' ([Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov))' <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; 'daniel.tello@canada.ca' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>; 'Uwe.Jendrich@grs.de' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; 'rachid.chaouadi@sckcen.be' <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; 'arait@criepi.denken.or.jp' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>; 'alpanfa@westinghouse.com' <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>; 'sokolovm@ornl.gov' <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; 'desire.ndomba@canada.ca' <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>; 'khuynh@aecl.ca' <[khuynh@aecl.ca](mailto:khuynh@aecl.ca)>; 'higuchi@criepi.denken.or.jp' <[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)>; 'kazunobu\_sakamoto@nsr.go.jp' <[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)>; 'chimi.yasuhiro@jaea.go.jp' <[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)>; 'Jackson, John Howard' <[john.jackson@inl.gov](mailto:john.jackson@inl.gov)>; 'Roussel Guy' <[guy.roussel@Belv.be](mailto:guy.roussel@Belv.be)>; 'John.wagner@inl.gov' <[john.wagner@inl.gov](mailto:john.wagner@inl.gov)>; 'Riccardella, Pete' <[Priccardella@Structint.com](mailto:Priccardella@Structint.com)>; 'RICHTER, Mark' <[mar@nei.org](mailto:mar@nei.org)>; 'Amberge, Kyle' <[kamberge@epri.com](mailto:kamberge@epri.com)>; 'Hull, Amy' <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>; 'Moyer, Carol' <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>; 'Oberson, Greg' <[Greg.Oberson@nrc.gov](mailto:Greg.Oberson@nrc.gov)>; 'Audrain, Margaret' <[Margaret.Audrain@nrc.gov](mailto:Margaret.Audrain@nrc.gov)>; 'Poehler, Jeffrey' <[Jeffrey.Poehler@nrc.gov](mailto:Jeffrey.Poehler@nrc.gov)>; 'Hiser, Allen' <[Allen.Hiser@nrc.gov](mailto:Allen.Hiser@nrc.gov)>; 'Yoo, Mark' <[Mark.Yoo@nrc.gov](mailto:Mark.Yoo@nrc.gov)>; 'Koshy, Thomas' <[Thomas.Koshy@nrc.gov](mailto:Thomas.Koshy@nrc.gov)>; 'Buford, Angela' <[Angela.Buford@nrc.gov](mailto:Angela.Buford@nrc.gov)>; 'Sircar, Madhumita' <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>

**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>

**Subject:** RE: Ex-plant Materials Harvesting Workshop

Dear Workshop Participants:

I have attached a list of participants in last week's workshop, along with their email for contact. Also, I have not received any concerns from the presenters regarding sharing slides, so feel free to share the slides, which are available on Google Drive: <https://drive.google.com/open?id=0B5DWMLch5YSXcnpZZ0JOS055QUU>.

We hope to share a detailed workshop summary report in the next two months.

Thanks!

Matt

---

**From:** Hiser, Matthew

**Sent:** Friday, March 10, 2017 7:03 AM

**To:** 'Bernhoft, Sherry' <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>; 'Jean Smith' ([jmsmith@epri.com](mailto:jmsmith@epri.com))' <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; 'Ahluwalia, Kawaljit' <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard Reister' ([Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov))' <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; 'leonardk@ornl.gov' <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; 'William F Zipp (Generation - 4)' <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>; 'Gerard P. Van Noordennen' <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>; 'Ramuhalli, Pradeep' ([Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov))' <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; 'daniel.tello@canada.ca' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>; 'Uwe.Jendrich@grs.de' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; 'rachid.chaouadi@sckcen.be' <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; 'arait@criepi.denken.or.jp' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>; 'alpanfa@westinghouse.com' <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>; 'sokolovm@ornl.gov' <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; 'desire.ndomba@canada.ca' <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>;



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**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>

**Subject:** RE: Ex-plant Materials Harvesting Workshop

Dear Workshop Participants:

Thank you for attending and participating in the workshop this week. I appreciate your active participation in what was a very interesting and informative discussion. I hope you were able to come away from the meeting with a better understanding of how to approach harvesting and what to expect in terms of cost, schedule, complexity, challenges, etc.

NRC will be developing a workshop summary report to be shared among meeting participants. We have also placed all of the presentations into a Google Drive folder for sharing among meeting participants (<https://drive.google.com/open?id=0B5DWMLch5YSXcnpZZ0JOS055QUU>).

I have laid out the action items and planned next steps to address each item below:

1. Sharing workshop slides (Ahluwalia)
  - a. **Next step:** Presenters, please reply to this email if you have any concerns with meeting participants sharing your slides with colleagues or other organizations. If I don't hear from you, we'll assume you're OK with sharing.
2. MRP-320 (Product ID: 1022866) on harvesting from MRP-227 inspections
  - a. Available to public for fee
3. Cable surveillance programs in Germany
  - a. **Next step:** GRS (Jendrich) to inquire with cable colleagues and share
4. Sources of Materials database
  - a. **Next step:** Opportunities presented in this meeting to be documented in workshop summary.
  - b. **Next step:** AECL, CNSC, NRC, PNNL, INL NSUF interested in database development. Any other parties interested?
5. Prioritized data needs
  - a. **Next step:** Smaller group meetings to prioritize data needs of interest
    - i. Material / component of interest, purpose, intended outcome
  - b. Idea: survey of participants at Environmental Degradation conference
6. EPRI report on SFP liner boric acid transport through concrete
  - a. NRC (Sircar) to contact EPRI if needed
7. Harvested Materials Research Results
  - a. **Next step:** A section of the workshop summary report to cover references from previous harvested materials research
  - b. Use references from EMDA as starting point



- c. **Next step:** Please send any references to harvested materials research that should be included and its outcome to Matt Hiser.

Please feel free to contact me with any questions or suggestions for documenting the workshop and the next steps moving forward.

Thanks!

Matt

**Matthew Hiser**

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

---

**From:** Hiser, Matthew

**Sent:** Friday, March 03, 2017 8:22 AM

**To:** 'Bernhoft, Sherry' <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>; 'Jean Smith' ([jmsmith@epri.com](mailto:jmsmith@epri.com))' <[jmsmith@epri.com](mailto:jmsmith@epri.com)>; 'Ahluwalia, Kawaljit' <[kahluwal@epri.com](mailto:kahluwal@epri.com)>; 'Richard Reister' ([Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov))' <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; 'leonardk@ornl.gov' <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; 'William F Zipp (Generation - 4)' <[william.f.zipp@dom.com](mailto:william.f.zipp@dom.com)>; 'Gerard P. Van Noordennen' <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>; 'Ramuhalli, Pradeep' ([Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov))' <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>; 'daniel.tello@canada.ca' <[daniel.tello@canada.ca](mailto:daniel.tello@canada.ca)>; 'Uwe.Jendrich@grs.de' <[Uwe.Jendrich@grs.de](mailto:Uwe.Jendrich@grs.de)>; 'rachid.chaouadi@sckcen.be' <[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)>; 'arait@criepi.denken.or.jp' <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>; 'alpanfa@westinghouse.com' <[alpanfa@westinghouse.com](mailto:alpanfa@westinghouse.com)>; 'sokolovm@ornl.gov' <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; 'desire.ndomba@canada.ca' <[desire.ndomba@canada.ca](mailto:desire.ndomba@canada.ca)>; 'khuynh@aecl.ca' <[khuynh@aecl.ca](mailto:khuynh@aecl.ca)>; 'higuchi@criepi.denken.or.jp' <[higuchi@criepi.denken.or.jp](mailto:higuchi@criepi.denken.or.jp)>; 'kazunobu\_sakamoto@nsr.go.jp' <[kazunobu\\_sakamoto@nsr.go.jp](mailto:kazunobu_sakamoto@nsr.go.jp)>; 'chimi.yasuhiro@jaea.go.jp' <[chimi.yasuhiro@jaea.go.jp](mailto:chimi.yasuhiro@jaea.go.jp)>; 'Jackson, John Howard' <[john.jackson@inl.gov](mailto:john.jackson@inl.gov)>; 'Roussel Guy' <[guy.roussel@Belv.be](mailto:guy.roussel@Belv.be)>; 'John.wagner@inl.gov' <[john.wagner@inl.gov](mailto:john.wagner@inl.gov)>; 'Riccardella, Pete' <[Priccardella@Structint.com](mailto:Priccardella@Structint.com)>; 'RICHTER, Mark' <[mar@nei.org](mailto:mar@nei.org)>

**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>

**Subject:** RE: 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 final workshop agenda as well as 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. If you have not yet responded, please let me know if you plan to join for the dinner with

other workshop participants, so I can make the appropriate reservation.

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](mailto:Matthew.Hiser@nrc.gov)



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**From:** [Hiser, Matthew](#)  
**To:** [Geelhood, Kenneth J](#)  
**Cc:** [Bales, Michelle](#)  
**Subject:** RE: Irradiated materials from NRU reactor  
**Date:** Tuesday, July 10, 2018 1:24:00 PM

---

Hi Ken,

I apologize for not getting back to you sooner. Thank you for sharing this information. We held a workshop last March (2017) on harvesting that was attended by folks from Canada, but they did not have this much detailed information on the NRU materials at that time. We are interested in identifying the best value (technical benefit + cost) opportunities for harvesting to answer materials degradation issues relevant to long-term operations (metals, concrete, cables). Part of that is prioritizing our technical needs and part is knowing what is available in terms of materials that could be harvested (which this helps provide). In terms of specific materials here for our interests, I don't see much due to relatively low temperatures and fluences for many components. However, I am somewhat interested in the activity described on slides 15-16 on the development of a dosimetry methodology. That has been an area of some interest here at NRC recently with trying to get a better handle on what the fluence levels are in different parts of the internals and how much uncertainty such analyses have and how they can be validated or confirmed. Could you touch base with your contact at PNNL for more information on that activity?

Thanks!

Matt

***Matthew Hiser***

Materials Engineer

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Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

---

**From:** Geelhood, Kenneth J [mailto:Kenneth.Geelhood@pnnl.gov]

**Sent:** Thursday, May 24, 2018 2:26 PM

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

**Cc:** Bales, Michelle <Michelle.Bales@nrc.gov>

**Subject:** [External\_Sender] Irradiated materials from NRU reactor

Matt,

I'm not sure what your interest in data on irradiated reactor component materials is beyond the tests that are being performed at Halden, but I was recently given the attached presentation on material that could be taken from the NRU reactor in Canada before it is dismantled.

If you are interested in any material on the list in the attached presentation, let me know and I can talk to the contact I have here at PNNL with the Canadian Nuclear Laboratories and get a rough idea of what it would take to obtain that material. I could also help you get an idea how to ship this material to a testing facility of your choice, including, but not limited to PNNL. Here at PNNL we have a number of thermal and mechanical test capabilities both in our high level and low level facilities. Let me know if any of this is of interest to you and I can get some more detailed information based on what you are interested in.

Ken Geelhood

**From:** [Hiser, Matthew](#)  
**To:** [Ramuhalli, Pradeep \(Pradeep.Ramuhalli@pnnl.gov\)](#)  
**Cc:** [Purtscher, Patrick](#)  
**Subject:** RE: harvesting report  
**Date:** Tuesday, July 18, 2017 8:31:00 AM

---

Hi Pradeep,  
I wanted to follow up from our brief discussion a couple weeks back at the EPRI workshop. Pat and I never received the final draft of the report, even though you seemed to think it was sent back in May? Can you resend the report for our review?

Thanks!

Matt

***Matthew Hiser***

Materials Engineer

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[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

---

**From:** Purtscher, Patrick  
**Sent:** Tuesday, July 18, 2017 7:08 AM  
**To:** Hiser, Matthew  
**Subject:** FW: harvesting report

---

**From:** Purtscher, Patrick  
**Sent:** Friday, June 30, 2017 10:13 AM  
**To:** Ramuhalli, Pradeep ([Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)) <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>  
**Subject:** harvesting report

Good morning,

I was just checking to see where you are with finalizing the harvesting report? I know you are almost finished, but I don't want to see this get delayed.

Thanks,

Pat



**From:** [Moyer, Carol](#)  
**To:** [KRIVANEK, Robert](#)  
**Cc:** [Hiser, Matthew](#)  
**Subject:** RE: FW: PLiM abstract on harvesting  
**Date:** Thursday, July 20, 2017 10:32:27 AM  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[image004.png](#)  
[image005.png](#)  
[image006.png](#)  
[image007.png](#)  
[image008.png](#)

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Robert,  
OK, thank you for the clarification. Unfortunately, the Indico tool was re-opened for only a few days, and it happened to be while I was away from the office and did not have an opportunity to send the synopsis in through that system. I understand that you have many, many submissions for this meeting – a “good problem” for you.  
Many thanks,  
Carol

---

*Carol E. Moyer*  
*Sr. Materials Engineer*  
*U.S. Nuclear Regulatory Commission*  
*Office of Nuclear Regulatory Research*  
*MS: T-10A36*  
*Washington, DC 20555-0001*  
*carol.moyer@nrc.gov*  
*301-415-2153*

---

**From:** KRIVANEK, Robert [mailto:[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)]  
**Sent:** Thursday, July 20, 2017 10:10 AM  
**To:** Moyer, Carol <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>  
**Subject:** [External\_Sender] FW: PLiM abstract on harvesting

Dear Carol,

We asked you to submit your synopsis through INDICO (see email below) but it did not happen. So we were not able to send your synopsis to programme committee for evaluation and it will not occur on the conference programme.

Sorry for that but there are currently 300 delegates and 150 synopsis, so we were not able to track each of them separately.

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |  
LTO Programme Manager

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

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**From:** KRIVANEK, Robert  
**Sent:** Friday, 26 May 2017 08:55  
**To:** 'Carol.Moyer@nrc.gov' <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>  
**Cc:** KHAELSS, Martina <[M.Khaelss@iaea.org](mailto:M.Khaelss@iaea.org)>  
**Subject:** FW: PLiM abstract on harvesting

Dear Carol,

Thank you for your synopsis. We have opened INDICO system for this week, so please submit it through the system.

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |

LTO Programme Manager

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

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---

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

**Sent:** Friday, 26 May 2017 00:19

**To:** KRIVANEK, Robert <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>

**Cc:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>;

Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>

**Subject:** PLiM abstract on harvesting

Dear Mr. Krivanek,

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

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

---

*Carol E. Moyer*

*Sr. Materials Engineer*

*Office of Nuclear Regulatory Research*

*RES/DE/CMB*

[carol.moyer@nrc.gov](mailto:carol.moyer@nrc.gov)

301-415-2153

---

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

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

**To:** Moyer, Carol <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>

**Subject:** [External\_Sender] RE: RE: CN246\_PLiM\_Abstract deadline extended to 19 May 2017

Dear Carol,

I will arrange it. Thank you.

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |

LTO Programme Manager

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

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

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

**Sent:** Monday, 22 May 2017 20:44

**To:** KRIVANEK, Robert <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>

**Subject:** RE: RE: CN246\_PLiM\_Abstract deadline extended to 19 May 2017



Dear Mr. Krivanek,

Since the formal deadline for abstract submissions has passed, I am no longer able to access the Indico system through the PLiM website (<https://conferences.iaea.org/indico/event/134/>). My abstract and Form B are attached. Are you able to work with these documents? Is there anything else that you need me to do at this time?

Thanks again for your patience and assistance,  
Carol

---

**From:** Moyer, Carol

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

**To:** 'KRIVANEK, Robert' <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>

**Cc:** Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>

**Subject:** RE: RE: CN246\_PLiM\_Abstract deadline extended to 19 May 2017

Dear Mr. Krivanek,

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

Thank you,

Mrs. Carol Moyer

---

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

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

**To:** Moyer, Carol <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>

**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>

**Subject:** [External\_Sender] RE: CN246\_PLiM\_Abstract deadline extended to 19 May 2017

Dear Mr Moyer,

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

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

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |

LTO Programme Manager

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

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---

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

**Sent:** Friday, 19 May 2017 23:19

**To:** KRIVANEK, Robert <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>

**Cc:** KANG, Ki-Sig <[K.S.Kang@iaea.org](mailto:K.S.Kang@iaea.org)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>

**Subject:** RE: CN246\_PLiM\_Abstract deadline extended to 19 May 2017

Dear Mr. Krivanek,

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

Thank you,

Carol Moyer

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*Carol E. Moyer*

*Sr. Materials Engineer*

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

---

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

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

**To:** [R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)

**Subject:** [External\_Sender] CN246\_PLiM\_Abstract deadline extended to 19 May 2017

Dear all,

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

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |

LTO Programme Manager

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

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

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

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---

**Subject:** Harvesting Topics  
**Location:** Telecon to be added

**Start:** Fri 8/17/2018 1:00 PM  
**End:** Fri 8/17/2018 2:00 PM  
**Show Time As:** Tentative

**Recurrence:** (none)

**Meeting Status:** Not yet responded

**Organizer:** Hiser, Matthew  
**Required Attendees** Ramuhalli, Pradeep (Pradeep.Ramuhalli@pnnl.gov); Purtscher, Patrick; Audrain, Margaret

Discuss report comments and inventory of harvested materials.

---

**Subject:** Harvesting Topics  
**Location:** Telecon: 888-677-8615 passcode: (b)(6)  
**Start:** Fri 8/17/2018 2:30 PM  
**End:** Fri 8/17/2018 3:30 PM  
**Show Time As:** Tentative  
**Recurrence:** (none)  
**Meeting Status:** Not yet responded  
**Organizer:** Hiser, Matthew  
**Required Attendees** Ramuhalli, Pradeep; Purtscher, Patrick; Audrain, Margaret

Telecon info added:

**Passcodes/Pin codes:**

Participant passcode: (b)(6)
------------------------------

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

Rescheduling for Pradeep's availability.

Discuss report comments and inventory of harvested materials.



**From:** [Hiser, Matthew](#)  
**To:** [Ramuhalli, Pradeep](#)  
**Subject:** RE: RE: RE: Harvesting Topics  
**Date:** Friday, August 17, 2018 1:54:59 PM

---

Hi Pradeep,

I just wanted to check / remind you to send the information mentioned below in advance of the call if possible.

Thanks!

Matt

---

**From:** Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]

**Sent:** Wednesday, August 15, 2018 11:26 AM

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

**Subject:** [External\_Sender] RE: RE: Harvesting Topics

Thanks. Will do.

---

With best regards,

Pradeep Ramuhalli, PhD

Tel: 509-375-2763

Email: [pradeep.ramuhalli@pnnl.gov](mailto:pradeep.ramuhalli@pnnl.gov)

---

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

**Sent:** Wednesday, August 15, 2018 4:04 AM

**To:** Ramuhalli, Pradeep <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>

**Subject:** RE: RE: Harvesting Topics

Hi Pradeep,

Sure thing – I slid it back to 2:30 our time on Friday.

If possible, could you send the latest version of the report (your progress on incorporating comments) and the rough columns/categories of what information you're providing under the NDE contract in terms of an inventory? I think having those at least somewhat in advance would be helpful for making the call most effective and useful.

Thanks!

Matt

**Matthew Hiser**

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

---

**From:** Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]

**Sent:** Tuesday, August 14, 2018 7:07 PM

**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** [External\_Sender] RE: Harvesting Topics

Matt,

Would it be possible to move this to either later in the day (2.30 pm EDT or later) or earlier in the day (between 11-1 EDT)? Juggling different meetings that are getting dropped on my calendar, and it seems like the 10-11 (1-2 EDT) time is the most popular!

Thanks.

With best regards,

Pradeep Ramuhalli, PhD

Tel: 509-375-2763

Email: [pradeep.ramuhalli@pnnl.gov](mailto:pradeep.ramuhalli@pnnl.gov)

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

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

**Sent:** Wednesday, August 08, 2018 9:06 PM

**To:** Hiser, Matthew; Ramuhalli, Pradeep; Purtscher, Patrick; Audrain, Margaret

**Subject:** Harvesting Topics

**When:** Friday, August 17, 2018 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).

**Where:** Telecon to be added

Discuss report comments and inventory of harvested materials.



**From:** [Sircar, Madhumita](#)  
**To:** [Hiser, Matthew](#)  
**Subject:** RE: RE: RE: RE: Concrete Cores  
**Date:** Thursday, August 23, 2018 4:15:46 PM  
**Attachments:** [image001.jpg](#)  
[image002.jpg](#)  
[image003.jpg](#)

---

Irradiated concrete is the primary interest from San Onofre.

Thanks,

*Mita*

---

**From:** Hiser, Matthew  
**Sent:** Thursday, August 23, 2018 12:39 PM  
**To:** Sircar, Madhumita <Madhumita.Sircar@nrc.gov>  
**Subject:** Fw: RE: RE: RE: Concrete Cores

Hi Mita,

I'm just refreshing this chain with EnergySolutions back in March. Might be good to pulse Gerry again and see where things stand at SONGS... Is there a particular (technical) reason you are so interested in concrete cores from SONGS? (Perhaps local geology or coastal marine environment effect on concrete aging?)

Thanks!

Matt

---

**From:** Gerard P. Van Noordennen <[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)>  
**Sent:** Thursday, March 22, 2018 4:23 PM  
**To:** Sircar, Madhumita  
**Cc:** Hiser, Matthew  
**Subject:** [External\_Sender] RE: RE: RE: Concrete Cores

Will do

Gerry van Noordennen

Vice President Regulatory Affairs

*EnergySolutions*

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Note to requester: The box with the question mark inside it is the Energy Solutions logo.

121 W. Trade Street, Suite 2700  
Charlotte, NC 28202  
Office: 704-343-6249

Cell: (b)(6)

[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)

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---

**From:** Sircar, Madhumita [<mailto:Madhumita.Sircar@nrc.gov>]

**Sent:** Thursday, March 22, 2018 4:18 PM

**To:** Gerard P. Van Noordennen

**Cc:** Hiser, Matthew

**Subject:** RE: RE: RE: Concrete Cores

Gerry,

I appreciate the updated information for San Onofre, Kewaunee, Crystal River and Fort Calhoun.

Please keep us in the information loop.

Thanks,

*Mita*

---

**From:** Gerard P. Van Noordennen [<mailto:gpvan Noordennen@energysolutions.com>]

**Sent:** Tuesday, March 20, 2018 4:44 PM

**To:** Sircar, Madhumita <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>

**Cc:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** [External\_Sender] RE: RE: Concrete Cores

Madhumita,

San Onofre cores will be taken by us in the Summer of 2019. We cannot start work until January 2019 until SCE receives the State of California environmental permits.

Kewaunee is in long-term SAFSTOR

Crystal River is expected to issue a Request For Proposal soon to hire a contractor to decommission the plant in 2019.

Fort Calhoun is self-performing decommissioning. Contact Brad Blume at OPPD to determine if they want to participate in the NRC Research Program in the future.

Hope this helps.

Gerry van Noordennen

Vice President Regulatory Affairs

EnergySolutions

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Office: 704-343-6249

Cell: (b)(6)

[gpvan Noordennen@energysolutions.com](mailto:gpvan Noordennen@energysolutions.com)

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---

**From:** Sircar, Madhumita [<mailto:Madhumita.Sircar@nrc.gov>]

**Sent:** Monday, March 19, 2018 5:15 PM

**To:** Gerard P. Van Noordennen

**Cc:** Hiser, Matthew

**Subject:** RE: RE: Concrete Cores

Hello Gerry,

Matt contacted you earlier regarding piggy backing some concrete cores from NPPs that are preparing for decommissioning. More specifically PWRs are of interest.

How is the planning on San Onofre coming along? Can you please share the latest status about when the permit to start work be available and when concrete coring can be taken?

We are also interested to know about Kewaunee, Crystal River, and Fort Calhoun or any other plant that may be next in the line for decommissioning.

**Thanks,**

**Madhumita Sircar, M.S., P.E.**

Senior Structural Engineer

U.S. Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Division of Engineering – T10A66

11555 Rockville Pike

Rockville, MD 20852

 T10A60

 301.415.1804

 301.415.6671

 [Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)

---

**From:** Hiser, Matthew

**Sent:** Tuesday, August 29, 2017 10:14 AM

**To:** Gerard P. Van Noordennen <[gpvan Noordennen@energysolutions.com](mailto:gpvan Noordennen@energysolutions.com)>

**Cc:** Sircar, Madhumita <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>

**Subject:** RE: RE: Concrete Cores

Thanks Gerry! We'll be in touch...

---

**From:** Gerard P. Van Noordennen [<mailto:gpvan Noordennen@energysolutions.com>]

**Sent:** Tuesday, August 29, 2017 10:11 AM

**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Sircar, Madhumita <[Madhumita.Sircar@nrc.gov](mailto:Madhumita.Sircar@nrc.gov)>

**Subject:** [External\_Sender] RE: Concrete Cores

Matt,

We plan to take concrete cores at San Onofre in mid-2018. We don't have a sample plan yet but will have one in a couple months. We are not allowed to take any cores at this time as we are waiting on the California permits to start work which will likely not be issued until the first quarter in 2018. I recommend you put some money in the 2018 budget if San Onofre is of interest. The only other plant that may go into active decommissioning next year is Vermont Yankee. Keep in touch.

Gerry van Noordennen

Vice President Regulatory Affairs

EnergySolutions

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151 Lafayette Drive, Suite 201

Oak Ridge, TN 37830

Cell:   (b)(6)

[gpvan Noordennen@energysolutions.com](mailto:gpvan Noordennen@energysolutions.com)

---

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

**Sent:** Tuesday, August 29, 2017 6:51 AM

**To:** Gerard P. Van Noordennen

**Cc:** Sircar, Madhumita

**Subject:** Concrete Cores

Hi Gerry,

Again, I appreciate your participation in our workshop on harvesting back in the spring. As we have been digesting the insights from the workshop here at NRC, I have had some discussions with Mita Sircar (on cc) who works in the area of concrete research here at NRC. We have been discussing what would be the best way to acquire concrete from decommissioning plants. I indicated to Mita that my takeaway in that area was that taking advantage of when cores are taken in the decommissioning planning stage would be the best option.

Our question to you is whether there are any plants that you are aware of that may be doing coring in preparation for decommissioning in the relatively near future. I know at the workshop you mentioned San Onofre and Vermont Yankee will be entering active decommissioning in 2018 and 2019 and Kewaunee, Crystal River, and Fort Calhoun are potentially starting soon as well. If there are any even rough plans to do this concrete coring activity, we would be quite interested in the possibility of piggy-backing on that to acquire some concrete cores for research purposes.

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)



---

**Subject:** Ex-plant Harvesting Visit  
**Location:** T10D40

**Start:** Wed 8/31/2016 2:00 PM  
**End:** Wed 8/31/2016 4:00 PM  
**Show Time As:** Tentative

**Recurrence:** (none)

**Meeting Status:** Not yet responded

**Organizer:** Hiser, Matthew

**Required Attendees:** Ramuhalli, Pradeep (Pradeep.Ramuhalli@pnnl.gov); Purtscher, Patrick

**Optional Attendees:** Tregoning, Robert; Frankl, Istvan; Hull, Amy

Dr. Pradeep Ramuhalli from PNNL will be stopping by NRC HQ for a visit on Wednesday afternoon to discuss the latest status of the project.

Please feel free to participate if available.

**From:** [Hiser, Matthew](#)  
**To:** [Mailänder Reiner](#)  
**Cc:** [Tregoning, Robert](#)  
**Subject:** RE: AW: Materials Harvesting Workshop at USNRC  
**Date:** Tuesday, August 29, 2017 10:35:00 AM

---

Dear Dr. Mailänder,

I wanted to follow up with you and others at ENSI on the plans for harvesting from the Muhleberg plant, which were shared in early form and discussed with the NRC back in early 2016. We have been making efforts here at the NRC to identify and prioritize harvesting opportunities to help address technical issues related to long-term operation. The workshop we hosted earlier this year was a key step in that effort.

Given the time that has passed since your visit in 2016, we were interested in how the planning for this effort at Muhleberg has progressed. NRC is interested in pursuing harvesting opportunities for research that present a good value for addressing important issues. Would it be possible to arrange a call with the appropriate staff at ENSI to discuss these plans at Muhleberg?

Thanks!  
Matt

***Matthew Hiser***

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

---

**From:** Mailänder Reiner [mailto:Reiner.Mailaender@ensi.ch]  
**Sent:** Wednesday, January 25, 2017 3:53 AM  
**To:** Hiser, Matthew <Matthew.Hiser@nrc.gov>  
**Subject:** [External\_Sender] AW: Materials Harvesting Workshop at USNRC

Dear Mr. Hiser

Thank you for informing us about the planned workshop. I will not be able to attend the workshop nor the RIC this year, but I have passed on your message to our experts in the relevant fields.

Kind regards

**Reiner Mailänder**

Ph.D., GeoEcologist  
ENSI Research Coordinator, Deputy Section Head

Swiss Federal Nuclear Safety Inspectorate ENSI  
International Affairs Section  
Industriestrasse 19



CH-5200 Brugg

Phone +41 56 460 86 19

E-Mail [reiner.mailaender@ensi.ch](mailto:reiner.mailaender@ensi.ch)

Website [www.ensi.ch/en](http://www.ensi.ch/en)

---

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

**Gesendet:** Dienstag, 24. Januar 2017 17:46

**An:** Mailänder Reiner

**Betreff:** Materials Harvesting Workshop at USNRC

Dear Mr. Mailander:

I am a materials engineer in the NRC's Office of Research and was present for your visit to the NRC last year to discuss plans in Switzerland for harvesting from the Muhleberg plant that will be shutting down in 2019.

I am coordinating a 2-day workshop on ex-plant materials harvesting. This workshop will be held on March 7-8 (one week before NRC's Regulatory Information Conference) here at NRC headquarters. I wanted to make you aware of the workshop and have attached the workshop announcement and session topics for your information.

We are currently working to finalize the agenda. If you have any questions or would like further information, please feel free to contact me.

Sincerely,

***Matthew Hiser***

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

**From:** [Gerard P. Van Noordennen](#)  
**To:** [Hiser, Matthew](#)  
**Cc:** [Sircar, Madhumita](#)  
**Subject:** [External\_Sender] RE: Concrete Cores  
**Date:** Tuesday, August 29, 2017 7:02:18 AM  
**Attachments:** [image003.jpg](#)

---

Hello Matt,

San Onofre and Vermont Yankee are your best bets. We have the San Onofre decommissioning contract. I can find out when we will start doing concrete cores and let you know. Northstar has the Vermont Yankee contract, so I don't know what they are doing. I will ask my contacts there. The other plants have not started any concrete coring.

Gerry van Noordennen

Vice President Regulatory Affairs

EnergySolutions

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151 Lafayette Drive, Suite 201

Oak Ridge, TN 37830

Cell: (b)(6)

[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)

---

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

**Sent:** Tuesday, August 29, 2017 6:51 AM

**To:** Gerard P. Van Noordennen

**Cc:** Sircar, Madhumita

**Subject:** Concrete Cores

Hi Gerry,

Again, I appreciate your participation in our workshop on harvesting back in the spring. As we have been digesting the insights from the workshop here at NRC, I have had some discussions with Mita Sircar (on cc) who works in the area of concrete research here at NRC. We have been discussing what would be the best way to acquire concrete from decommissioning plants. I indicated to Mita that my takeaway in that area was that taking advantage of when cores are taken in the decommissioning planning stage would be the best option.

Our question to you is whether there are any plants that you are aware of that may be doing coring in preparation for decommissioning in the relatively near future. I know at the workshop you mentioned San Onofre and Vermont Yankee will be entering active decommissioning in 2018 and 2019 and Kewaunee, Crystal River, and Fort Calhoun are potentially starting soon as well. If there are any even rough plans to do this concrete coring activity, we would be quite interested in the possibility of piggy-backing on that to acquire some concrete cores for research purposes.

Thanks!

Matt

**Matthew Hiser**

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch



Phone: 301-415-2454 | Office: TWFN 10D62  
[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

**From:** [Hiser, Matthew](#)  
**To:** [Sircar, Madhumita](#)  
**Subject:** FW: RE: Concrete Cores  
**Date:** Tuesday, August 29, 2017 10:14:00 AM  
**Attachments:** [image003.jpg](#)

---

Hi Mita,  
Do you want to reach out to ORNL folks to see what interest there is in cooperating on this?  
Perhaps we could have a call with EnergySolutions and ORNL to discuss?

Thanks!

Matt

**Matthew Hiser**

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

---

**From:** Gerard P. Van Noordennen [<mailto:gpvannoordennen@energysolutions.com>]

**Sent:** Tuesday, August 29, 2017 10:11 AM

**To:** Hiser, Matthew

**Cc:** Sircar, Madhumita

**Subject:** [External\_Sender] RE: Concrete Cores

Matt,

We plan to take concrete cores at San Onofre in mid-2018. We don't have a sample plan yet but will have one in a couple months. We are not allowed to take any cores at this time as we are waiting on the California permits to start work which will likely not be issued until the first quarter in 2018. I recommend you put some money in the 2018 budget if San Onofre is of interest. The only other plant that may go into active decommissioning next year is Vermont Yankee. Keep in touch.

Gerry van Noordennen

Vice President Regulatory Affairs

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Oak Ridge, TN 37830

Cell: (b)(6)

[gpvan Noordennen@energysolutions.com](mailto:gpvan Noordennen@energysolutions.com)

---

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

**Sent:** Tuesday, August 29, 2017 6:51 AM

**To:** Gerard P. Van Noordennen

**Cc:** Sircar, Madhumita

**Subject:** Concrete Cores

Hi Gerry,

Again, I appreciate your participation in our workshop on harvesting back in the spring. As we have been digesting the insights from the workshop here at NRC, I have had some discussions with Mita Sircar (on cc) who works in the area of concrete research here at NRC. We have been discussing what would be the best way to acquire concrete from

decommissioning plants. I indicated to Mita that my takeaway in that area was that taking advantage of when cores are taken in the decommissioning planning stage would be the best option.

Our question to you is whether there are any plants that you are aware of that may be doing coring in preparation for decommissioning in the relatively near future. I know at the workshop you mentioned San Onofre and Vermont Yankee will be entering active decommissioning in 2018 and 2019 and Kewaunee, Crystal River, and Fort Calhoun are potentially starting soon as well. If there are any even rough plans to do this concrete coring activity, we would be quite interested in the possibility of piggy-backing on that to acquire some concrete cores for research purposes.

Thanks!

Matt

***Matthew Hiser***

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)



**From:** [Tregoning, Robert](#)  
**To:** [Hiser, Matthew](#)  
**Subject:** RE: Swiss request on decommissioning/dismantling NPPs  
**Date:** Tuesday, August 29, 2017 9:12:17 AM

---

No outreach to my knowledge and I agree it would be good to touch base with them to see what their current plans are. Let's set up a call if possible.....

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, August 29, 2017 8:26 AM  
**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>  
**Subject:** RE: Swiss request on decommissioning/dismantling NPPs

Hi Rob,

Do you know if there has been any further outreach to ENSI on the Muhleberg harvesting plan since they visited for RIC back in 2016? I know we reached out to them for the harvesting workshop, but they did not attend. I wonder if I should contact them and see how they have progressed in their planning...

Thanks!

Matt

**Matthew Hiser**

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

---

**From:** Frankl, Istvan  
**Sent:** Friday, January 22, 2016 11:34 AM  
**To:** Berrios, Ilka <[Ilka.Berrios@nrc.gov](mailto:Ilka.Berrios@nrc.gov)>  
**Cc:** Burke, John <[John.Burke@nrc.gov](mailto:John.Burke@nrc.gov)>; Rudland, David <[David.Rudland@nrc.gov](mailto:David.Rudland@nrc.gov)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** RE: Swiss request on decommissioning/dismantling NPPs  
CMB would also be very interested in activity 1 and perhaps activity 2. described below.  
Steve

---

**From:** Burke, John  
**Sent:** Friday, January 22, 2016 7:47 AM  
**To:** Berrios, Ilka; Rudland, David; Frankl, Istvan; Kirk, Mark; Pires, Jose  
**Cc:** Thomas, Brian; Brock, Kathryn  
**Subject:** RE: Swiss request on decommissioning/dismantling NPPs  
SGSEB would be very interested in research activities 1 and 3 mentioned by the Swiss, in their email to Donna-Marie.  
*John Burke, PE*

Branch Chief RES/DE/SGSEB  
US NRC  
(301) 415-2343  
[john.burke@nrc.gov](mailto:john.burke@nrc.gov)

---

**From:** Berrios, Ilka

**Sent:** Friday, January 22, 2016 7:25 AM

**To:** Rudland, David <[David.Rudland@nrc.gov](mailto:David.Rudland@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>; Kirk, Mark <[Mark.Kirk@nrc.gov](mailto:Mark.Kirk@nrc.gov)>; Burke, John <[John.Burke@nrc.gov](mailto:John.Burke@nrc.gov)>

**Cc:** Thomas, Brian <[Brian.Thomas@nrc.gov](mailto:Brian.Thomas@nrc.gov)>; Brock, Kathryn <[Kathryn.Brock@nrc.gov](mailto:Kathryn.Brock@nrc.gov)>

**Subject:** FW: Swiss request on decommissioning/dismantling NPPs

All,

The Swiss regulators would like to meet with us during the RIC to discuss decommissioning of NPPs. Please see email below for more details. As soon as I get more details I will let you know.

Stay warm!!!

Thanks!!

*Ilka*

415-2404

---

**From:** Sangimino, Donna-Marie

**Sent:** Thursday, January 21, 2016 5:45 PM

**To:** Berrios, Ilka <[Ilka.Berrios@nrc.gov](mailto:Ilka.Berrios@nrc.gov)>; Armstrong, Kenneth <[Kenneth.Armstrong@nrc.gov](mailto:Kenneth.Armstrong@nrc.gov)>; Schroer, Suzanne <[Suzanne.Schroer@nrc.gov](mailto:Suzanne.Schroer@nrc.gov)>

**Cc:** Culp, Lisa <[Lisa.Culp@nrc.gov](mailto:Lisa.Culp@nrc.gov)>; Landau, Mindy <[Mindy.Landau@nrc.gov](mailto:Mindy.Landau@nrc.gov)>

**Subject:** Swiss request on decommissioning/dismantling NPPs

Good afternoon Kenneth, Suzanne, and Ilka,

During the December CSNI meeting our Swiss colleague approached me about engaging NRC staff on the decommissioning work underway at NRC. A three member Swiss delegation will attend the RIC and hope to have a separate bilateral meeting to discuss decommissioning activities – past, present and future. While the technical areas listed in the email below focuses on materials (DE), I wanted to notify all divisions about the incoming request and gauge the level of interest. I'll also be reaching out to my counterpart in NMSS for participation in the proposed bilateral meeting

Thanks and be careful in the snow!

Donna-Marie

---

**From:** Mailänder Reiner [<mailto:Reiner.Mailaender@ensi.ch>]

**Sent:** Wednesday, December 09, 2015 7:39 AM

**To:** Sangimino, Donna-Marie <[Donna-Marie.Sangimino@nrc.gov](mailto:Donna-Marie.Sangimino@nrc.gov)>

**Cc:** Correia, Richard <[Richard.Correia@nrc.gov](mailto:Richard.Correia@nrc.gov)>; Müller Annatina <[Annatina.Mueller@ensi.ch](mailto:Annatina.Mueller@ensi.ch)>

**Subject:** [External\_Sender] Research during decommissioning/dismantling of NPPs

Dear Donna-Marie

As discussed last week at the CSNI meeting, I'm approaching you because of long-term planning for the decommissioning and dismantling of the Mühleberg NPP, a GE boiling water reactor operated since 1972. The licensee of this NPP, the Bernische Kraftwerke BKW, announced about two years ago that they will shut down the plant in 2019 after 47 years of operation.

ENSI intends to conduct research during the decommissioning and dismantling phases, which is not

feasible during operation but can be expected to be beneficial for assessing other plants. We have collected first ideas as follows:

1. Sampling of the containment, the RPV, the core shroud and possibly other components of the pressurized conduits, in order to investigate the samples concerning embrittlement, cracks etc. (ageing issues).
2. Sampling of surfaces of the pressurized conduits with respect to platinum deposits. The Mühleberg NPP uses the Online NobleChem application of GE. We already support a research project of the Paul Scherrer institute PSI looking at the distribution of the platinum particles and including the development of a surface sampling technique (NORA project, please confer our last annual research report on our website: [http://www.ensi.ch/de/wp-content/uploads/sites/2/2015/05/erfahrungs\\_und\\_forschungsbericht\\_2014\\_ensi.pdf](http://www.ensi.ch/de/wp-content/uploads/sites/2/2015/05/erfahrungs_und_forschungsbericht_2014_ensi.pdf) ). We are especially interested in evidence whether or not the platinum reaches also „difficult-to-access-areas“.
3. Our civil engineers want to study the robustness of safety-relevant buildings against earthquakes. So they think about experiments on the vibrational behaviour of these buildings after decontamination, using explosives or other means to induce impulses.

Before planning such investigations in detail, we would like to discuss with the U.S.NRC about research activities during the decommissioning/dismantling of NPPs in the United States, be they already completed, ongoing or planned for the future. We may benefit both from informing us mutually about possible developments in this field in the coming years. On the one hand, we want to avoid unnecessary duplications. On the other hand, it may also be possible for us to organize investigations together with international partners, if there is interest in specific issues. So we also welcome ideas from your side on topics of interest.

As already envisaged, the RIC would be a good opportunity to have a first general discussion on these issues. It would be a pleasure for me to provide a short overview on our situation, and I would be thankful to talk to members of your staff who can give me information about the respective activities of the U.S.NRC. This may provide the basis for more detailed discussions between experts for specific investigations.

I would be very grateful to you for helping me with contacts to members of your staff and with organizing a short meeting in the margins of the RIC in March.

Thank you for this in advance, and I wish you Merry Christmas and a Happy New Year!

Best regards

**Reiner Mailänder**

Ph.D., GeoEcologist

ENSI Research Coordinator, Deputy Section Head

Swiss Federal Nuclear Safety Inspectorate ENSI

International Affairs Section

Industriestrasse 19

CH-5200 Brugg

Phone +41 56 460 86 19

Fax +41 56 460 84 99

[reiner.mailaender@ensi.ch](mailto:reiner.mailaender@ensi.ch)

[www.ensi.ch/en](http://www.ensi.ch/en)



**From:** [Hiser, Matthew](#)  
**To:** [Tregoning, Robert](#); [Purtscher, Patrick](#); [Audrain, Margaret](#)  
**Cc:** [Frankl, Istvan](#)  
**Subject:** FW: RE: Concrete Cores  
**Date:** Thursday, August 31, 2017 4:48:00 PM  
**Attachments:** [image003.jpg](#)

---

FYI – Mita and I discussed concrete harvesting after she reviewed the workshop report. We contacted EnergySolutions (which participated in the workshop) about upcoming opportunities to piggyback on concrete coring plans and received a quick response below. Mita is going to work within her branch to determine how to proceed.

Thanks!

Matt

---

**From:** Gerard P. Van Noordennen [<mailto:gpvannoordennen@energysolutions.com>]  
**Sent:** Tuesday, August 29, 2017 10:11 AM  
**To:** Hiser, Matthew  
**Cc:** Sircar, Madhumita  
**Subject:** [External\_Sender] RE: Concrete Cores

Matt,

We plan to take concrete cores at San Onofre in mid-2018. We don't have a sample plan yet but will have one in a couple months. We are not allowed to take any cores at this time as we are waiting on the California permits to start work which will likely not be issued until the first quarter in 2018. I recommend you put some money in the 2018 budget if San Onofre is of interest. The only other plant that may go into active decommissioning next year is Vermont Yankee. Keep in touch.

Gerry van Noordennen

Vice President Regulatory Affairs

*EnergySolutions*

ES - 8



151 Lafayette Drive, Suite 201

Oak Ridge, TN 37830

Cell: (b)(6)

[gpvannoordennen@energysolutions.com](mailto:gpvannoordennen@energysolutions.com)

---

**From:** Hiser, Matthew [<mailto:Matthew.Hiser@nrc.gov>]  
**Sent:** Tuesday, August 29, 2017 6:51 AM  
**To:** Gerard P. Van Noordennen  
**Cc:** Sircar, Madhumita  
**Subject:** Concrete Cores

Hi Gerry,

Again, I appreciate your participation in our workshop on harvesting back in the spring. As we have been digesting the insights from the workshop here at NRC, I have had some discussions with Mita Sircar (on cc) who works in the area of concrete research here at NRC. We have been discussing what would be the best way to acquire concrete from decommissioning plants. I indicated to Mita that my takeaway in that area was that taking advantage of when cores are taken in the decommissioning planning stage would be the best option.

Our question to you is whether there are any plants that you are aware of that may be

doing coring in preparation for decommissioning in the relatively near future. I know at the workshop you mentioned San Onofre and Vermont Yankee will be entering active decommissioning in 2018 and 2019 and Kewaunee, Crystal River, and Fort Calhoun are potentially starting soon as well. If there are any even rough plans to do this concrete coring activity, we would be quite interested in the possibility of piggy-backing on that to acquire some concrete cores for research purposes.

Thanks!

Matt

***Matthew Hiser***

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

**From:** [Ramuhalli, Pradeep](#)  
**To:** [Hiser, Matthew](#)  
**Cc:** [Purtscher, Patrick](#)  
**Subject:** [External\_Sender] RE: Zorita Public Info  
**Date:** Thursday, September 1, 2016 8:26:59 PM

---

Matt,

Thank you. This should be helpful.

---

With best regards,

Pradeep Ramuhalli, PhD

Tel: 509-375-2763

Email: [pradeep.ramuhalli@pnnl.gov](mailto:pradeep.ramuhalli@pnnl.gov)

---

**From:** Hiser, Matthew [mailto:Matthew.Hiser@nrc.gov]  
**Sent:** Thursday, September 01, 2016 12:41 PM  
**To:** Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>  
**Cc:** Purtscher, Patrick <Patrick.Purtscher@nrc.gov>  
**Subject:** Zorita Public Info

Hi Pradeep,

Here a couple pdfs with info on the Zorita harvesting program. One is the award document for NRC's participation in the Zorita Internals Research Project. Pages 4-7 cover the technical scope of work. The other are some briefing slides that are in public ADAMS.

I will try to dig in to find some more information, but this as at least a start.

Thanks!

Matt

***Matthew Hiser***

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)



**From:** [Hiser, Matthew](#)  
**To:** [Tregoning, Robert](#)  
**Subject:** FW: AW: AW: Materials Harvesting Workshop at USNRC  
**Date:** Friday, September 1, 2017 6:40:53 AM

---

Hi Rob,

Do you want to reach out to Klaus? If not, I'm happy to try to contact him and set up a call.

Thanks!

Matt

---

**From:** Mailänder Reiner [mailto:Reiner.Mailaender@ensi.ch]  
**Sent:** Friday, September 01, 2017 2:07 AM  
**To:** Hiser, Matthew  
**Cc:** Germerdonk Klaus  
**Subject:** [External\_Sender] AW: AW: Materials Harvesting Workshop at USNRC

Dear Mr. Hiser

Thank you for your e-mail. Regarding the harvesting plans, please turn to Mr. Klaus Germerdonk (in cc.), who is already in close contact with Mr. Robert Tregoning.

Please do not hesitate to contact me also regarding other research issues related to decommissioning/dismantling of NPPs. We are highly interested in cooperating with other regulators for achieving the best results by using synergies.

Kind regards

**Reiner Mailänder**

Ph.D., GeoEcologist

ENSI Research Coordinator, Deputy Section Head

Swiss Federal Nuclear Safety Inspectorate ENSI

International Affairs Section

Industriestrasse 19

CH-5200 Brugg

Phone +41 56 460 86 19

E-Mail [reiner.mailaender@ensi.ch](mailto:reiner.mailaender@ensi.ch)

Website [www.ensi.ch/en](http://www.ensi.ch/en)

---

**Von:** Hiser, Matthew [mailto:Matthew.Hiser@nrc.gov]

**Gesendet:** Dienstag, 29. August 2017 16:35

**An:** Mailänder Reiner

**Cc:** Tregoning, Robert

**Betreff:** RE: AW: Materials Harvesting Workshop at USNRC

Dear Dr. Mailänder,

I wanted to follow up with you and others at ENSI on the plans for harvesting from the Muhleberg plant, which were shared in early form and discussed with the NRC back in early 2016. We have been making efforts here at the NRC to identify and prioritize harvesting opportunities to help address technical issues related to long-term operation. The workshop we hosted earlier this year was a key step in that effort.

Given the time that has passed since your visit in 2016, we were interested in how the planning for this effort at Muhleberg has progressed. NRC is interested in pursuing harvesting opportunities for research that present a good value for addressing important issues. Would it be possible to arrange a call with the appropriate staff at ENSI to discuss

these plans at Muhleberg?

Thanks!

Matt

***Matthew Hiser***

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

**From:** [Jendrich, Uwe Dr.](#)  
**To:** [Hiser, Matthew](#)  
**Subject:** [External\_Sender] AW: AW: Ex-plant Materials Harvesting Workshop - Presentations - correction  
**Date:** Monday, September 11, 2017 7:59:29 AM

---

Just a minor correction: I just learnt that the reports will be published by ENSREG. A first one in August 2018 as a workshop report and the final report is foreseen for December 2018.

---

**Von:** Hiser, Matthew [mailto:Matthew.Hiser@nrc.gov]  
**Gesendet:** Freitag, 8. September 2017 15:07  
**An:** Jendrich, Uwe Dr.  
**Betreff:** RE: AW: Ex-plant Materials Harvesting Workshop - Presentations

Dear Uwe,

Thank you for attending our workshop on harvesting back in March. We are looking to finalize the report and one of the action items from the meeting was regarding cable surveillance programs in Germany: "One question that GRS will follow-up on is the "rumored" cable surveillance programs that may be used in Germany and could provide experience and lessons learned for other countries."

Have you had the opportunity to follow-up with your colleagues at GRS on this topic? Any insights (or references) you might be able to share would certainly be welcome.

Thanks!

Matt

---

**From:** Jendrich, Uwe Dr. [mailto:Uwe.Jendrich@grs.de]  
**Sent:** Friday, March 03, 2017 10:22 AM  
**To:** Hiser, Matthew <Matthew.Hiser@nrc.gov>  
**Cc:** Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Michel, Frank Dr. <Frank.Michel@grs.de>  
**Subject:** [External\_Sender] AW: Ex-plant Materials Harvesting Workshop - Presentations

Dear Matt,

Thank you for this information.

Please find enclosed my two short presentations.

Kind regards

Uwe

---

**Von:** Hiser, Matthew [mailto:Matthew.Hiser@nrc.gov]  
**Gesendet:** Freitag, 3. März 2017 14:22  
**An:** 'Bernhoft, Sherry'; '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'; 'Jendrich, Uwe Dr.'; 'rachid.chaouadi@sckcen.be'; 'arait@criepi.denken.or.jp'; 'alpanfa@westinghouse.com'; 'sokolovm@ornl.gov'; 'desire.ndomba@canada.ca'; 'khuyinh@aecl.ca'; 'higuchi@criepi.denken.or.jp'; 'kazunobu\_sakamoto@nsr.go.jp'; 'chimi.yasuhiro@jaea.go.jp'; 'Jackson, John Howard'; 'Roussel Guy'; 'john.wagner@inl.gov'; 'Riccardella, Pete'; 'RICHTER, Mark'  
**Cc:** Tregoning, Robert; Purtscher, Patrick; Frankl, Istvan  
**Betreff:** RE: 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 final workshop agenda as well as 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.

If you have not yet responded, please let me know if you plan to join for the dinner with other workshop participants, so I can make the appropriate reservation.

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](mailto:Matthew.Hiser@nrc.gov)

**From:** [Tregoning, Robert](#)  
**To:** [Hiser, Matthew](#)  
**Subject:** RE: AW: AW: Ex-plant Materials Harvesting Workshop - Presentations  
**Date:** Monday, September 11, 2017 9:14:26 AM

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Matt:

Thanks for the follow-up. It would be good to document this exchange and this pending report publication in the workshop summary report. However, it's still not clear to me if the Dec. 2018 report will be publicly available or not. I'm guessing it will also be in German as well. Can you confirm both of these questions?

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:** Monday, September 11, 2017 8:37 AM

**To:** Tregoning, Robert <Robert.Tregoning@nrc.gov>

**Subject:** FW: AW: AW: Ex-plant Materials Harvesting Workshop - Presentations

FYI

**From:** Jendrich, Uwe Dr. [<mailto:Uwe.Jendrich@grs.de>]

**Sent:** Monday, September 11, 2017 7:59 AM

**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** [External\_Sender] AW: AW: Ex-plant Materials Harvesting Workshop - Presentations - correction

Just a minor correction: I just learnt that the reports will be published by ENSREG. A first one in August 2018 as a workshop report and the final report is foreseen for December 2018.

---

**From:** Jendrich, Uwe Dr. [<mailto:Uwe.Jendrich@grs.de>]

**Sent:** Monday, September 11, 2017 7:51 AM

**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** [External\_Sender] AW: AW: Ex-plant Materials Harvesting Workshop - Presentations

Dear Matt,

Thank you for your reminder. In fact, I asked a couple of people and no one provided a clear answer. That is why I did not write to you.

Just recently, the German association of utilities (VGB) drafted a report, where a cable deposit in one of the Konvoi plants is described. Specimens of different cable types are deposited close to the main coolant line. On a picture some tens of pieces of cable appear to be attached to the outside of the metallic insulation of the line. Maybe such a deposit exists also in other plants. This question was not clarified yet.

This report in German language is considered a confidential German contribution to the Topical Peer Review on Ageing Management in European countries, that was decided as an action by the

European Nuclear Safety Regulators Group (ENSREG). This Topical Peer Review will finally be published as a WENRA report containing all national contributions and some kind of conclusion. So you might reference that report when published. The following topics shall be addressed:

- Electrical cables;
- Concealed pipework;
- Reactor pressure vessels;
- Calandria/pressure tubes (CANDU);
- Concrete containment structures;
- Pre-stressed concrete pressure vessels (AGR).

So maybe there will be more interesting information for you in that report.

I hope that will be of some help to you.

Kind regards

Uwe

---

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

**Gesendet:** Freitag, 8. September 2017 15:07

**An:** Jendrich, Uwe Dr.

**Betreff:** RE: AW: Ex-plant Materials Harvesting Workshop - Presentations

Dear Uwe,

Thank you for attending our workshop on harvesting back in March. We are looking to finalize the report and one of the action items from the meeting was regarding cable surveillance programs in Germany: "One question that GRS will follow-up on is the "rumored" cable surveillance programs that may be used in Germany and could provide experience and lessons learned for other countries."

Have you had the opportunity to follow-up with your colleagues at GRS on this topic? Any insights (or references) you might be able to share would certainly be welcome.

Thanks!

Matt

---

**From:** Jendrich, Uwe Dr. [<mailto:Uwe.Jendrich@grs.de>]

**Sent:** Friday, March 03, 2017 10:22 AM

**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>; Michel, Frank Dr. <[Frank.Michel@grs.de](mailto:Frank.Michel@grs.de)>

**Subject:** [External\_Sender] AW: Ex-plant Materials Harvesting Workshop - Presentations

Dear Matt,

Thank you for this information.

Please find enclosed my two short presentations.

Kind regards

Uwe

---

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

**Gesendet:** Freitag, 3. März 2017 14:22

**An:** 'Bernhoft, Sherry'; 'Dyle, Robin'; 'Jean Smith ([jmsmith@epri.com](mailto:jmsmith@epri.com))'; 'Ahluwalia, Kawaljit'; 'Richard Reister ([Richard.Reister@nuclear.energy.gov](mailto: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](mailto:Pradeep.Ramuhalli@pnnl.gov))'; 'daniel.tello@canada.ca'; 'Jendrich, Uwe Dr.'; 'rachid.chaouadi@sckcen.be'; 'arait@criepi.denken.or.jp'; 'alpanfa@westinghouse.com'; 'sokolovm@ornl.gov'; 'desire.ndomba@canada.ca'; 'khuyinh@aecl.ca';



'higuchi@criepi.denken.or.jp'; 'kazunobu\_sakamoto@nsr.go.jp'; 'chimi.yasuhiro@jaea.go.jp'; Jackson, John Howard; 'Roussel Guy'; 'john.wagner@inl.gov'; 'Riccardella, Pete'; 'RICHTER, Mark'

**Cc:** Tregoning, Robert; Purtscher, Patrick; Frankl, Istvan

**Betreff:** RE: 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 final workshop agenda as well as 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.

If you have not yet responded, please let me know if you plan to join for the dinner with other workshop participants, so I can make the appropriate reservation.

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](mailto:Matthew.Hiser@nrc.gov)

**From:** [Tregoning, Robert](#)  
**To:** [Rini, Brett](#)  
**Cc:** [Iyengar, Raj](#); [Frankl, Istvan](#); [Sangimino, Donna-Marie](#); [Hiser, Matthew](#); [Purtscher, Patrick](#); [Audrain, Margaret](#)  
**Subject:** RE: AW: AW: Materials Harvesting Workshop at USNRC  
**Date:** Wednesday, September 12, 2018 1:57:07 PM

---

Brett:

We'll certainly keep IPT and OIP in the loop. We haven't had any substantive discussions about Muhleberg other than during the 2016 RIC. We have just reached out to technical staff to get some idea of the status of the project and then identify next steps for NRC to learn more about the plans that have been developed. With that in mind, we would appreciate you passing on the following message through Margie to the ENSI DG next week.

"NRC remains interested in the plans related to the decommissioning of the Muhleberg plant and especially any planned testing or evaluation of ex-plant components or structures to evaluate the effects of age-related degradation. NRC is also interested in exploring possibilities to collaborate with ENSI and the licensee on any such plans.

NRC would also like to identify a technical POC within ENSI for having further discussions about this effort."

I can serve as the initial POC for NRC. Thanks for any help that you can provide. Please let me know if you have any questions or need any other information to support the EDO's meeting next week.

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:** Rini, Brett  
**Sent:** Wednesday, September 12, 2018 1:03 PM  
**To:** Tregoning, Robert <Robert.Tregoning@nrc.gov>  
**Cc:** Iyengar, Raj <Raj.Iyengar@nrc.gov>  
**Subject:** FW: AW: AW: Materials Harvesting Workshop at USNRC

Rob,

Please keep IPT and me (as the OIP desk officer) in the loop if you don't mind. The EDO is meeting

with the ENSI DG next week during the IAEA General Conference. Are there any messages related to Muhleberg that you'd like her to raise with him?

Thanks,

Brett

---

**From:** Iyengar, Raj  
**Sent:** Wednesday, September 12, 2018 12:53 PM  
**To:** Rini, Brett <[Brett.Rini@nrc.gov](mailto:Brett.Rini@nrc.gov)>  
**Subject:** FW: AW: AW: Materials Harvesting Workshop at USNRC

FYI.

---

**From:** Tregoning, Robert  
**Sent:** Wednesday, September 12, 2018 12:52 PM  
**To:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Kirk, Mark <[Mark.Kirk@nrc.gov](mailto:Mark.Kirk@nrc.gov)>  
**Cc:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; Audrain, Margaret <[Margaret.Audrain@nrc.gov](mailto:Margaret.Audrain@nrc.gov)>  
**Subject:** FW: AW: AW: Materials Harvesting Workshop at USNRC

Raj/Mark:

We've been following up concerning Muhleberg w.r.t. the harvesting effort (see thread below). We'll obviously keep you guys, and everyone else, in the loop as we get more 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:** Tregoning, Robert  
**Sent:** Monday, September 10, 2018 7:32 AM  
**To:** 'Germerdonk Klaus' <[Klaus.Germerdonk@ensi.ch](mailto:Klaus.Germerdonk@ensi.ch)>  
**Cc:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; Audrain, Margaret <[Margaret.Audrain@nrc.gov](mailto:Margaret.Audrain@nrc.gov)>  
**Subject:** RE: AW: AW: Materials Harvesting Workshop at USNRC



Klaus:

Welcome back. I hope that you have had a good summer. I'm very interested to hear about the latest for Muhleberg. Please just let me know when you would like to discuss further. I'm pretty busy for the rest of September with meetings and travel but would love to schedule a call at our earliest mutual convenience.

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:** Germerdonk Klaus [<mailto:Klaus.Germerdonk@ensi.ch>]  
**Sent:** Monday, September 10, 2018 7:13 AM  
**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>  
**Subject:** [External\_Sender] AW: AW: Materials Harvesting Workshop at USNRC

Rob

After a long break I am finally back in the office.

Of cause, I am interested in further discussion with you regarding Muhleberg harvesting.

So, I have to catch up with the latest status of planned activities.

With best regards

Klaus

---

**Von:** Tregoning, Robert [<mailto:Robert.Tregoning@nrc.gov>]  
**Gesendet:** Montag, 7. Mai 2018 17:03  
**An:** Germerdonk Klaus <[Klaus.Germerdonk@ensi.ch](mailto:Klaus.Germerdonk@ensi.ch)>  
**Cc:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Betreff:** FW: AW: Materials Harvesting Workshop at USNRC [signed INVALID]

Klaus:

I'm resending an email that I sent you back in August, 2017 expressing interest in the Muhleberg harvesting and evaluation project. I'm resending this information in light of your upcoming position change within ENSI. I would be happy to discuss the Muhleberg harvesting project further with you in order to explore possibilities for NRC to be involved in this project. Let me know if you are interested in further discussions.

Warm regards,

Rob

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

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**From:** Tregoning, Robert  
**Sent:** Tuesday, August 29, 2017 11:05 AM  
**To:** Germerdonk Klaus ([Klaus.Germerdonk@ensi.ch](mailto:Klaus.Germerdonk@ensi.ch)) <[Klaus.Germerdonk@ensi.ch](mailto:Klaus.Germerdonk@ensi.ch)>  
**Subject:** FW: AW: Materials Harvesting Workshop at USNRC

Klaus:

How are you? I hope that all is well with you and your family and that you are not too consumed with Beznau ☺. I'm forwarding the email that my colleague, Matt Hiser, sent to Dr. Maillander about your harvesting plans for Muhleberg for your awareness. Perhaps you would like to participate in any discussions.

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:** Tuesday, August 29, 2017 10:35 AM  
**To:** Mailänder Reiner <[Reiner.Mailaender@ensi.ch](mailto:Reiner.Mailaender@ensi.ch)>  
**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>  
**Subject:** RE: AW: Materials Harvesting Workshop at USNRC

Dear Dr. Mailänder,

I wanted to follow up with you and others at ENSI on the plans for harvesting from the Muhleberg plant, which were shared in early form and discussed with the NRC back in early 2016. We have been making efforts here at the NRC to identify and prioritize harvesting opportunities to help address technical issues related to long-term operation. The workshop we hosted earlier this year was a key step in that effort.

Given the time that has passed since your visit in 2016, we were interested in how the planning for this effort at Muhleberg has progressed. NRC is interested in pursuing harvesting opportunities for research that present a good value for addressing important issues. Would it be possible to arrange a call with the appropriate staff at ENSI to discuss these plans at Muhleberg?

Thanks!  
Matt

***Matthew Hiser***

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

---

**From:** Mailänder Reiner [<mailto:Reiner.Mailaender@ensi.ch>]  
**Sent:** Wednesday, January 25, 2017 3:53 AM  
**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Subject:** [External\_Sender] AW: Materials Harvesting Workshop at USNRC

Dear Mr. Hiser

Thank you for informing us about the planned workshop. I will not be able to attend the workshop nor the RIC this year, but I have passed on your message to our experts in the relevant fields.

Kind regards

**Reiner Mailänder**

Ph.D., GeoEcologist  
ENSI Research Coordinator, Deputy Section Head

Swiss Federal Nuclear Safety Inspectorate ENSI  
International Affairs Section  
Industriestrasse 19



CH-5200 Brugg

Phone +41 56 460 86 19

E-Mail [reiner.mailaender@ensi.ch](mailto:reiner.mailaender@ensi.ch)

Website [www.ensi.ch/en](http://www.ensi.ch/en)

---

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

**Gesendet:** Dienstag, 24. Januar 2017 17:46

**An:** Mailänder Reiner

**Betreff:** Materials Harvesting Workshop at USNRC

Dear Mr. Mailander:

I am a materials engineer in the NRC's Office of Research and was present for your visit to the NRC last year to discuss plans in Switzerland for harvesting from the Muhleberg plant that will be shutting down in 2019.

I am coordinating a 2-day workshop on ex-plant materials harvesting. This workshop will be held on March 7-8 (one week before NRC's Regulatory Information Conference) here at NRC headquarters. I wanted to make you aware of the workshop and have attached the workshop announcement and session topics for your information.

We are currently working to finalize the agenda. If you have any questions or would like further information, please feel free to contact me.

Sincerely,

***Matthew Hiser***

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

**From:** [Hiser, Matthew](#)  
**To:** [Tregoning, Robert](#)  
**Subject:** FW: AW: AW: AW: Ex-plant Materials Harvesting Workshop - Presentations  
**Date:** Wednesday, September 13, 2017 8:29:59 AM

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FYI

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**From:** Jendrich, Uwe Dr. [<mailto:Uwe.Jendrich@grs.de>]  
**Sent:** Monday, September 11, 2017 9:52 AM  
**To:** Hiser, Matthew  
**Subject:** [External\_Sender] AW: AW: AW: Ex-plant Materials Harvesting Workshop - Presentations  
Dear Matt,  
yes, to my understanding that report will be public and in English.  
Regards  
Uwe

---

**Von:** Hiser, Matthew [<mailto:Matthew.Hiser@nrc.gov>]  
**Gesendet:** Montag, 11. September 2017 15:29  
**An:** Jendrich, Uwe Dr.  
**Betreff:** RE: AW: AW: Ex-plant Materials Harvesting Workshop - Presentations  
Dear Uwe,  
Thank you for responding with this information. I appreciate you looking into this topic for us.  
I have a couple questions about the ENSREG report that you indicated will be expected in December 2018. Will that report be publicly available? Will it be in English?  
Thanks!  
Matt

---

**From:** Jendrich, Uwe Dr. [<mailto:Uwe.Jendrich@grs.de>]  
**Sent:** Monday, September 11, 2017 7:51 AM  
**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Subject:** [External\_Sender] AW: AW: Ex-plant Materials Harvesting Workshop - Presentations  
Dear Matt,  
Thank you for your reminder. In fact, I asked a couple of people and no one provided a clear answer. That is why I did not write to you.  
Just recently, the German association of utilities (VGB) drafted a report, where a cable deposit in one of the Konvoi plants is described. Specimens of different cable types are deposited close to the main coolant line. On a picture some tens of pieces of cable appear to be attached to the outside of the metallic insulation of the line. Maybe such a deposit exists also in other plants. This question was not clarified yet.  
This report in German language is considered a confidential German contribution to the Topical Peer Review on Ageing Management in European countries, that was decided as an action by the European Nuclear Safety Regulators Group (ENSREG). This Topical Peer Review will finally be published as a WENRA report containing all national contributions and some kind of conclusion. So you might reference that report when published. The following topics shall be addressed:

- Electrical cables;
- Concealed pipework;
- Reactor pressure vessels;
- Calandria/pressure tubes (CANDU);

- Concrete containment structures;
- Pre-stressed concrete pressure vessels (AGR).

So maybe there will be more interesting information for you in that report.

I hope that will be of some help to you.

Kind regards

Uwe

---

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

**Gesendet:** Freitag, 8. September 2017 15:07

**An:** Jendrich, Uwe Dr.

**Betreff:** RE: AW: Ex-plant Materials Harvesting Workshop - Presentations

Dear Uwe,

Thank you for attending our workshop on harvesting back in March. We are looking to finalize the report and one of the action items from the meeting was regarding cable surveillance programs in Germany: "One question that GRS will follow-up on is the "rumored" cable surveillance programs that may be used in Germany and could provide experience and lessons learned for other countries."

Have you had the opportunity to follow-up with your colleagues at GRS on this topic? Any insights (or references) you might be able to share would certainly be welcome.

Thanks!

Matt

---

**From:** Jendrich, Uwe Dr. [<mailto:Uwe.Jendrich@grs.de>]

**Sent:** Friday, March 03, 2017 10:22 AM

**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>; Michel, Frank Dr. <[Frank.Michel@grs.de](mailto:Frank.Michel@grs.de)>

**Subject:** [External\_Sender] AW: Ex-plant Materials Harvesting Workshop - Presentations

Dear Matt,

Thank you for this information.

Please find enclosed my two short presentations.

Kind regards

Uwe

---

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

**Gesendet:** Freitag, 3. März 2017 14:22

**An:** 'Bernhoft, Sherry'; 'Dyle, Robin'; 'Jean Smith ([jmsmith@epri.com](mailto:jmsmith@epri.com))'; 'Ahluwalia, Kawaljit'; 'Richard Reister ([Richard.Reister@nuclear.energy.gov](mailto: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](mailto:Pradeep.Ramuhalli@pnnl.gov))'; 'daniel.tello@canada.ca'; 'Jendrich, Uwe Dr.'; 'rachid.chaouadi@sckcen.be'; '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'; 'Jackson, John Howard'; 'Roussel Guy'; 'john.wagner@inl.gov'; 'Riccardella, Pete'; 'RICHTER, Mark'

**Cc:** Tregoning, Robert; Purtscher, Patrick; Frankl, Istvan

**Betreff:** RE: 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 final workshop agenda as well as 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.

If you have not yet responded, please let me know if you plan to join for the dinner with other workshop participants, so I can make the appropriate reservation.

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](mailto:Matthew.Hiser@nrc.gov)

**From:** [Tregoning, Robert](#)  
**To:** [Hiser, Matthew](#); [Purtscher, Patrick](#)  
**Subject:** RE: HRP/IAEA/NEA Decommissioning Workshop – Third Announcement  
**Date:** Wednesday, September 21, 2016 9:21:22 AM

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I think it's a good idea to send to NMSS. Let's keep tabs if they decide to send someone. It might be worth contacting the organizers. We can see if they'd give us the attendance list. While I doubt they'll do this, we could also tell them about our workshop and see if they'd advertise it. They may be more likely to do this.

Cheers,

Rob

---

**From:** Hiser, Matthew  
**Sent:** Wednesday, September 21, 2016 9:04 AM  
**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>  
**Subject:** RE: HRP/IAEA/NEA Decommissioning Workshop – Third Announcement  
Thanks Rob!

No, I wasn't aware of this – not sure why I wasn't on Halden's distribution.

I agree it's probably not worth us in RES going (although getting a contact list would be good), but I will also share with the decommissioning branch in NMSS in case they may want to attend.

Thanks!

**Matthew Hiser**

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

---

**From:** Tregoning, Robert  
**Sent:** Wednesday, September 21, 2016 6:14 AM  
**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>  
**Subject:** FW: HRP/IAEA/NEA Decommissioning Workshop – Third Announcement  
Don't know if you saw this or not. While I'm not sure if the workshop itself would be that useful in helping plan harvesting activities, I think that getting the attendance list and/or making contact with relevant attendees would be. Let's discuss at some point.....

---

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

**Dear Robert TREGONING,**

A workshop on "Current and Emerging Methods for Optimising Safety and Efficiency in Nuclear Decommissioning" (7<sup>th</sup> – 9<sup>th</sup> February 2017) organised by the Institute for Energy Technology (IFE) on behalf of the OECD Halden Reactor Project (OECD-HRP) in collaboration with the

International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA).

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

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

**Costs:**

**Registration fee:**

450 EUR by **October 31**

650 EUR after **October 31**

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

**Accommodation at workshop site (Quality Hotel Sarpsborg):**

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

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

For those wishing to stay at other hotels we request:

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

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

**Abstracts:**

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

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

Abstracts can be submitted via email to [Jannicke.Neeb@ife.no](mailto:Jannicke.Neeb@ife.no)

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

**Final presentation and paper:**

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

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

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

Please distribute this invitation!

We are looking forward to see you in February!

With Kindest Regards from the organisers,

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

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

Vladimir Michal (IAEA): [V.Michal@iaea.org](mailto:V.Michal@iaea.org)

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

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

István Szoke (IFE / OECD-HRP): [Istvan.Szoke@ife.no](mailto:Istvan.Szoke@ife.no)



**From:** [Tregoning, Robert](#)  
**To:** [Hiser, Matthew](#)  
**Subject:** RE: RE: AW: Materials Harvesting Workshop at USNRC  
**Date:** Tuesday, September 26, 2017 6:35:45 AM

---

No, I haven't heard anything back from him so we should reach out....

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

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**From:** Hiser, Matthew  
**Sent:** Tuesday, September 26, 2017 6:06 AM  
**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>  
**Subject:** RE: AW: Materials Harvesting Workshop at USNRC

Hi Rob,  
Have you heard anything more from Klaus?  
Thanks!  
Matt

**From:** Tregoning, Robert  
**Sent:** Thursday, September 07, 2017 9:17 AM  
**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Subject:** FW: AW: Materials Harvesting Workshop at USNRC

Matt:  
I already reached out to Klaus (see below). I haven't heard back from him yet. If I don't hear from him early next week, we can email him again or call.

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:** Tregoning, Robert  
**Sent:** Tuesday, August 29, 2017 11:05 AM  
**To:** Germerdonk Klaus ([Klaus.Germerdonk@ensi.ch](mailto:Klaus.Germerdonk@ensi.ch)) <[Klaus.Germerdonk@ensi.ch](mailto:Klaus.Germerdonk@ensi.ch)>  
**Subject:** FW: AW: Materials Harvesting Workshop at USNRC

Klaus:  
How are you? I hope that all is well with you and your family and that you are not too consumed with Beznau ☺. I'm forwarding the email that my colleague, Matt Hiser, sent to Dr. Maillander about your harvesting plans for Muhleberg for your awareness. Perhaps you would like to participate in any discussions.

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:** Tuesday, August 29, 2017 10:35 AM

**To:** Mailänder Reiner <[Reiner.Mailaender@ensi.ch](mailto:Reiner.Mailaender@ensi.ch)>

**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>

**Subject:** RE: AW: Materials Harvesting Workshop at USNRC

Dear Dr. Mailänder,

I wanted to follow up with you and others at ENSI on the plans for harvesting from the Muhleberg plant, which were shared in early form and discussed with the NRC back in early 2016. We have been making efforts here at the NRC to identify and prioritize harvesting opportunities to help address technical issues related to long-term operation. The workshop we hosted earlier this year was a key step in that effort.

Given the time that has passed since your visit in 2016, we were interested in how the planning for this effort at Muhleberg has progressed. NRC is interested in pursuing harvesting opportunities for research that present a good value for addressing important issues. Would it be possible to arrange a call with the appropriate staff at ENSI to discuss these plans at Muhleberg?

Thanks!

Matt

***Matthew Hiser***

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

**From:** Mailänder Reiner [<mailto:Reiner.Mailaender@ensi.ch>]

**Sent:** Wednesday, January 25, 2017 3:53 AM

**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** [External\_Sender] AW: Materials Harvesting Workshop at USNRC

Dear Mr. Hiser

Thank you for informing us about the planned workshop. I will not be able to attend the workshop nor the RIC this year, but I have passed on your message to our experts in the relevant fields.

Kind regards

**Reiner Mailänder**

Ph.D., GeoEcologist

ENSI Research Coordinator, Deputy Section Head

Swiss Federal Nuclear Safety Inspectorate ENSI

International Affairs Section

Industriestrasse 19

CH-5200 Brugg

Phone +41 56 460 86 19

E-Mail [reiner.mailaender@ensi.ch](mailto:reiner.mailaender@ensi.ch)

Website [www.ensi.ch/en](http://www.ensi.ch/en)

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

**Gesendet:** Dienstag, 24. Januar 2017 17:46

**An:** Mailänder Reiner

**Betreff:** Materials Harvesting Workshop at USNRC

Dear Mr. Mailander:

I am a materials engineer in the NRC's Office of Research and was present for your visit to the NRC last year to discuss plans in Switzerland for harvesting from the Muhleberg plant that will be shutting down in 2019.

I am coordinating a 2-day workshop on ex-plant materials harvesting. This workshop will be held on March 7-8 (one week before NRC's Regulatory Information Conference) here at NRC headquarters. I wanted to make you aware of the workshop and have attached the workshop announcement and session topics for your information.

We are currently working to finalize the agenda. If you have any questions or would like further information, please feel free to contact me.

Sincerely,

***Matthew Hiser***

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)



**From:** [Ramuhalli, Pradeep](#)  
**To:** [Purtscher, Patrick](#)  
**Cc:** [Audrain, Margaret](#); [Hiser, Matthew](#)  
**Subject:** [External\_Sender] RE: Question  
**Date:** Wednesday, September 27, 2017 1:12:57 PM

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Patrick,  
Thanks. Look forward to hearing from you.

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

---

**From:** Purtscher, Patrick [mailto:Patrick.Purtscher@nrc.gov]  
**Sent:** Wednesday, September 27, 2017 10:11 AM  
**To:** Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>  
**Cc:** Audrain, Margaret <Margaret.Audrain@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>  
**Subject:** RE: Question

Sounds good. We will be having an internal update meeting here next week and we will talk more about it then so I would expect to hear from us later next week.

Pat

---

**From:** Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]  
**Sent:** Wednesday, September 27, 2017 12:01 PM  
**To:** Purtscher, Patrick <Patrick.Purtscher@nrc.gov>  
**Subject:** [External\_Sender] Question

Patrick,

You had mentioned on our call the other day that Meg Audran (sp?) was visiting PNNL at some point and was going to look into available materials. Do you have any additional information on this (when, etc.)? I am debating if it would be worthwhile meeting with Meg for a half an hour and perhaps pull in some of our other NRC program folks who are aware of available harvested materials from cancelled plants and operating plants.

With best regards,  
Pradeep

---

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

**From:** [KRIVANEK, Robert](#)  
**To:** [sbernhoft@epri.com](mailto:sbernhoft@epri.com); [Tregoning, Robert](#); [KANG, Ki-Sig](#); [Hiser, Allen](#)  
**Cc:** [Moyer, Carol](#); [Hull, Amy](#); [Hiser, Matthew](#)  
**Subject:** [External\_Sender] RE: [EXTERNAL] NRC PLiM poster on harvesting  
**Date:** Thursday, October 5, 2017 2:06:59 PM  
**Attachments:** [image001.png](#)  
[image003.png](#)  
[image004.png](#)  
[image005.png](#)  
[image006.png](#)  
[image007.png](#)  
[image008.png](#)

---

Dear Sherry,

I have no problem with it.

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |

LTO Programme Manager

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

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

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

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---

**From:** [sbernhoft@epri.com](mailto:sbernhoft@epri.com) [mailto:[sbernhoft@epri.com](mailto:sbernhoft@epri.com)]

**Sent:** Thursday, 05 October 2017 18:26

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; KANG, Ki-Sig <[K.S.Kang@iaea.org](mailto:K.S.Kang@iaea.org)>; Allen Hiser <[allen.hiser@nrc.gov](mailto:allen.hiser@nrc.gov)>

**Cc:** KRIVANEK, Robert <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>; Moyer, Carol <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>; Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** Re: [EXTERNAL] NRC PLiM poster on harvesting

Ki-Sig and Robert,

Please see the note below regarding NRC poster on material harvesting. Allen Hiser will be bringing the poster and supporting this during the PLiM if you can help ensure it is part of one of the poster sessions that would be greatly appreciated.

See you in a few weeks,

Sherry

Sent from my iPad

On Oct 4, 2017, at 2:26 PM, Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)> wrote:

Robert/Sherry:

I just checked the latest PLiM program agenda that is on the website and it doesn't have the NRC's poster on material harvesting listed. We submitted the attached abstract and assumed, based on this email chain, that it had been accepted for the poster session. We have prepared the poster and are making plans to have it manned during the conference. I just want to confirm that the poster is accepted and to see if the program can be updated accordingly.

Thanks for your help with this.

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, October 04, 2017 3:02 PM

**To:** Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>; Moyer, Carol <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>

**Subject:** FW: FW: PLiM abstract on harvesting

This email chain I thought confirmed that we were accepted for a poster...

---

**From:** Moyer, Carol

**Sent:** Thursday, July 20, 2017 12:49 PM

**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** FW: FW: PLiM abstract on harvesting

Matt,

I am a bit confused by the pronoun used in this email...

Are you interested in doing a poster instead?

Carol

---

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

**Sent:** Thursday, July 20, 2017 11:10 AM

**To:** Moyer, Carol <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>

**Subject:** [External\_Sender] FW: PLiM abstract on harvesting

You have just agreed that we will add this paper to poster session.

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |

LTO Programme Manager

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

|

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

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

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<

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**From:** KRIVANEK, Robert

**Sent:** Thursday, 20 July 2017 16:10

**To:** 'Carol.Moyer@nrc.gov' <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>

**Subject:** FW: PLiM abstract on harvesting

Dear Carol,

We asked you to submit your synopsis through INDICO (see email below) but it did not happened. So we were not able to send your synopsis to programme committee for evaluation and it will not occur on the conference programme.

Sorry for that but there are currently 300 delegates and 150 synopsis, so we were not



able to track each of them separately.

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |  
LTO Programme Manager  
Operational Safety Section | Division of Nuclear Installation Safety | Department of  
Nuclear Safety and Security |  
International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria  
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**From:** KRIVANEK, Robert  
**Sent:** Friday, 26 May 2017 08:55  
**To:** 'Carol.Moyer@nrc.gov' <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>  
**Cc:** KHAELSS, Martina <[M.Khaelss@iaea.org](mailto:M.Khaelss@iaea.org)>  
**Subject:** FW: PLiM abstract on harvesting

Dear Carol,

Thank you for your synopsis. We have opened INDICO system for this week, so please submit it through the system.

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |  
LTO Programme Manager  
Operational Safety Section | Division of Nuclear Installation Safety | Department of  
Nuclear Safety and Security |  
International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria  
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**From:** [Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov) [<mailto:Carol.Moyer@nrc.gov>]  
**Sent:** Friday, 26 May 2017 00:19  
**To:** KRIVANEK, Robert <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>  
**Cc:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Tregoning, Robert  
<[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>  
**Subject:** PLiM abstract on harvesting

Dear Mr. Krivanek,

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

---

*Carol E. Moyer*  
*Sr. Materials Engineer*  
*Office of Nuclear Regulatory Research*  
*RES/DE/CMB*  
[carol.moyer@nrc.gov](mailto:carol.moyer@nrc.gov)

301-415-2153

---

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

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

**To:** Moyer, Carol <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>

**Subject:** [External\_Sender] RE: RE: CN246\_PLiM\_Abstract deadline extended to 19 May 2017

Dear Carol,

I will arrange it. Thank you.

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |

LTO Programme Manager

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

Nuclear Safety and Security |

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

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

**Sent:** Monday, 22 May 2017 20:44

**To:** KRIVANEK, Robert <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>

**Subject:** RE: RE: CN246\_PLiM\_Abstract deadline extended to 19 May 2017

Dear Mr. Krivanek,

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

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

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

Thanks again for your patience and assistance,

Carol

---

**From:** Moyer, Carol

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

**To:** 'KRIVANEK, Robert' <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>

**Cc:** Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>

**Subject:** RE: RE: CN246\_PLiM\_Abstract deadline extended to 19 May 2017

Dear Mr. Krivanek,

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

Thank you,

Mrs. Carol Moyer

---

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

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

**To:** Moyer, Carol <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>

**Cc:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>

**Subject:** [External\_Sender] RE: CN246\_PLiM\_Abstract deadline extended to 19 May 2017

Dear Mr Moyer,

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

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

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |

LTO Programme Manager

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

Nuclear Safety and Security |

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

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---

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

**Sent:** Friday, 19 May 2017 23:19

**To:** KRIVANEK, Robert <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>

**Cc:** KANG, Ki-Sig <[K.S.Kang@iaea.org](mailto:K.S.Kang@iaea.org)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>

**Subject:** RE: CN246\_PLiM\_Abstract deadline extended to 19 May 2017

Dear Mr. Krivanek,

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

Thank you,

Carol Moyer

---

*Carol E. Moyer*

*Sr. Materials Engineer*

*U.S. Nuclear Regulatory Commission*

*Office of Nuclear Regulatory Research*

*MS: T-10A36*

*Washington, DC 20555-0001*

[carol.moyer@nrc.gov](mailto:carol.moyer@nrc.gov)

*301-415-2153*

---

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

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

**To:** [R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)

**Subject:** [External\_Sender] CN246\_PLiM\_Abstract deadline extended to 19 May 2017

Dear all,

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

Best regards,

**Mr Robert KRIVANEK** | Senior Safety Officer |

LTO Programme Manager

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



Nuclear Safety and Security |  
International Atomic Energy Agency | Vienna International Centre, PO Box 100, 1400 Vienna, Austria  
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<Harvesting IAEA PLim 2 page synopsis USNRC.docx>

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

**From:** [Sircar, Madhumita](#)  
**To:** [Hiser, Matthew](#)  
**Subject:** RE: Concrete Harvesting at SONGS  
**Date:** Friday, October 13, 2017 8:04:50 AM

---

Matt,

Thanks for arranging the call and getting the information. It is good to know that we have a good bit of time.

I arranged a technical session yesterday and the discussion continued, so I couldn't join the call. ☹

*Mita*

---

**From:** Hiser, Matthew  
**Sent:** Friday, October 13, 2017 7:20 AM  
**To:** Sircar, Madhumita <Madhumita.Sircar@nrc.gov>  
**Subject:** RE: Concrete Harvesting at SONGS

Hi Mita,

Yes, I had the call with Gerry and Matt Marston, who works for AECOM, which is Energy Solutions' partner for the SONGS decommissioning.

I asked about rough estimates of costs and timelines. Their response about costs was that they needed an approximate number and location of the cores to be taken to be able to at least roughly estimate how much it would cost. They said you should be able to get an idea from the drawings the UFSAR of how the buildings are laid out.

In terms of schedule, it sounds like their coring operations won't be until at least late next year, if not slipping into 2019, so there is still a good bit of time.

Thanks!

Matt

---

**From:** Sircar, Madhumita  
**Sent:** Thursday, October 12, 2017 5:01 PM  
**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Subject:** RE: Concrete Harvesting at SONGS

Did you get a response from Gerry? Or I missed the call?



*Miles*

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

**From:** Hiser, Matthew

**Sent:** Thursday, October 12, 2017 8:19 AM

**To:** Sircar, Madhumita; Gerard P. Van Noordennen

**Cc:** Marston, Matt

**Subject:** Concrete Harvesting at SONGS

**When:** Thursday, October 12, 2017 4:00 PM-4:30 PM (UTC-05:00) Eastern Time (US & Canada).

**Where:** Telecon: 888-677-8615 passcode:   (b)(6)

Hi Gerry,

Would you be available sometime next week for a quick call regarding concrete harvesting at SONGS?

We had exchanged emails a few months ago and were looking to get a rough idea on costs and schedule for when we would need to get something in place contractually as well as identifying where and how many cores.

Thanks!

Matt

Note to requester: This email record was forwarded (with its attachment) in an email record provided in interim response #3. The attachment is immediately following.

**From:** [Hiser, Matthew](#)  
**To:** [PLIM2@iaea.org](mailto:PLIM2@iaea.org)  
**Cc:** [Hiser, Allen](#); [Frankl, Istvan](#); [Moyer, Carol](#); [KRIVANEK, Robert](#); [KANG, Ki-Sig](#)  
**Subject:** PLiM Slides Submission  
**Date:** Monday, October 16, 2017 4:58:00 PM  
**Attachments:** [NRC PLiM slides on Harvesting final.pdf](#)

---

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](mailto:Matthew.Hiser@nrc.gov)

# Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

M. Hiser<sup>a</sup>, P. Purtscher<sup>a</sup>, P. Ramuhalli<sup>b</sup>, A. B. Hull<sup>a</sup>, R. Tregoning<sup>a</sup>  
<sup>a</sup>U.S. Nuclear Regulatory Commission (NRC), Washington, D.C., USA  
<sup>b</sup>Pacific Northwest National Laboratory (PNNL), Richland, WA, USA

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# 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



---

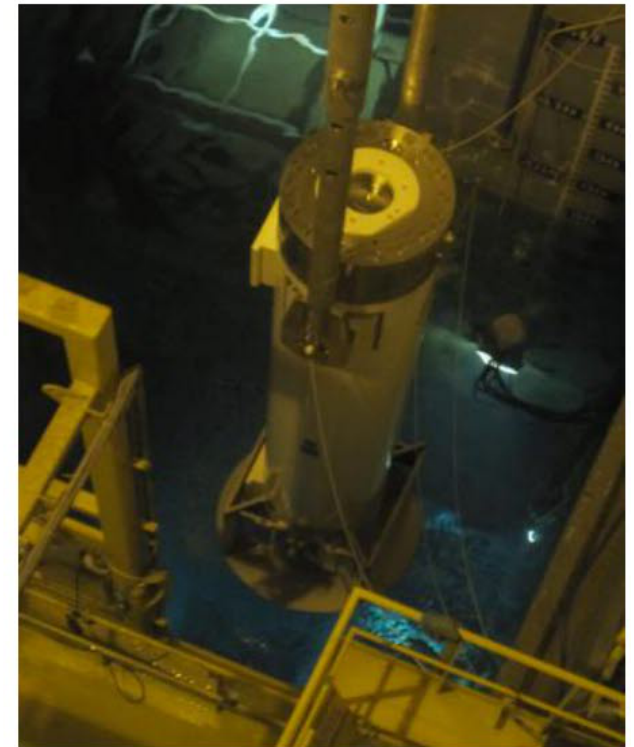
# Technical Lessons Learned

- 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

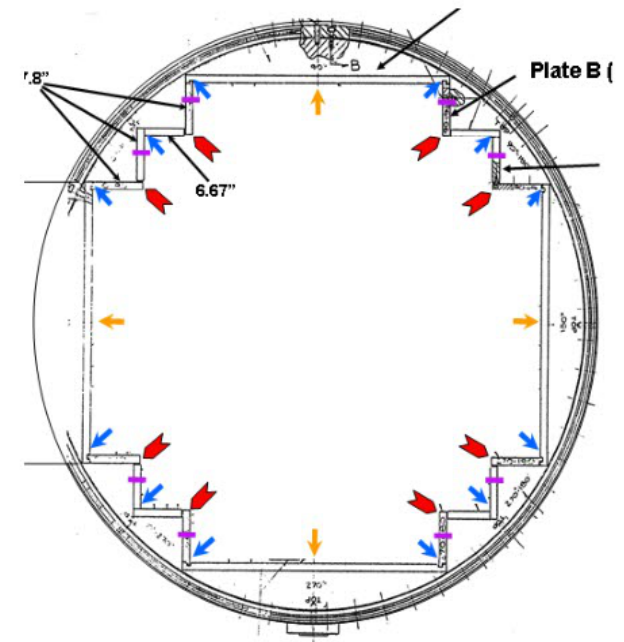
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# Potential Criteria for Harvesting Prioritization

- 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:** [Hiser, Matthew](#)  
**To:** ["Rosseel, Thomas M."](#)  
**Subject:** RE: Re: [External] FW: Harvesting Workshop Announcement  
**Date:** Friday, October 21, 2016 3:32:20 PM

---

Hi Tom,

Yes, we are planning to have this be a public meeting and anticipate inviting international participants.

At RIC last year, a representative from Switzerland shared plans for harvesting from a plant planning to shutdown in 2019. We've also mentioned this workshop idea to counterparts in Japan and Belgium that are interested.

Part of the reason for wanting to hold this meeting in close proximity to RIC is the significant international attendance the RIC normally receives.

Thanks!

Matt

---

**From:** Rosseel, Thomas M. [<mailto:rosseeltm@ornl.gov>]  
**Sent:** Friday, October 21, 2016 3:25 PM  
**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Subject:** [External\_Sender] Re: [External] FW: Harvesting Workshop Announcement

Hi Matt,

Rich had forwarded a copy of the document and I have asked for input into the topics from lab staff who have participated in harvesting or have / will receive harvested material.

Will non-US citizens be allowed to participate in the meeting?

Thanks,

Tom

Thomas M. Rosseel, Ph. D.

Past Chair, International Committee on Irradiated Concrete and  
Materials Aging and Degradation, Deputy Pathway Lead

Light Water Reactor Sustainability Program

Materials, Science and Technology Division

Oak Ridge National Laboratory

4500S MS 6132

PO Box 2008

Oak Ridge, TN 37831

TEL: 1-865-574-5380

[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)

---

**From:** "Hiser, Matthew" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Date:** Friday, October 21, 2016 at 2:18 PM  
**To:** "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>  
**Subject:** RE: Re: [External] FW: Harvesting Workshop Announcement

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Thanks!

Matt

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**Sent:** Friday, October 21, 2016 2:06 PM

**To:** Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Bernhoft, Sherry <[sbernhof@epri.com](mailto:sbernhof@epri.com)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

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Cheers,

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**From:** [Hiser, Matthew](#)  
**To:** ["Rosseel, Thomas M."](#)  
**Subject:** RE: Re: [External] FW: Harvesting Workshop Announcement  
**Date:** Friday, October 21, 2016 2:18:07 PM  
**Attachments:** [NRC Harvesting Workshop Announcement.docx](#)

Note to requester: Attachment is immediately following.

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# Ex-Plant Materials Harvesting Workshop

**Location:** NRC HQ in Rockville, MD

**Potential Dates:**

- March 16-17, 2017 – Thursday/Friday of RIC week
- March 20-21, 2017 – Monday/Tuesday after RIC

**Motivation:**

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

**Purpose and Objective:**

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

**Workshop Topics:**

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

**From:** [Bernhoft, Sherry](#)  
**To:** [Tregoning, Robert](#); [Reister, Richard](#); [Dyle, Robin](#)  
**Cc:** [Iyengar, Raj](#); [Hiser, Matthew](#); ["Rosseel, Thomas M."](#)  
**Subject:** [External\_Sender] RE: RE: [External] FW: Harvesting Workshop Announcement  
**Date:** Friday, October 21, 2016 2:54:42 PM

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Good question – I would anticipate a meeting at NEI the afternoon before if the plan is to have EPRI or the industry make a presentation to the ACRS. If this is the case then it will only be me who is affected so we proceed on the 7<sup>th</sup> and 8<sup>th</sup>.

From an NEI-EPRI stand point we are planning a webcast the week after the RIC to brief the results of the ACRS meeting to the utility members.

Have a great weekend,

Sherry Bernhoft

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**Electric Power Research Institute**

EPRI, Senior Program Manager

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*Together...Shaping the Future of Electricity*

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**From:** Reister, Richard [<mailto:Richard.Reister@nuclear.energy.gov>]

**Sent:** Friday, October 21, 2016 11:57 AM

**To:** Bernhoft, Sherry <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Subject:** RE: [External] FW: Harvesting Workshop Announcement

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

Rich

---

**From:** Bernhoft, Sherry [<mailto:sbernhoft@epri.com>]

**Sent:** Friday, October 21, 2016 12:49 PM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** RE: [External] FW: Harvesting Workshop Announcement

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

Sherry Bernhoft

**Electric Power Research Institute**

EPRI, Senior Program Manager

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

**Sent:** Friday, October 21, 2016 8:16 AM

**To:** Bernhoft, Sherry <[sbernhof@epri.com](mailto:sbernhof@epri.com)>; Rich Reister ([Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)) <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** [External] FW: Harvesting Workshop Announcement

Robin/Sherry/Rich:

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

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

Cheers,

Rob

Robert Tregoning

Technical Advisor for Materials

US Nuclear Regulatory Commission

Two White Flint North, M/S T-10 A36

11545 Rockville Pike

Rockville, MD 20852-2738

ph: 301-415-2324

fax: 301-415-6671

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**From:** Hiser, Matthew

**Sent:** Friday, October 21, 2016 9:05 AM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>

**Subject:** Harvesting Workshop Announcement

Hi Rob and Raj,

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

Thanks!

Matt

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**From:** [Tregoning, Robert](#)  
**To:** [Bernhoft, Sherry \[sbernhoft@epri.com\]](#) ([sbernhoft@epri.com](mailto:sbernhoft@epri.com)); [Rich Reister](#) ([Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)); [Dyle, Robin](#)  
**Cc:** [Iyengar, Raj](#); [Hiser, Matthew](#)  
**Subject:** FW: Harvesting Workshop Announcement  
**Date:** Friday, October 21, 2016 9:16:11 AM  
**Attachments:** [NRC Harvesting Workshop Announcement.docx](#)

Note to requester: Attachment is immediately following.
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Robin/Sherry/Rich:

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

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

Cheers,

Rob

Robert Tregoning

Technical Advisor for Materials

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---

**From:** Hiser, Matthew

**Sent:** Friday, October 21, 2016 9:05 AM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>

**Subject:** Harvesting Workshop Announcement

Hi Rob and Raj,

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

Thanks!

Matt

# Ex-Plant Materials Harvesting Workshop

**Location:** NRC HQ in Rockville, MD

**Potential Dates:**

- March 16-17, 2017 – Thursday/Friday of RIC week
- March 20-21, 2017 – Monday/Tuesday after RIC

**Motivation:**

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

**Purpose and Objective:**

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

**Workshop Topics:**

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

Note to requester: Attachment is immediately following. The attachment was also released in full in the interim response #2.

**From:** [Hiser, Matthew](#)  
**To:** ["PLIM2@iaea.org"](mailto:PLIM2@iaea.org)  
**Cc:** [Hiser, Allen](#); [Frankl, Istvan](#); [Moyer, Carol](#); ["KRIVANEK, Robert"](#); ["KANG, Ki-Sig"](#); [Tregoning, Robert](#)  
**Subject:** RE: PLiM Slides Submission  
**Date:** Wednesday, October 25, 2017 8:51:26 AM  
**Attachments:** [IAEA PLiM Harvesting Final.pdf](#)

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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](mailto:PLIM2@iaea.org)

**Cc:** Hiser, Allen <[Allen.Hiser@nrc.gov](mailto:Allen.Hiser@nrc.gov)>; Frankl, Istvan <[Istvan.Frankl@nrc.gov](mailto:Istvan.Frankl@nrc.gov)>; Moyer, Carol <[Carol.Moyer@nrc.gov](mailto:Carol.Moyer@nrc.gov)>; KRIVANEK, Robert <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>; KANG, Ki-Sig <[K.S.Kang@iaea.org](mailto: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](mailto:Matthew.Hiser@nrc.gov)



# **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. 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.

## 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

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- [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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- [6] SCHUSTER, G. J., DOCTOR, S. R., PARDINI, A.F., CRAWFORD, S.L., "Characterization of Flaws in U.S. Reactor Pressure Vessels: Validation of Flaw Density and Distribution in the Weld Metal of the PVRUF Vessel," NUREG/CR-6471 Volume 2, U.S. Nuclear Regulatory Commission, August 2000.
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- [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.
- [10] CRAWFORD, S.L., ET AL., "Ultrasonic Phased Array Assessment of the Interference Fit and Leak Path of the North Anna Unit 2 Control Rod Drive Mechanism Nozzle 63 with Destructive Validation," NUREG/CR-7142 (PNNL-21547), U.S. Nuclear Regulatory Commission, August 2012.
- [11] ALEXANDREANU, B., CHOPRA, O.K., SHACK, W.J., "Crack Growth Rates in a PWR Environment of Nickel Alloys from the Davis-Besse and V.C. Summer Power Plants," NUREG/CR-6921 (ANL-05/55), U.S. Nuclear Regulatory Commission, November 2006.
- [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.
- [13] BURKE, J., "Characterization of Irradiation-Assisted Degradation of Reactor Internals Materials," IAEA CRP Coordinated Research Meeting, 2014, Vienna, Austria, <https://www.nrc.gov/docs/ML1415/ML14153A403.pdf>.
- [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>.
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**From:** [Tregoning, Robert](#)  
**To:** [Bernhoft, Sherry](#); [Dyle, Robin](#); [Iyengar, Raj](#); [Hiser, Matthew](#); [Mantey, Andrew](#); [Swilley, Steven](#)  
**Subject:** RE: RE: [External] FW: Harvesting Workshop Announcement  
**Date:** Wednesday, October 26, 2016 7:01:26 AM

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Sherry:

Thanks for your feedback and perspectives. We certainly don't expect or ask for any other commitments from EPRI on harvesting and that isn't the purpose of the workshop. The purpose is to assess what we've learned from past harvesting projects, identify things that should be done differently in any future harvesting ventures in order to maximize value, and then begin to assess possible future opportunities. With this in mind, we would very much like EPRI to give 1 or 2 talks during the workshop related to lessons-learned with various harvesting activities and elaborate on your message below that harvesting is expensive, complex, and that the value may not always be worth it. I'm hopeful that your message will be blunt and objective so that we can better assess future harvesting opportunities and determine when the value might be worth it and when it might not be worth it. If you identify experiences that you wouldn't repeat and why you wouldn't repeat them, I think that will be very valuable.

You guys have been involved in several harvesting programs over the years and your critical assessment of those programs is strongly encouraged. We also agree that harvesting opportunities have to be carefully selected to optimize value and that it's not prudent to take every opportunity. I'm hopeful that this workshop will lead to a frank discussion of harvesting. I don't want to sugarcoat anything. I know that some of the participants will be strong advocates for these programs because of the potential benefits to their own organizations and having balance to this viewpoint is important.

With these objectives in mind, we'd like to work with you over the next few months to develop the workshop agenda and discussion topics.

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  
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---

**From:** Bernhoft, Sherry [mailto:[sbernhoft@epri.com](mailto:sbernhoft@epri.com)]

**Sent:** Wednesday, October 26, 2016 6:30 AM

**To:** Rosseel, Thomas M. <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>; Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Mantey, Andrew <[AMantey@epri.com](mailto:AMantey@epri.com)>; Swilley, Steven <[sswilley@epri.com](mailto:sswilley@epri.com)>

**Cc:** Sokolov, Mikhail A. <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; Duckworth, Robert C. <[duckworthrc@ornl.gov](mailto:duckworthrc@ornl.gov)>; Fifield, Leo S <[leo.fifield@pnnl.gov](mailto:leo.fifield@pnnl.gov)>; Leonard, Keith J. <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; Williams Jr, Donald L. <[williamsdljr@ornl.gov](mailto:williamsdljr@ornl.gov)>; Kathryn McCarthy <[Kathryn.McCarthy@inl.gov](mailto:Kathryn.McCarthy@inl.gov)>

**Subject:** [External\_Sender] RE: [External] FW: Harvesting Workshop Announcement

Rob



I have been checking within EPRI, we will participate in the meeting but we are not going to make any commitments. From our lessons learned harvesting is very expensive, complex and in some cases providing limited value.

Our preference is March 7 & 8.

Sherry Bernhoft

**Electric Power Research Institute**

EPRI, Senior Program Manager

1300 West WT Harris Boulevard | Charlotte, NC 28262

704.595.2740 (office)

 (cell) (b)(6)

Email: [sbernhof@epri.com](mailto:sbernhof@epri.com)

[www.epri.com](http://www.epri.com)

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---

**From:** Rosseel, Thomas M. [<mailto:rosseeltm@ornl.gov>]

**Sent:** Tuesday, October 25, 2016 4:26 PM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Bernhoft, Sherry <[sbernhof@epri.com](mailto:sbernhof@epri.com)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>; Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Cc:** Sokolov, Mikhail A. <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; Duckworth, Robert C. <[duckworthrc@ornl.gov](mailto:duckworthrc@ornl.gov)>; Fifield, Leo S <[leo.fifield@pnnl.gov](mailto:leo.fifield@pnnl.gov)>; Leonard, Keith J. <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; Williams Jr, Donald L. <[williamsdljr@ornl.gov](mailto:williamsdljr@ornl.gov)>; Kathryn McCarthy <[Kathryn.McCarthy@inl.gov](mailto:Kathryn.McCarthy@inl.gov)>

**Subject:** Re: [External] FW: Harvesting Workshop Announcement

Rob,

Yes we could support it, but the week of March 13th is Spring Break week for many of the local schools in the Oak Ridge / Knoxville area. Not sure about Richland and its surrounding communities. It may not affect many of the potential participants, but it might reduce participation.

I am not aware of anyone who is currently planing to attend the RIC conference.

Regards,

Tom

Tom

Thomas M. Rosseel, Ph. D.

Past Chair, International Committee on Irradiated Concrete and

Materials Aging and Degradation, Deputy Pathway Lead

Light Water Reactor Sustainability Program

Materials, Science and Technology Division

Oak Ridge National Laboratory

4500S MS 6132

PO Box 2008

Oak Ridge, TN 37831

TEL: 1-865-574-5380

[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)

---

**From:** "Tregoning, Robert" <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>

**Date:** Tuesday, October 25, 2016 at 5:15 PM

**To:** "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>, Richard Reister <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>, Sherry Bernhoft <[sbernhof@epri.com](mailto:sbernhof@epri.com)>, Robin Dyle <[rdyle@epri.com](mailto:rdyle@epri.com)>, "Iyengar, Raj" <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>, "Hiser, Matthew" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Mikhail Sokolov <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>, "Duckworth, Robert C." <[duckworthrc@ornl.gov](mailto:duckworthrc@ornl.gov)>, "Fifield, Leo S" <[leo.fifield@pnnl.gov](mailto:leo.fifield@pnnl.gov)>, "Leonard, Keith J." <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>, Don Williams



<[Williamsdljr@ornl.gov](mailto:Williamsdljr@ornl.gov)>, Kathryn McCarthy <[kathryn.mccarthy@inl.gov](mailto:kathryn.mccarthy@inl.gov)>

**Subject:** RE: Re: [External] FW: Harvesting Workshop Announcement

Tom:

Thanks for getting back to us. Could you also support a meeting on March 16<sup>th</sup> and 17<sup>th</sup>? I think this is our initial preference with March 7<sup>th</sup> – 8<sup>th</sup> as a fallback. We're still awaiting final confirmation from EPRI as well but Sherry had earlier indicated that she thought the 16<sup>th</sup> and 17<sup>th</sup> would work.

Regards,

Rob

Robert Tregoning

Technical Advisor for Materials

US Nuclear Regulatory Commission

Two White Flint North, M/S T-10 A36

11545 Rockville Pike

Rockville, MD 20852-2738

ph: 301-415-2324

fax: 301-415-6671

---

**From:** Rosseel, Thomas M. [<mailto:rosseeltm@ornl.gov>]

**Sent:** Tuesday, October 25, 2016 5:10 PM

**To:** Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Bernhoft, Sherry <[sbernhof@epri.com](mailto:sbernhof@epri.com)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>; Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Rosseel, Thomas M. <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; Sokolov, Mikhail A. <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; Duckworth, Robert C. <[duckworthrc@ornl.gov](mailto:duckworthrc@ornl.gov)>; Fifield, Leo S <[leo.fifield@pnnl.gov](mailto:leo.fifield@pnnl.gov)>; Leonard, Keith J. <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; Williams Jr, Donald L. <[williamsdljr@ornl.gov](mailto:williamsdljr@ornl.gov)>; Kathryn McCarthy <[Kathryn.McCarthy@inl.gov](mailto:Kathryn.McCarthy@inl.gov)>

**Subject:** [External\_Sender] Re: [External] FW: Harvesting Workshop Announcement

**Importance:** High

All,

The following individuals from the LWRs Materials Pathway have indicated an interest in participating in the workshop:

Mikhail Sokolov, ORNL (baffle bolts and RPV)

Robert Duckworth, ORNL (Cables)

Leo Fifield, PNNL (Cables)

Tom Rosseel, ORNL (Cables, Concrete, RPVs)

We can support March 7th/8th.

Best regards,

Tom

---

**From:** "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Date:** Friday, October 21, 2016 at 2:05 PM

**To:** Richard Reister <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>, "Tregoning, Robert" <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>, Sherry Bernhoft <[sbernhof@epri.com](mailto:sbernhof@epri.com)>, Robin Dyle <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** "Iyengar, Raj" <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>, "Hiser, Matthew" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** Re: [External] FW: Harvesting Workshop Announcement

All,

I have asked those involved in harvesting materials and / or characterizing harvested materials to let me know early next week whether they will be able to participate in the workshop and what dates would work best.

Will let you no later than cob Tuesday.

Regards,

Tom

---

**From:** Richard Reister <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>

**Date:** Friday, October 21, 2016 at 1:47 PM

**To:** "'Tregoning, Robert'" <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>, Sherry Bernhoft <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>, Robin Dyle <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** "Iyengar, Raj" <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>, "Hiser, Matthew" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>, "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Subject:** RE: RE: [External] FW: Harvesting Workshop Announcement

I can support these dates but will defer to Tom on whether they will work for the lab folks.

Rich

---

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

**Sent:** Friday, October 21, 2016 1:43 PM

**To:** Bernhoft, Sherry <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Subject:** RE: RE: [External] FW: Harvesting Workshop Announcement

Sherry/Rich:

All good thoughts; thanks for your input. The ACRS meeting is on the 9<sup>th</sup>. Could you guys support the workshop on the 7<sup>th</sup>/8<sup>th</sup> or do you already have other meeting scheduled associated with the ACRS SLR presentation?

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:** Bernhoft, Sherry [<mailto:sbernhoft@epri.com>]

**Sent:** Friday, October 21, 2016 1:04 PM

**To:** Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Subject:** [External\_Sender] RE: [External] FW: Harvesting Workshop Announcement

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



area for that week.

Sherry Bernhoft

**Electric Power Research Institute**

EPRI, Senior Program Manager

1300 West WT Harris Boulevard | Charlotte, NC 28262

704.595.2740 (office)

[REDACTED] (cell) (b)(6)

Email: [sbernhof@epri.com](mailto:sbernhof@epri.com)

[www.epri.com](http://www.epri.com)

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---

**From:** Reister, Richard [<mailto:Richard.Reister@nuclear.energy.gov>]

**Sent:** Friday, October 21, 2016 11:57 AM

**To:** Bernhoft, Sherry <[sbernhof@epri.com](mailto:sbernhof@epri.com)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** lyengar, Raj <[Raj.lyengar@nrc.gov](mailto:Raj.lyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Subject:** RE: [External] FW: Harvesting Workshop Announcement

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

Rich

---

**From:** Bernhoft, Sherry [<mailto:sbernhof@epri.com>]

**Sent:** Friday, October 21, 2016 12:49 PM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** lyengar, Raj <[Raj.lyengar@nrc.gov](mailto:Raj.lyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** RE: [External] FW: Harvesting Workshop Announcement

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

Sherry Bernhoft

**Electric Power Research Institute**

EPRI, Senior Program Manager

1300 West WT Harris Boulevard | Charlotte, NC 28262

704.595.2740 (office)

[REDACTED] (cell) (b)(6)

Email: [sbernhof@epri.com](mailto:sbernhof@epri.com)

[www.epri.com](http://www.epri.com)

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---

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

**Sent:** Friday, October 21, 2016 8:16 AM

**To:** Bernhoft, Sherry <[sbernhof@epri.com](mailto:sbernhof@epri.com)>; Rich Reister ([Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)) <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** lyengar, Raj <[Raj.lyengar@nrc.gov](mailto:Raj.lyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** [External] FW: Harvesting Workshop Announcement

Robin/Sherry/Rich:

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



Monday – Tuesday (March 20 – 21) are preferable from your current schedule. We're leaning toward the Thursday – Friday of RIC week just to capture some international folks who may be coming anyway for the RIC but recognize that a workshop ending on Friday can also have its drawbacks. We're anticipating two full days for this. Please provide any feedback on dates by COB next Friday (10/28) so that we can finalize the announcement and start to publicize the workshop.

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

Cheers,

Rob

Robert Tregoning

Technical Advisor for Materials

US Nuclear Regulatory Commission

Two White Flint North, M/S T-10 A36

11545 Rockville Pike

Rockville, MD 20852-2738

ph: 301-415-2324

fax: 301-415-6671

---

**From:** Hiser, Matthew

**Sent:** Friday, October 21, 2016 9:05 AM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>

**Subject:** Harvesting Workshop Announcement

Hi Rob and Raj,

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

Thanks!

Matt

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or attachments.\*\*

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**Subject:** FW: Ex-plant harvesting information tool  
**Location:** 866-528-1882; Conference ID: [REDACTED] (b)(6)  
**Start:** Wed 11/11/2015 1:00 PM  
**End:** Wed 11/11/2015 2:00 PM  
**Show Time As:** Tentative  
**Recurrence:** (none)  
**Meeting Status:** Not yet responded  
**Organizer:** Ramuhalli, Pradeep

Hi Rob,

They are trying to reschedule to not on Veteran's Day, but I wanted you to be aware of this meeting if you'd like to participate.

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

Sorry – moving to 1 pm ET to accommodate schedules.

---

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

[Find a local number](#)

Conference ID:  (b)(6)

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

[IOC([1033])] ]

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**Subject:** NSUF Specimen Library  
**Location:** Telecon: 888-677-8615 passcode: [REDACTED] (b)(6)  
**Start:** Thu 11/9/2017 1:00 PM  
**End:** Thu 11/9/2017 2:00 PM  
**Show Time As:** Tentative  
**Recurrence:** (none)  
**Meeting Status:** Not yet responded  
**Organizer:** Hiser, Matthew  
**Required Attendees** Jackson, John Howard; 'kelly.cunningham@inl.gov'; Purtscher, Patrick; Tregoning, Robert; Audrain, Margaret; Simon Martin Pimblott

Updated with bridge line info.

Dear John and Kelly,

Would you be available sometime later this week or next week for a call to discuss the NSUF NFML and how it may be possible to coordinate with our ex-plant harvesting effort here at NRC?

Hopefully, you recall the harvesting workshop that NRC hosted back in March. As a first step on a database for sources of materials, we're looking to reach out in the near future to a few national labs regarding their "boneyards" of previously harvested materials. We hoped to discuss what lessons you may have learned from developing the NFML as well as any synergies that could exist with our harvesting efforts.

Thanks!  
Matt

**From:** [Ramuhalli, Pradeep](#)  
**To:** [Hull, Amy](#)  
**Cc:** [Hiser, Matthew](#)  
**Subject:** [External\_Sender] RE: pls go ahead and buy: Materials Aging Institute handbook  
**Date:** Tuesday, November 10, 2015 7:52:11 PM

---

On another note, I have not heard back from ORNL on their availability later in the week for pushing out the conference call from tomorrow. If you are able to call in, that's great! If not, I can talk to them tomorrow and give you an update (email or phone).

With best regards,

Pradeep Ramuhalli, PhD  
Pacific Northwest National Laboratory  
509-375-2763  
[pradeep.ramuhalli@pnnl.gov](mailto:pradeep.ramuhalli@pnnl.gov)

---

**From:** Hull, Amy [mailto:[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)]  
**Sent:** Tuesday, November 10, 2015 8:52 AM  
**To:** Ramuhalli, Pradeep  
**Cc:** Hiser, Matthew  
**Subject:** pls go ahead and buy: Materials Aging Institute handbook

Pradeep,

Please go ahead and buy this handbook. As we discussed when I was at PNNL, this looks like an excellent reference. I will make sure to get a copy for our use at NRC also.

Thanks,

Amy

---

**From:** Ramuhalli, Pradeep [mailto:[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)]  
**Sent:** Monday, November 09, 2015 8:11 PM  
**To:** Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>  
**Cc:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Subject:** [External\_Sender] Materials Aging Institute handbook

Amy,

We would like to get a copy of the materials aging institute (MAI) handbook on LWR materials aging. The handbook has appears to have some good information on aging mechanisms in reactor metals, and could serve to provide not only supplementary information to the EMDA PIRT analyses, but possibly also a robust taxonomy for use with the information tool. The book appears to be available for purchase only on the MAI site and costs 299 euros. It appears that only a print version of this book is available (while a digital version is listed as available, the order form does not appear to have this option).

The table of contents is available at the following link:

<http://www.themai.org/fichiers/publications/Table-of-contents-publication-1.pdf>

Would you approve our purchase of this book on the project on ex-plant harvesting?

With best regards,

Pradeep

---

Pradeep Ramuhalli, PhD  
Senior Research Scientist,  
Applied Physics Group  
Pacific Northwest National Laboratory



902 Battelle Blvd.

P.O.Box 999, MSIN K5-26

Richland, WA 99352

Tel: 509-375-2763

Email: [pradeep.ramuhalli@pnnl.gov](mailto:pradeep.ramuhalli@pnnl.gov)

<http://www.pnnl.gov>

**From:** [Ramuhalli, Pradeep](#)  
**To:** [Hiser, Matthew](#)  
**Subject:** [External\_Sender] RE: Draft report  
**Date:** Thursday, November 10, 2016 4:13:03 PM

---

Great! Thanks.

With best regards,

Pradeep Ramuhalli, PhD

Tel: 509-375-2763

Email: [pradeep.ramuhalli@pnnl.gov](mailto:pradeep.ramuhalli@pnnl.gov)

---

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

**Sent:** Thursday, November 10, 2016 1:12 PM

**To:** Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>

**Subject:** RE: Draft report

Email received.

**Matthew Hiser**

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

---

**From:** Ramuhalli, Pradeep [mailto:Pradeep.Ramuhalli@pnnl.gov]

**Sent:** Thursday, November 10, 2016 3:17 PM

**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>

**Subject:** [External\_Sender] Draft report

Matt, Pat,

The attached document is a draft and should be treated as such. As discussed, the document is missing some references, and is awaiting some input for the sections on information tools for harvesting. Also note that the section on examples is being rewritten to homogenize the language. Any feedback on the updates is appreciated.

On the other items:

- We would prefer to combine the report and the workshop summary and issue a single report. This should help with managing costs associated with producing the report, and will ensure that the report includes the latest information from the workshop.
- I will work with our financial specialists to see where we stand on spending to date and anticipated costs through January. I will touch base with Pat on Monday about this.
- As discussed, it would be helpful to have two people from PNNL (me, plus our materials SME) attend the workshop. This (and the associated planning and post-workshop summary generation) will require a modification to the scope and costs on the contract.

Please let me know when you receive this.

With best regards,

Pradeep

---

Pradeep Ramuhalli, PhD

Senior Research Scientist,

Applied Physics Group

Pacific Northwest National Laboratory  
902 Battelle Blvd.  
P.O.Box 999, MSIN K5-26  
Richland, WA 99352  
Tel: 509-375-2763  
Email: [pradeep.ramuhalli@pnnl.gov](mailto:pradeep.ramuhalli@pnnl.gov)  
<http://www.pnnl.gov>



**From:** [Ramuhalli, Pradeep](#)  
**To:** [Hiser, Matthew](#)  
**Subject:** [External\_Sender] RE: Zorita Public Info  
**Date:** Thursday, November 10, 2016 4:12:49 PM

---

Got it. Thanks.

Can you confirm you received my email?

---

With best regards,

Pradeep Ramuhalli, PhD

Tel: 509-375-2763

Email: [pradeep.ramuhalli@pnnl.gov](mailto:pradeep.ramuhalli@pnnl.gov)

---

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

**Sent:** Thursday, November 10, 2016 1:10 PM

**To:** Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>

**Subject:** FW: Zorita Public Info

Resending Zorita info. Please confirm receipt.

Thanks!

Matt

***Matthew Hiser***

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

---

**From:** Hiser, Matthew

**Sent:** Thursday, September 01, 2016 3:41 PM

**To:** Ramuhalli, Pradeep ([Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)) <[Pradeep.Ramuhalli@pnnl.gov](mailto:Pradeep.Ramuhalli@pnnl.gov)>

**Cc:** Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>

**Subject:** Zorita Public Info

Hi Pradeep,

Here a couple pdfs with info on the Zorita harvesting program. One is the award document for NRC's participation in the Zorita Internals Research Project. Pages 4-7 cover the technical scope of work.

The other are some briefing slides that are in public ADAMS.

I will try to dig in to find some more information, but this as at least a start.

Thanks!

Matt

***Matthew Hiser***

Materials Engineer

US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research

Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)

**From:** [Ramuhalli, Pradeep](#)  
**To:** [Hiser, Matthew](#); [Purtscher, Patrick](#)  
**Subject:** [External\_Sender] RE: Draft report  
**Date:** Thursday, November 10, 2016 4:50:37 PM

---

Matt,

Thanks. Got it. I will take a look at this and get back to you with any thoughts by tomorrow.

---

With best regards,

Pradeep Ramuhalli, PhD

Tel: 509-375-2763

Email: [pradeep.ramuhalli@pnnl.gov](mailto:pradeep.ramuhalli@pnnl.gov)

---

**From:** Hiser, Matthew [mailto:Matthew.Hiser@nrc.gov]  
**Sent:** Thursday, November 10, 2016 1:15 PM  
**To:** Ramuhalli, Pradeep <Pradeep.Ramuhalli@pnnl.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>  
**Subject:** RE: Draft report

Hi Pradeep,

Thank you for the update today. We will take a look at the report and provide you feedback and understand you will be fleshing out a couple sections a bit more.

I have attached the current draft agenda for the harvesting workshop for your information and any comments or suggestions.

Thanks!

Matt

***Matthew Hiser***

Materials Engineer

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<http://www.pnnl.gov>

**From:** [Hiser, Matthew](#)  
**To:** ["leonardk@ornl.gov"; "rosseeltm@ornl.gov"](#)  
**Cc:** [Hull, Amy](#); [Ramuhalli, Pradeep \(Pradeep.Ramuhalli@pnnl.gov\)](#)  
**Subject:** Strategic Harvesting Slides  
**Date:** Friday, November 13, 2015 1:53:04 PM  
**Attachments:** [Harvesting Efforts June NRC-Industry materials mtg 5-29-15.pptx](#)

---

Note to requester: Attachment is immediately following, attachment was also released in full in the interim response #3.

Hi Keith and Tom,  
Here are the slides that were presented at the NRC-industry materials meeting in June.  
They mostly lay out the background of NRC's harvesting experience as well as the vision for this strategic approach.

Thanks!

Matt

***Matthew Hiser***

Materials Engineer

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Division of Engineering | Corrosion and Metallurgy Branch

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

[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)



# Strategic Approach for Obtaining Material and Component Aging Information

Matthew Hiser

Amy Hull

U.S. NRC RES/DE/CMB

Industry/NRC Materials Programs Technical Information Exchange Meeting  
Nuclear Regulatory Commission Headquarters

June 2 - 4, 2015

# Outline

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

# Purpose

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

# Background

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



# Harvesting Experience

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

# Zorita Internals Research Project (ZIRP)

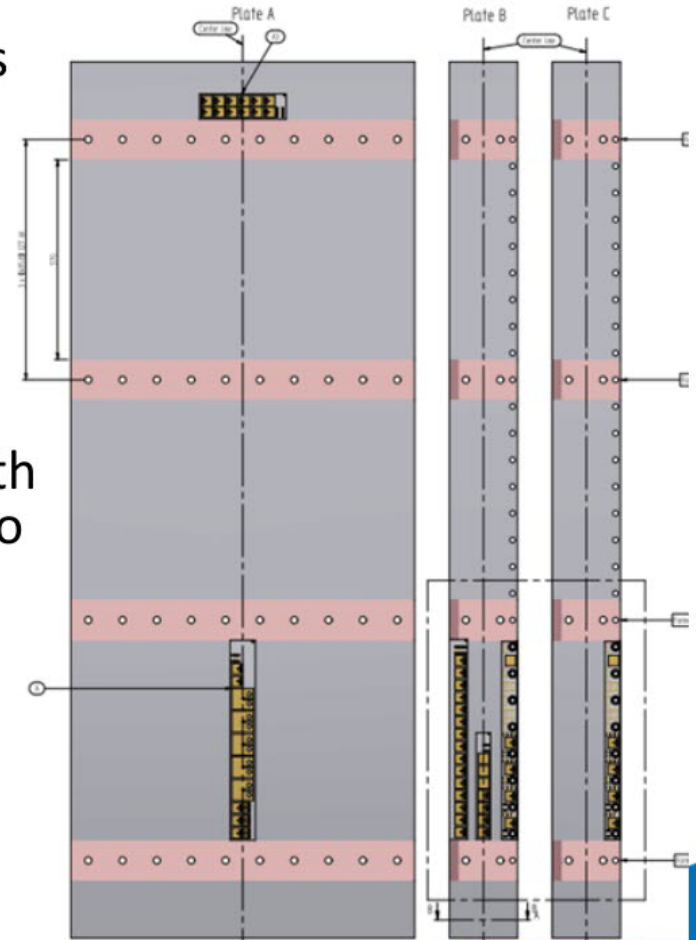


**U.S.NRC**

United States Nuclear Regulatory Commission

*Protecting People and the Environment*

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



# ZIRP Timeline

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

# Neutron Absorbers from Zion

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



# Concrete from Zorita (Plan)

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

# Cables: Zion and Crystal River

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

# Approach: Integrated Aging Degradation Need/Resource Interrogatory Tool

- Utilize various sources of technical information with respect to anticipated degradation in NPPs out to 80 years of operation
  - NRC, DOE, EPRI, IAEA
- Identify high-priority data needs that could be addressed through harvesting ex-plant materials
  - Focus on identifying characteristics of important systems, structures, and components (SSCs) for harvesting
- Evaluate what relevant ex-plant material from decommissioned reactors is projected to be available for potential harvesting given previously identified needs



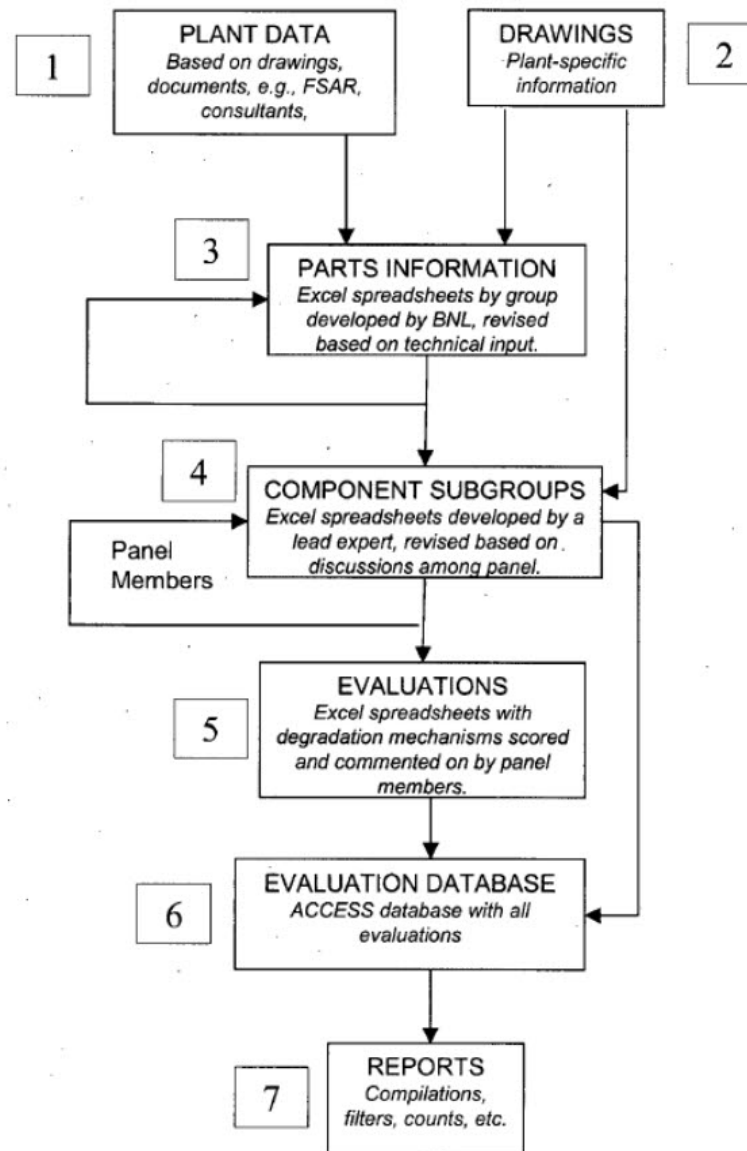
# Sources: PMDA & EMDA

## ***How does one try to predict the future?***

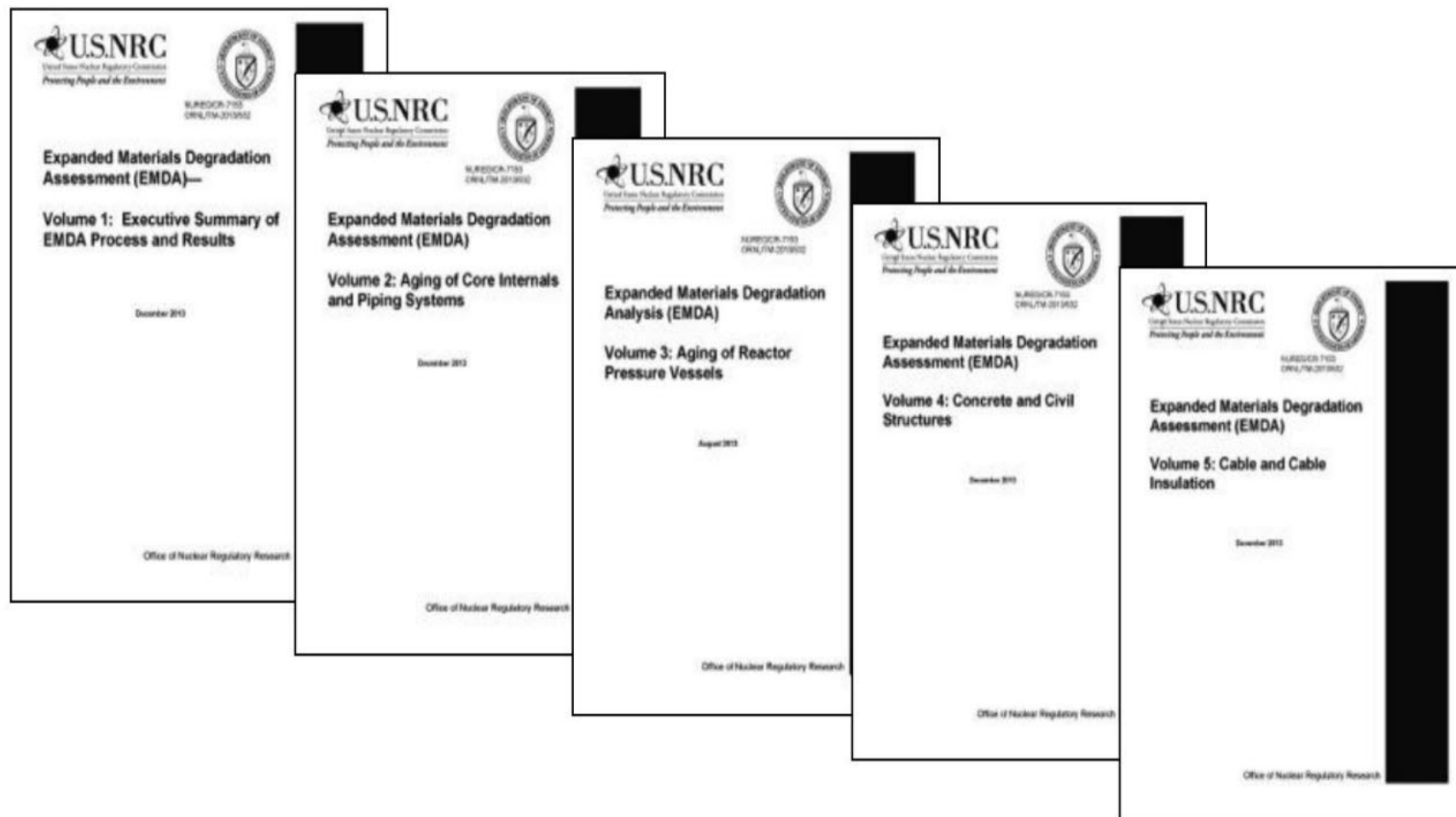
- Experts were tasked with
  - Listing passive reactor components
  - Reviewing relevant degradation mechanisms
  - Determining the degree to which the components were susceptible to these mechanisms
  - Determining confidence level in their predictions
- The PMDA panel evaluated 3863 components (2203 for PWRs, 1603 for BWRs) for their susceptibility to 16 degradation mechanisms.
  - Documented in NUREG/CR-6923
- The EMDA panels investigated issues of reactor aging beyond 60 years to identify possible knowledge gaps, and provided an expansion of scope and time
  - Documented in NUREG/CR-7153



# Sources: PMDA & EMDA

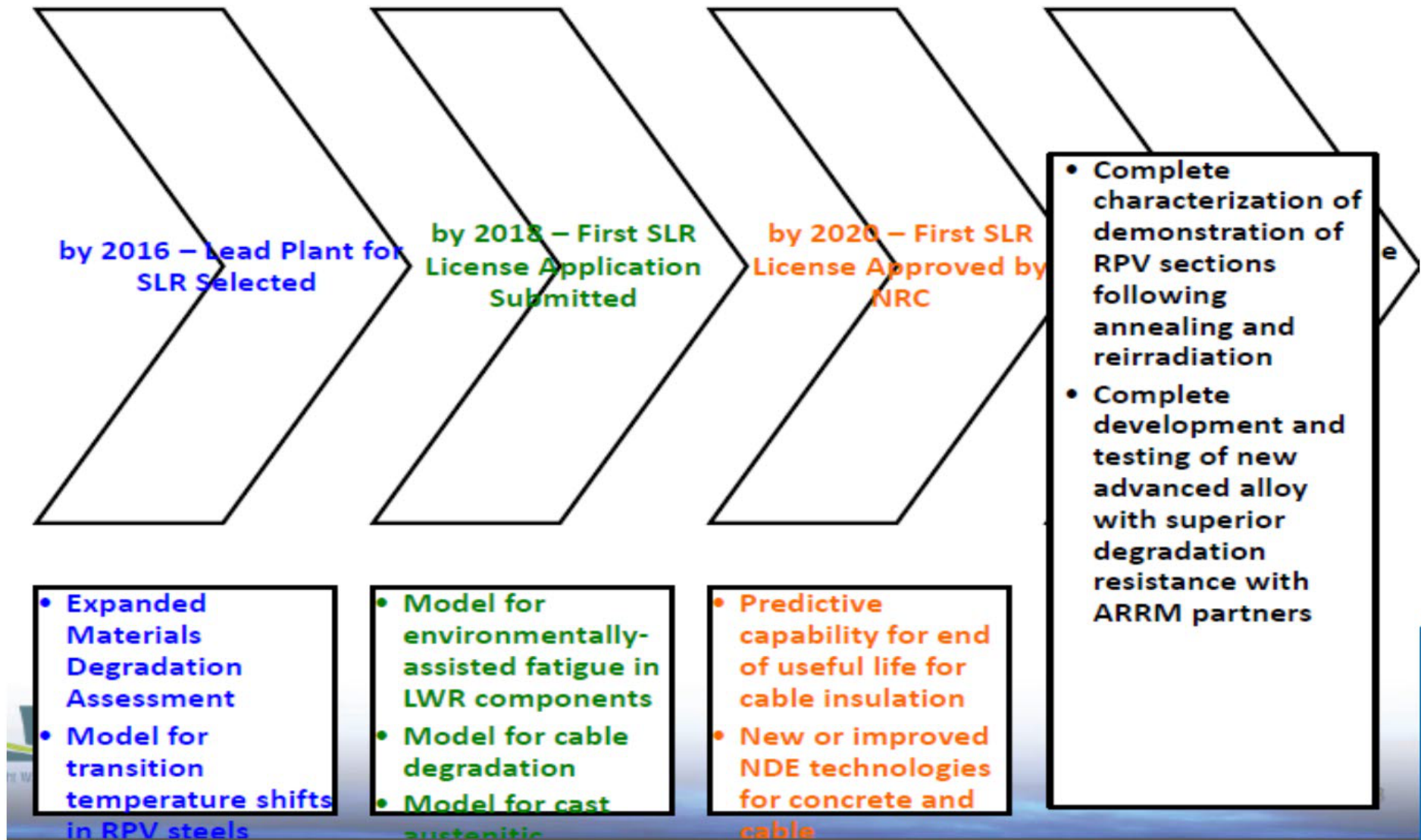


# EMDA (NUREG/CR-7153)

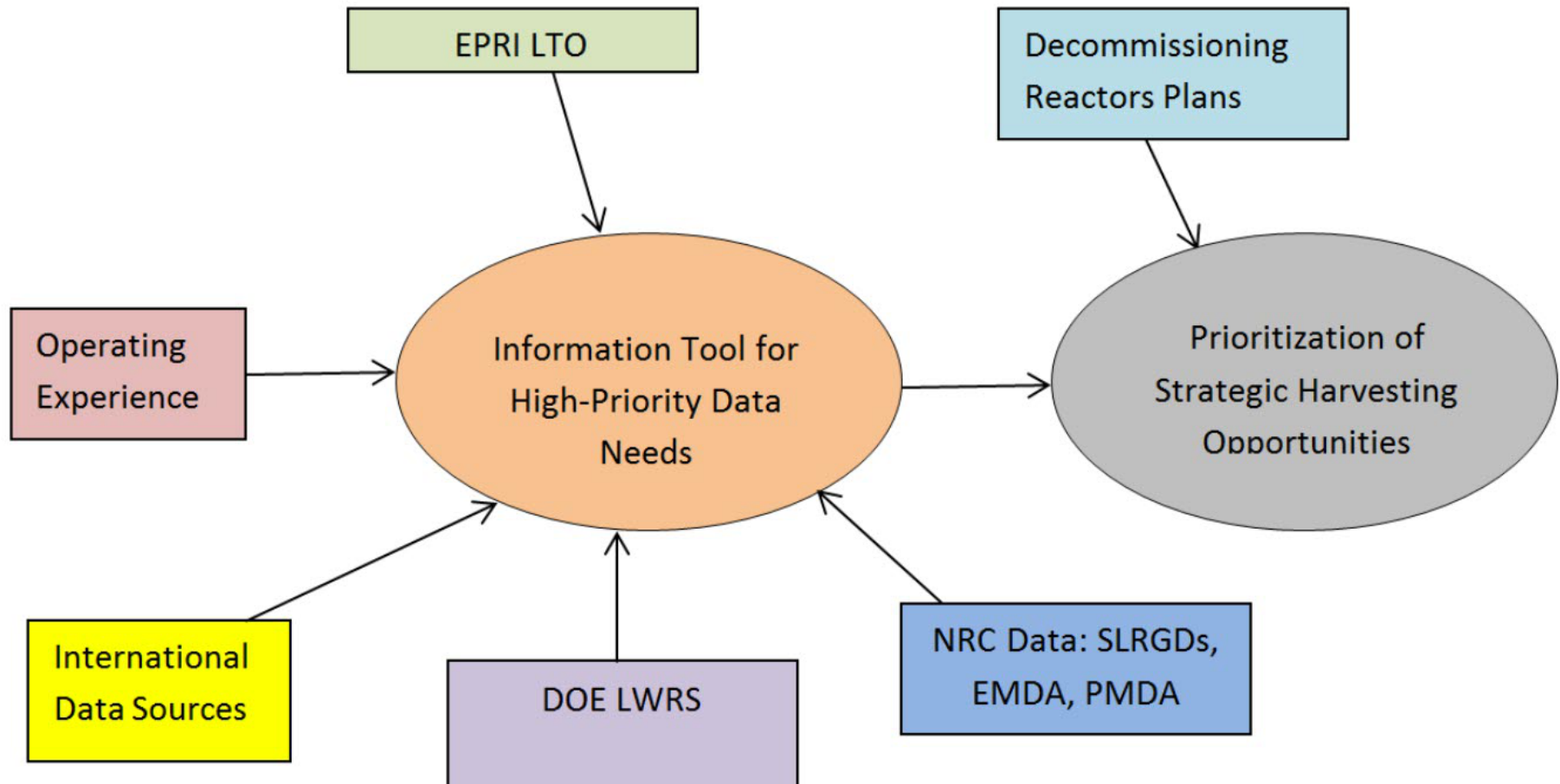


# Source: DOE LWRS Program

(J. Busby, Overview Presentation to NESCC May 12, 2015)



# The Vision: Integrated Aging Degradation Need/Resource Interrogatory Tool



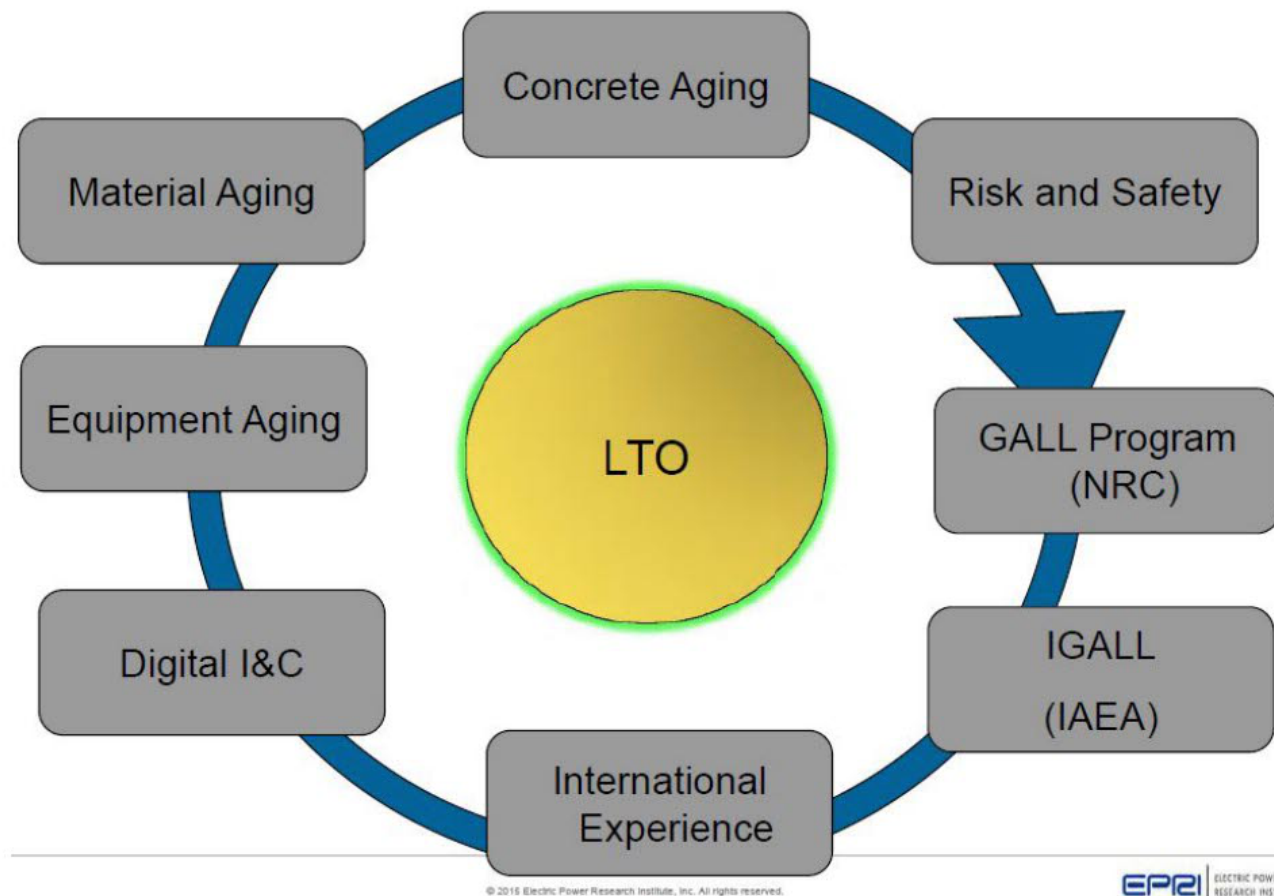


# Implementation

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

# Coordination with EPRI and DOE

- NRC has memorandums of understanding with EPRI LTO and DOE LWRS covering exchange of information related to SLR and welcomes the involvement of other stakeholders.



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# Stakeholder Engagement

- IAEA CRP: Evaluation of Structures and Components Material Properties Utilizing Actual Aged Materials Removed from Decommissioned Reactors for Safe LTO.
- Conduct public workshops to further refine the concept of useful database of research objectives for ex-plant materials
- NRC welcomes collaboration under current EPRI/LTO and DOE/LWRS MOUs.

# Acknowledgements

- Robert Tregoning, RES/DE
- Eric Focht, RES/DE
- Darrell Murdock, RES/DE
- Mita Sircar, RES/DE



# Acronyms

- ARRM – advanced radiation resistant materials
- CGR- crack growth rate
- CRP – coordinated research project (IAEA)
- CSN – Spanish regulator
- EMDA- expanded materials degradation assessment
- ENRESA – Spanish decommissioning authority
- FT – fracture toughness
- GALL – Generic Aging Lessons Learned
- IAD – irradiation-assisted degradation
- IGALL – international GALL
- LTO – long-term sustainability
- LWRS – LWR Sustainability
- MOU – Memorandum of Understanding
- NAM – neutron absorbing material
- NIST – National Institute of Standards & Technology
- NPAR – nuclear plant aging research
- PMDA – Proactive Materials Degradation Assessment
- PTS – pressurized thermal shock
- RPV – reactor pressure vessel
- SFP- spent fuel pool
- SLR – subsequent license renewal
- SLRGDs – subsequent license renewal guidance documents
- SRP-LR standard review plan for license renewal

**From:** [KANG, Ki-Sig](#)  
**To:** [Hiser, Allen](#)  
**Cc:** [POLYAKOV, Alex V.](#); [KRIVANEK, Robert](#); [Hiser, Matthew](#); [Hull, Amy](#); [Tregoning, Robert](#)  
**Subject:** [External\_Sender] RE: [External\_Sender] After the 4th PLiM conference held 23-26 Oct at Lyon - presentation material  
**Date:** Tuesday, November 14, 2017 2:28:50 PM

---

Dear Allen

Thanks for your remind. I will ask IT to register PDF.

Regards

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

---

**From:** Allen.Hiser@nrc.gov [mailto:Allen.Hiser@nrc.gov]  
**Sent:** Tuesday, 14 November 2017 18:21  
**To:** KANG, Ki-Sig <[K.S.Kang@iaea.org](mailto:K.S.Kang@iaea.org)>  
**Cc:** POLYAKOV, Alex V. <[O.Polyakov@iaea.org](mailto:O.Polyakov@iaea.org)>; KRIVANEK, Robert <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>  
**Subject:** RE: [External\_Sender] After the 4th PLiM conference held 23-26 Oct at Lyon - presentation material

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I have attached a copy of the slides for information.

Sincerely,

Allen

Allen L. Hiser, Jr., PhD  
Senior Technical Advisor for Licensing Renewal Aging Management  
Division of License Renewal  
Office of Nuclear Reactor Regulation  
US Nuclear Regulatory Commission  
Mailstop O-11F1  
Washington, DC 20555  
[allen.hiser@nrc.gov](mailto:allen.hiser@nrc.gov)  
301-415-5650

---

**From:** KANG, Ki-Sig [<mailto:K.S.Kang@iaea.org>]  
**Sent:** Thursday, November 02, 2017 12:57 PM  
**To:** KANG, Ki-Sig <[K.S.Kang@iaea.org](mailto:K.S.Kang@iaea.org)>; SIDDIQUI, Shahzad Ismail <[S.Siddiqui@iaea.org](mailto:S.Siddiqui@iaea.org)>  
**Cc:** VINCZE, Pal <[P.Vincze@iaea.org](mailto:P.Vincze@iaea.org)>; NENP - Engineering Section <[NENP.Engineering-Section@iaea.org](mailto:NENP.Engineering-Section@iaea.org)>; KUNITO, Susumu <[S.Kunito@iaea.org](mailto:S.Kunito@iaea.org)>; POLYAKOV, Alex V.

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KHAELSS, Martina <[M.Khaelss@iaea.org](mailto:M.Khaelss@iaea.org)>

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As promised, all presentations including reporting session material are uploaded at IAEA web site.

Please visit below and download;

<https://www.iaea.org/NuclearPower/Meetings/2017/2017-10-23-10-27-NPES.html>

For conference proceedings, I need your full papers. The presentation material cannot put into the conference proceedings. Thus please send your full papers within 8 pages by the end of Nov. 2017 to me if you have not submitted yet. The proceedings will consist of two parts. Part 1 is the summary of conference and Part 2 is full papers.

Thanks again for your participation and presentations. The IAEA is willing to support your activities to strengthen the excellence in nuclear power plant operation and to establish effective collaboration mechanisms.

Best Regards,

**Ki- Sig KANG**

**Technical Head (PLiM/LTO)**

**Nuclear Power Engineering Section**

**Division of Nuclear Power**

**International Atomic Energy Agency**

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**To:** [KANG, Ki-Sig](#)  
**Cc:** [POLYAKOV, Alex V.](#); [KRIVANEK, Robert](#); [Hiser, Matthew](#); [Hull, Amy](#); [Tregoning, Robert](#)  
**Subject:** RE: [External\_Sender] After the 4th PLiM conference held 23-26 Oct at Lyon - presentation material  
**Date:** Tuesday, November 14, 2017 12:21:04 PM  
**Attachments:** [NRC PLiM slides on Harvesting final.pdf](#)

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Sincerely,

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

**Sent:** Thursday, November 02, 2017 12:57 PM

**To:** KANG, Ki-Sig <[K.S.Kang@iaea.org](mailto:K.S.Kang@iaea.org)>; SIDDIQUI, Shahzad Ismail <[S.Siddiqui@iaea.org](mailto:S.Siddiqui@iaea.org)>

**Cc:** VINCZE, Pal <[P.Vincze@iaea.org](mailto:P.Vincze@iaea.org)>; NENP - Engineering Section <[NENP.Engineering-Section@iaea.org](mailto:NENP.Engineering-Section@iaea.org)>; KUNITO, Susumu <[S.Kunito@iaea.org](mailto:S.Kunito@iaea.org)>; POLYAKOV, Alex V. <[O.Polyakov@iaea.org](mailto:O.Polyakov@iaea.org)>; KRIVANEK, Robert <[R.Krivanek@iaea.org](mailto:R.Krivanek@iaea.org)>; abderrahim.al-mazouzi@edf.fr; KHAELSS, Martina <[M.Khaelss@iaea.org](mailto:M.Khaelss@iaea.org)>

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# Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

M. Hiser<sup>a</sup>, P. Purtscher<sup>a</sup>, P. Ramuhalli<sup>b</sup>, A. B. Hull<sup>a</sup>, R. Tregoning<sup>a</sup>  
<sup>a</sup>U.S. Nuclear Regulatory Commission (NRC), Washington, D.C., USA  
<sup>b</sup>Pacific Northwest National Laboratory (PNNL), Richland, WA, USA

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# Outline

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

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# 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



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# 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

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# 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

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# 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



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# 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

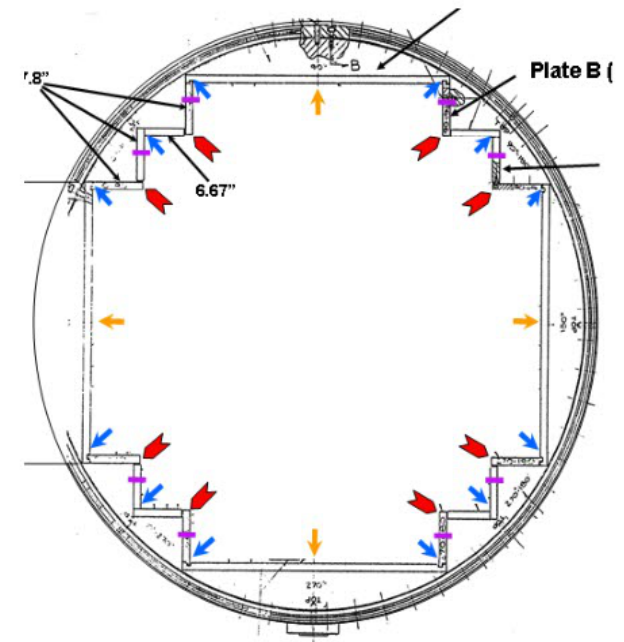
---

# 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

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# 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:** [Natesan, Krishnamurti](#)  
**To:** [Audrain, Margaret](#); [Chen, Yiren](#); [Alexandreaanu, Bogdan](#)  
**Cc:** [Hiser, Matthew](#); [Purtscher, Patrick](#)  
**Subject:** [External\_Sender] Re: ANL Harvesting Trip  
**Date:** Friday, November 17, 2017 12:58:04 PM

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Hello Meg,

This is Ken Natesan, Section Manager of Corrosion of Materials Section in Nuclear Engineering Division, and we are available for the December 13th meeting at ANL. I have informed Pat about it and also told him that we have compiled a list of irradiated materials/specimens available at ANL for future use. Pat asked me to hold the list till the meeting in December and we will make sure it is fully updated by the December meeting.

Thank you all

Ken Natesan  
Argonne Distinguished Fellow  
Nuclear Engineering Division  
(630) 252 5103  
[natesan@anl.gov](mailto:natesan@anl.gov)

---

**From:** Audrain, Margaret <[Margaret.Audrain@nrc.gov](mailto:Margaret.Audrain@nrc.gov)>  
**Sent:** Friday, November 17, 2017 11:43:51 AM  
**To:** Chen, Yiren; Alexandreaanu, Bogdan; Natesan, Krishnamurti  
**Cc:** Hiser, Matthew; Purtscher, Patrick  
**Subject:** ANL Harvesting Trip

Dear Bogdan, Yiren, and Ken,

The NRC is looking into setting up a database of materials related to ex-plant materials harvesting. A few NRC staff, including Meg Audrain, Matt Hiser, Pat Purtscher, and Rob Tregoning, are involved with this harvesting effort. One of our first steps is to identify materials available from past harvesting programs that may be available in "boneyards" at various labs. We'd like to schedule a visit to ANL to be our "guinea pig" site to get rolling with the effort. Pat Purtscher and Meg Audrain would be the NRC staff attending this visit.

We have four main material areas of interest, aligned with NRC's focus areas for SLR: RPV, RVI, cables, & concrete. We are interested in what materials ANL may have available from past programs with the NRC, DOE and others. Our emphasis is in the four areas outlined earlier, but not necessarily limited to those four. Materials of interest also don't necessarily have to be material from plants with extensive service history if they may be of research value for other reasons.

We hope to assemble an inventory of available materials related to harvesting like, or in potentially in coordination with, that in the INL NSUF Nuclear Fuels and Materials Library (NFML). Last week, we had a call with staff from INL that are involved with the NSUF NFML and both sides see potential synergies between our interests and the established NSUF specimen library.

Would you all be available to meet with us to discuss the materials ANL has in inventory? We hope that all of you, with the potential assistance of prior ANL staff such as Omesh Chopra and Bill Shack,

may be able to begin identifying materials of interest before the visit in mid-December. This would involve some limited prep work on your part and then roughly a half day in person meeting. We are thinking about planning the trip in mid-Dec, perhaps on Wed., December 13. Would you be available to meet on that date? Would this give you enough time to compile some information on material of potential interest? We would be happy to have a phone call in advance to better describe what we're looking for if that would help.

Thanks,

Meg, Matt, and Pat

**From:** [Tregoning, Robert](#)  
**To:** [Hiser, Matthew](#)  
**Subject:** RE: harvesting workshop  
**Date:** Monday, November 21, 2016 9:20:03 AM

---

(b)(6)

Thanks for update; [REDACTED]

(b)(6)

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

---

**From:** Hiser, Matthew  
**Sent:** Monday, November 21, 2016 9:09 AM  
**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>  
**Cc:** Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>  
**Subject:** RE: harvesting workshop

Yeah, Pat replied, but didn't really any comments. I'll contact Jeff and Allen again. I talked to Allen

(b)(6) last night [REDACTED] and he mentioned he's [REDACTED] (b)(6)

(b)(6) [REDACTED] but I'll try to get him to take a look and give some feedback...

Thanks!

Matt

---

**From:** Tregoning, Robert  
**Sent:** Monday, November 21, 2016 9:02 AM  
**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Cc:** Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>  
**Subject:** RE: harvesting workshop

Thanks for latest; we obviously won't contact speakers until after we get agreement on the agenda with EPRI/DOE. Also, let's plan to have a closed meeting unless directed otherwise. Have you gotten comments on the draft agenda from anyone? I know it's a short week but's let press to get you comments by COB Wednesday. I'll do my part and hopefully Pat can comply. If you contact Jeff directly, he'll probably be able to take a look at it. We'll just have to set a hard deadline [REDACTED] (b)(6)

[REDACTED]  
RT

(b)(6)

Robert Tregoning  
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---

**From:** Hiser, Matthew  
**Sent:** Monday, November 21, 2016 8:57 AM  
**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>  
**Cc:** Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>  
**Subject:** RE: harvesting workshop

Hi Rob,

I have attached the latest version of the announcement and agenda. I think the announcement is good and ready for distribution.

For the agenda, the latest status is I sent it to you, Pat, Jeff, and Allen for comment / feedback. Once we are relatively happy internally, it can go to EPRI/DOE for feedback / a meeting to discuss.

The other big things we need to do is determine whether this meeting should be open or closed and contact speakers.

Side note: Greg said transcription services were "free" to him when he did the concrete workshop a couple years ago (covered under some other contract I presume). Of course, that could have changed so I need to contact the right people for more info.

Thanks!

Matt

---

**From:** Tregoning, Robert  
**Sent:** Monday, November 21, 2016 8:19 AM  
**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Cc:** Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>  
**Subject:** FW: harvesting workshop

Matt:

Is announcement finished at this point so I can start sending it out? We need to finalize our strawman agenda so it can be sent to both EPRI and DOE. We also need to arrange a meeting to flush this agenda out in December. We should have the agenda finalized before the holidays and speakers contacted if possible. Do you agree?

I know you're going to be   so Pat and I will have to drive this ground in your absence.

(b)(6)

Cheers,

Rob

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

---

**From:** Sokolov, Mikhail A. [<mailto:sokolovm@ornl.gov>]  
**Sent:** Monday, November 21, 2016 8:03 AM  
**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>  
**Subject:** [External\_Sender] harvesting workshop

Hi Rob,

It was nice to see you last week in Orlando.

I forgot to ask you. You are organizing the "harvesting" workshop in March. Since I am involved in



Ginna baffle bolts and Zion RPV project, I would be interested in participating to hear the NRC take on this subject. However, there was some moves in dates for it. Have you settled with dates? I have some other commitments in March and trying to manage my trips.

Thanks,

Mikhail

Dr. Mikhail A. Sokolov

Oak Ridge National Laboratory

P.O. Box 2008, M.S. 6151 (*for delivery use 1 Bethel Valley Road*)

Oak Ridge, TN 37831

865-574-4842 (ph.)

865-241-1026 (fax)

[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)

**From:** [Tregoning, Robert](#)  
**To:** [Hiser, Matthew](#)  
**Subject:** RE: RE: RE: [External] strawman harvesting workshop agenda  
**Date:** Friday, December 2, 2016 1:05:11 PM

---

We'll just keep fightin' the good fight ☺

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

---

**From:** Hiser, Matthew  
**Sent:** Friday, December 02, 2016 12:03 PM  
**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>  
**Subject:** RE: RE: RE: [External] strawman harvesting workshop agenda  
Quite a chilly reception from Sherry... Hopefully others see more value.

---

**From:** Tregoning, Robert  
**Sent:** Friday, December 02, 2016 6:57 AM  
**To:** Bernhoft, Sherry <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; [richard.reister@nuclear.energy.gov](mailto:richard.reister@nuclear.energy.gov); Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>  
**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>  
**Subject:** RE: RE: RE: [External] strawman harvesting workshop agenda  
Sherry:  
Thanks for letting me know. I forgot that you moved that call. Can we talk next Friday just about this if Rich is available?  
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  
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fax: 301-415-6671

---

**From:** Bernhoft, Sherry [<mailto:sbernhoft@epri.com>]  
**Sent:** Friday, December 02, 2016 6:54 AM  
**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; [richard.reister@nuclear.energy.gov](mailto:richard.reister@nuclear.energy.gov); Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>  
**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>  
**Subject:** [External\_Sender] RE: RE: [External] strawman harvesting workshop agenda

Rob

I have our next coordination call on 12/19 – we deleted the call next week due to the DOE LWRS Pathway Leads meeting. Rich and I will be at that meeting and I think Raj and Brian Thomas may be attending as well.

If you need to talk sooner I may be able to do next Friday, then I am [REDACTED] the week of Dec 12<sup>th</sup>. (b)(6)

Take care

Sherry Bernhoft

**Electric Power Research Institute**

EPRI, Senior Program Manager

1300 West WT Harris Boulevard | Charlotte, NC 28262

704.595.2740 (office)

[REDACTED] (cell) (b)(6)

Email: [sbernhof@epri.com](mailto:sbernhof@epri.com)

[www.epri.com](http://www.epri.com)

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---

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

**Sent:** Friday, December 02, 2016 5:49 AM

**To:** Bernhoft, Sherry <[sbernhof@epri.com](mailto:sbernhof@epri.com)>; [richard.reister@nuclear.energy.gov](mailto:richard.reister@nuclear.energy.gov); Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>

**Subject:** RE: RE: [External] strawman harvesting workshop agenda

Sherry:

Thanks for the initial feedback. As I've stated many times, the goal is to have the workshop provide a thorough and honest assessment of harvesting (both in the past and in the future). The IAEA workshop was more of an advertisement for different harvesting opportunities. If you believe the agenda doesn't reflect this goal, then we need to modify it appropriately during our call next week. Please consider your recommendations so that we can achieve this goal.

Cheers,

Rob

Robert Tregoning

Technical Advisor for Materials

US Nuclear Regulatory Commission

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Rockville, MD 20852-2738

ph: 301-415-2324

fax: 301-415-6671

---

**From:** Bernhoft, Sherry [<mailto:sbernhof@epri.com>]

**Sent:** Thursday, December 01, 2016 6:13 PM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; [richard.reister@nuclear.energy.gov](mailto:richard.reister@nuclear.energy.gov); Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>

**Subject:** [External\_Sender] RE: [External] strawman harvesting workshop agenda

Rob

I will take a closer look and we can discuss. My first comment is that this is not all that different than the IAEA pre-CRP meeting that Rich, John Burke and I attended. As you know that was not very successful. I would appreciate Rich's perspective since he was also at that meeting.

I don't think what we get to is that harvesting has to have a value that matches or exceeds its cost. It seems like most harvesting projects are based on windows of opportunity and not a clear up-front definition of what materials are needed, at what exposure (temperature/radiation) to add to the database and then see if you can find those materials. In the cables work that is what Drew is trying to accomplish. He has identified the cables types where data is needed and those are the only ones he is interested in harvesting. What is missing is he can tell you the need, but not the where and when he can find the cables of interest.

From an EPRI standpoint we don't think we have ½ hour of information to present during sessions 3 and 5.

Thanks

Sherry Bernhoft

**Electric Power Research Institute**

EPRI, Senior Program Manager

1300 West WT Harris Boulevard | Charlotte, NC 28262

704.595.2740 (office)

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---

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

**Sent:** Thursday, December 01, 2016 2:26 PM

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

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Hull, Amy <[Amy.Hull@nrc.gov](mailto:Amy.Hull@nrc.gov)>

**Subject:** [External] strawman harvesting workshop agenda

Sherry/Rich:

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

As always, thanks for your help with this.

Cheers,

Rob

Robert Tregoning

Technical Advisor for Materials

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**From:** [Hiser, Matthew](#)  
**To:** ["charles.a.tomes@dom.com"](mailto:charles.a.tomes@dom.com)  
**Subject:** Harvesting Workshop at NRC HQ  
**Date:** Monday, December 12, 2016 5:31:56 PM  
**Attachments:** [Harvesting Workshop Announcement.docx](#)

Note to requester: Attachment is immediately following.

Hi Chuck,

We spoke several months back with Bob Hardies about opportunities for harvesting at Kewaunee. Bob has since moved on from NRC and NRC's budget has continued to be very tight, so the prospects for moving forward in the near-term on harvesting at Kewaunee are not clear. However, NRC is working with DOE and EPRI to host a workshop on ex-plant materials harvesting on March 7 and 8, 2017 at NRC headquarters in Rockville, MD. I am working with Rob Tregoning and Pat Purtscher at the NRC on this effort. I have attached a 1-page announcement we've put together describing the workshop purpose and objectives. Our hope is for this workshop to bring together a diverse group of interested parties: researchers, utilities, decommissioning experts, and regulators, both domestic and international. We're looking to have an open and honest discussion of the benefits and challenges associated with harvesting, including when it makes sense and is effective and when it isn't. The plan is for this to be a non-public workshop (no NRC public meeting requirements) in order to elicit the best and most frank discussion of harvesting. One of the sessions we're planning is focused on the practical aspects of harvesting and balancing the perspectives and priorities of the different parties involved in a harvesting project: researchers, utility, decommissioning contractor, etc. We would like to invite you to present the utility perspective on harvesting and the decommissioning process. Dominion's position with a decommissioning plant that may be useful for harvesting along with a number of operating reactors makes your perspective a quite valuable and interesting one in the discussion. We're hoping to also have a decommissioning contractor (perhaps EnergySolutions) provide their perspective and experience with harvesting and the decommissioning process in this session, along with a couple researchers with harvesting experience.

Please let me know if I can provide any more information and if you're interested in participating in and presenting at the workshop.

(b)(6)

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)

# Ex-Plant Materials Harvesting Workshop

**Location:** NRC Headquarters in Rockville, MD, USA

**Dates:** March 7-8, 2017

## Motivation:

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

## Purpose and Objective:

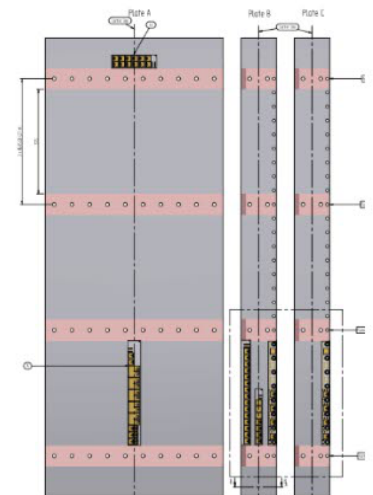
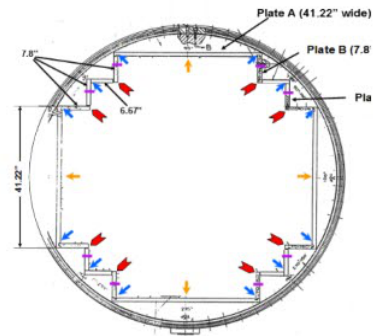
- For NRC staff and interested stakeholders to have greater awareness and knowledge of the benefits and challenges associated with ex-plant harvesting.
- Facilitate contacts and communication to enable specific cooperative ex-plant harvesting programs to be initiated.

## Workshop Topics:

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

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

**Contacts:** Robert Tregoning, [Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)  
Matthew Hiser, [Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)  
Patrick Purtscher, [Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)



**From:** [Hiser, Matthew](#)  
**To:** [Chen, Yiren](#)  
**Subject:** RE: RE: a quick question  
**Date:** Wednesday, December 13, 2017 2:15:37 PM

---

OK, yeah and I think ANL is a participating lab, so accepted proposals can use NSUF funding to perform work at ANL...

---

**From:** Chen, Yiren [[mailto:yiren\\_chen@anl.gov](mailto:yiren_chen@anl.gov)]  
**Sent:** Wednesday, December 13, 2017 2:02 PM  
**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Subject:** [External\_Sender] RE: a quick question

Hi Matt,

Yes, I know this library. Some DOE projects use the materials from this library.

Thanks,

Yiren

---

**From:** Hiser, Matthew [<mailto:Matthew.Hiser@nrc.gov>]  
**Sent:** Wednesday, December 13, 2017 12:52 PM  
**To:** Chen, Yiren <[yiren\\_chen@anl.gov](mailto:yiren_chen@anl.gov)>  
**Subject:** RE: a quick question

Hi Yiren,

Yes, they're referring to the NSUF Nuclear Fuels and Materials Library. Are you familiar with it?

<https://nsuf.inl.gov/File/pfwg%20Cunningham%20-%20NFML.pdf>

Thanks!

Matt

---

**From:** Chen, Yiren [[mailto:yiren\\_chen@anl.gov](mailto:yiren_chen@anl.gov)]  
**Sent:** Wednesday, December 13, 2017 1:35 PM  
**To:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
**Subject:** [External\_Sender] a quick question

Hi Matt,

We just met with Pat and Meg and discussed about harvesting reactor materials. The sample or material list compiled by INL was mentioned in the meeting. Is this the "Nuclear Fuels and Materials Library"? Or INL has a separate list just for the reactor harvested materials? I am just curious and want to find out who in Argonne is in charge of this effort.

Thanks,

Yiren



**From:** [Tregoning, Robert](#)  
**To:** [Rosseel, Thomas M.](#)  
**Cc:** [Purtscher, Patrick](#); [Hiser, Matthew](#)  
**Subject:** RE: Re: [External] FW: Harvesting Workshop Announcement  
**Date:** Thursday, December 15, 2016 5:08:52 PM  
**Attachments:** [Harvesting Workshop Announcement.docx](#)  
[Workshop Agenda 12-12-16.docx](#)

Note to requester: Attachments are immediately following.
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Tom:

I've attached the workshop announcement and a (still) draft agenda, fyi. I have discussed the agenda with Sherry Bernhoft (EPRI) and Rich Reister and this version reflects their suggestions. I also just sent them this agenda and asked for any final comments. Please let me know if you have any suggested modifications as well. We're working on identify POCs from EPRI and DOE (to go with those we've picked from the NRC) for each of the 5 sessions in the agenda. The idea is that the POCs will work together to plan each session. I've asked Rich for the DOE POCs. I'm hopeful that he'll identify you as a POC for at least one of the sessions.

Let me know if you have any questions.

Cheers,

Rob

Robert Tregoning

Technical Advisor for Materials

US Nuclear Regulatory Commission

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---

**From:** Rosseel, Thomas M. [mailto:[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)]

**Sent:** Tuesday, December 13, 2016 5:19 PM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Sokolov, Mikhail A. <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; Leonard, Keith J. <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; Kathryn McCarthy <[Kathryn.McCarthy@inl.gov](mailto:Kathryn.McCarthy@inl.gov)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>

**Subject:** [External\_Sender] Re: [External] FW: Harvesting Workshop Announcement

Thanks Rob,

I will pass that information along.

I would appreciate any update on "the latest workshop planning information" that you could share with me.

Best regards and Happy Holidays,

Tom

---

**From:** "Tregoning, Robert" <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>

**Date:** Tuesday, December 13, 2016 at 1:24 PM

**To:** "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>, "Matthew.Hiser@nrc.gov" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Mikhail Sokolov <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>, "Leonard, Keith J." <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>, Kathryn McCarthy <[kathryn.mccarthy@inl.gov](mailto:kathryn.mccarthy@inl.gov)>, Richard Reister <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>

**Subject:** RE: FW: [External] FW: Harvesting Workshop Announcement

Tom:

Thanks for the email letting us know about the inquiries you've received. We actually want

foreign participation. We just want to make sure that the workshop stays on topic and that it doesn't devolve into pitches for certain research projects or advertisements to harvest from Plant X. Our objective is to use the workshop to help us develop a more informed, proactive strategy for harvesting than we have used in the past.

Could you put Eric and Naoki in touch with me or Matt? We'll then share the latest workshop planning information with them and see if there's a good fit for them to come and speak or possibly attend. We've been working with Rich and Sherry from EPRI to develop a preliminary agenda, which we're hoping will be mature enough to share with you shortly so that you can start planning as well. Let me know if you have any other questions.

Regards,

Rob

Robert Tregoning

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Rockville, MD 20852-2738

ph: 301-415-2324

fax: 301-415-6671

---

**From:** Rosseel, Thomas M. [<mailto:rosseeltm@ornl.gov>]

**Sent:** Tuesday, December 13, 2016 8:05 AM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Sokolov, Mikhail A. <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; Leonard, Keith J. <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; Kathryn McCarthy <[Kathryn.McCarthy@inl.gov](mailto:Kathryn.McCarthy@inl.gov)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>

**Subject:** [External\_Sender] FW: [External] FW: Harvesting Workshop Announcement

**Importance:** High

Rob and Matt,

I have received inquiries from Eric van Walle (SCK-CEN) and Naoki Senada (CRIEPI) as to whether foreign research organizations will be able to send representatives to participate in the harvesting workshop in March. Is this something you have or would consider?

Thanks,

Tom

---

**From:** "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Date:** Tuesday, October 25, 2016 at 4:25 PM

**To:** "Tregoning, Robert" <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>, Richard Reister <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>, Sherry Bernhoft <[sbernhof@epri.com](mailto:sbernhof@epri.com)>, Robin Dyle <[rdyle@epri.com](mailto:rdyle@epri.com)>, "Iyengar, Raj" <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>, "Hiser, Matthew" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Mikhail Sokolov <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>, "Duckworth, Robert C." <[duckworthrc@ornl.gov](mailto:duckworthrc@ornl.gov)>, "Fifield, Leo S" <[leo.fifield@pnnl.gov](mailto:leo.fifield@pnnl.gov)>, Leonard, Keith J. <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>, Don Williams <[Williamsdljr@ornl.gov](mailto:Williamsdljr@ornl.gov)>, Kathryn McCarthy <[kathryn.mccarthy@inl.gov](mailto:kathryn.mccarthy@inl.gov)>

**Subject:** Re: [External] FW: Harvesting Workshop Announcement

Rob,

Yes we could support it, but the week of March 13th is Spring Break week for many of the local schools in the Oak Ridge / Knoxville area. Not sure about Richland and its surrounding communities. It may not affect many of the potential participants, but it might reduce participation.



I am not aware of anyone who is currently planing to attend the RIC conference.

Regards,

Tom

Tom

Thomas M. Rosseel, Ph. D.

Past Chair, International Committee on Irradiated Concrete and  
Materials Aging and Degradation, Deputy Pathway Lead

Light Water Reactor Sustainability Program

Materials, Science and Technology Division

Oak Ridge National Laboratory

4500S MS 6132

PO Box 2008

Oak Ridge, TN 37831

TEL: 1-865-574-5380

[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)

---

**From:** "Tregoning, Robert" <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>

**Date:** Tuesday, October 25, 2016 at 5:15 PM

**To:** "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>, Richard Reister <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>, Sherry Bernhoft <[sbernhof@epri.com](mailto:sbernhof@epri.com)>, Robin Dyle <[rdyle@epri.com](mailto:rdyle@epri.com)>, "Iyengar, Raj"

<[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>, "Hiser, Matthew" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Mikhail Sokolov <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>, "Duckworth, Robert C." <[duckworthrc@ornl.gov](mailto:duckworthrc@ornl.gov)>, "Fifield, Leo S" <[leo.fifield@pnnl.gov](mailto:leo.fifield@pnnl.gov)>, "Leonard, Keith J." <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>, Don Williams <[Williamsdljr@ornl.gov](mailto:Williamsdljr@ornl.gov)>, Kathryn Mccarthy <[kathryn.mccarthy@inl.gov](mailto:kathryn.mccarthy@inl.gov)>

**Subject:** RE: Re: [External] FW: Harvesting Workshop Announcement

Tom:

Thanks for getting back to us. Could you also support a meeting on March 16<sup>th</sup> and 17<sup>th</sup>? I think this is our initial preference with March 7<sup>th</sup> – 8<sup>th</sup> as a fallback. We're still awaiting final confirmation from EPRI as well but Sherry had earlier indicated that she thought the 16<sup>th</sup> and 17<sup>th</sup> would work.

Regards,

Rob

Robert Tregoning

Technical Advisor for Materials

US Nuclear Regulatory Commission

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11545 Rockville Pike

Rockville, MD 20852-2738

ph: 301-415-2324

fax: 301-415-6671

---

**From:** Rosseel, Thomas M. [<mailto:rosseeltm@ornl.gov>]

**Sent:** Tuesday, October 25, 2016 5:10 PM

**To:** Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Bernhoft, Sherry <[sbernhof@epri.com](mailto:sbernhof@epri.com)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>; Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Rosseel, Thomas M. <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; Sokolov, Mikhail A. <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; Duckworth, Robert C. <[duckworthrc@ornl.gov](mailto:duckworthrc@ornl.gov)>; Fifield, Leo S <[leo.fifield@pnnl.gov](mailto:leo.fifield@pnnl.gov)>; Leonard, Keith J. <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>; Williams Jr, Donald L. <[williamsdljr@ornl.gov](mailto:williamsdljr@ornl.gov)>; Kathryn McCarthy

<[Kathryn.McCarthy@inl.gov](mailto:Kathryn.McCarthy@inl.gov)>

**Subject:** [External\_Sender] Re: [External] FW: Harvesting Workshop Announcement

**Importance:** High

All,

The following individuals from the LWRS Materials Pathway have indicated an interest in participating in the workshop:

Mikhail Sokolov, ORNL (baffle bolts and RPV)

Robert Duckworth, ORNL (Cables)

Leo Fifield, PNNL (Cables)

Tom Rosseel, ORNL (Cables, Concrete, RPVs)

We can support March 7th/8th.

Best regards,

Tom

---

**From:** "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Date:** Friday, October 21, 2016 at 2:05 PM

**To:** Richard Reister <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>, "'Tregoning, Robert'" <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>, Sherry Bernhoft <[sbernhof@epri.com](mailto:sbernhof@epri.com)>, Robin Dyle <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** "Iyengar, Raj" <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>, "Hiser, Matthew" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** Re: [External] FW: Harvesting Workshop Announcement

All,

I have asked those involved in harvesting materials and / or characterizing harvested materials to let me know early next week whether they will be able to participate in the workshop and what dates would work best.

Will let you no later than cob Tuesday.

Regards,

Tom

---

**From:** Richard Reister <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>

**Date:** Friday, October 21, 2016 at 1:47 PM

**To:** "'Tregoning, Robert'" <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>, Sherry Bernhoft <[sbernhof@epri.com](mailto:sbernhof@epri.com)>, Robin Dyle <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** "Iyengar, Raj" <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>, "Hiser, Matthew" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>, "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Subject:** RE: RE: [External] FW: Harvesting Workshop Announcement

I can support these dates but will defer to Tom on whether they will work for the lab folks.

Rich

---

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

**Sent:** Friday, October 21, 2016 1:43 PM

**To:** Bernhoft, Sherry <[sbernhof@epri.com](mailto:sbernhof@epri.com)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Subject:** RE: RE: [External] FW: Harvesting Workshop Announcement

Sherry/Rich:

All good thoughts; thanks for your input. The ACRS meeting is on the 9<sup>th</sup>. Could you guys support the workshop on the 7<sup>th</sup>/8<sup>th</sup> or do you already have other meeting scheduled



associated with the ACRS SLR presentation?

Thanks,

Rob

Robert Tregoning

Technical Advisor for Materials

US Nuclear Regulatory Commission

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11545 Rockville Pike

Rockville, MD 20852-2738

ph: 301-415-2324

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---

**From:** Bernhoft, Sherry [<mailto:sbernhoft@epri.com>]

**Sent:** Friday, October 21, 2016 1:04 PM

**To:** Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Subject:** [External\_Sender] RE: [External] FW: Harvesting Workshop Announcement

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

Sherry Bernhoft

**Electric Power Research Institute**

EPRI, Senior Program Manager

1300 West WT Harris Boulevard | Charlotte, NC 28262

704.595.2740 (office)

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[www.epri.com](http://www.epri.com)

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---

**From:** Reister, Richard [<mailto:Richard.Reister@nuclear.energy.gov>]

**Sent:** Friday, October 21, 2016 11:57 AM

**To:** Bernhoft, Sherry <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; 'Rosseel, Thomas M.' <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>

**Subject:** RE: [External] FW: Harvesting Workshop Announcement

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

Rich

---

**From:** Bernhoft, Sherry [<mailto:sbernhoft@epri.com>]

**Sent:** Friday, October 21, 2016 12:49 PM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** RE: [External] FW: Harvesting Workshop Announcement

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

Sherry Bernhoft

**Electric Power Research Institute**

EPRI, Senior Program Manager

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[www.epri.com](http://www.epri.com)

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

**Sent:** Friday, October 21, 2016 8:16 AM

**To:** Bernhoft, Sherry <[sbernhof@epri.com](mailto:sbernhof@epri.com)>; Rich Reister ([Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov))

<[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Cc:** Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Subject:** [External] FW: Harvesting Workshop Announcement

Robin/Sherry/Rich:

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

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

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

Cheers,

Rob

Robert Tregoning

Technical Advisor for Materials

US Nuclear Regulatory Commission

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11545 Rockville Pike

Rockville, MD 20852-2738

ph: 301-415-2324

fax: 301-415-6671

---

**From:** Hiser, Matthew

**Sent:** Friday, October 21, 2016 9:05 AM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Iyengar, Raj <[Raj.Iyengar@nrc.gov](mailto:Raj.Iyengar@nrc.gov)>

**Subject:** Harvesting Workshop Announcement

Hi Rob and Raj,

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

present at the workshop.

Thanks!

Matt

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# Ex-Plant Materials Harvesting Workshop

**Location:** NRC Headquarters in Rockville, MD, USA

**Dates:** March 7-8, 2017

## Motivation:

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

## Purpose and Objective:

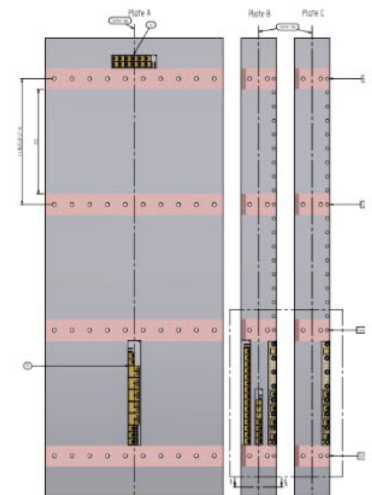
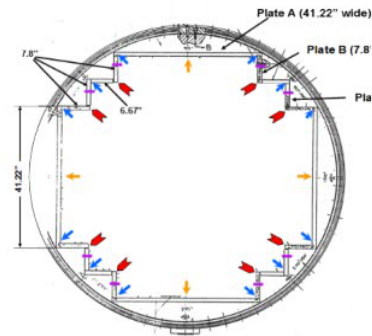
- For NRC staff and interested stakeholders to have greater awareness and knowledge of the benefits and challenges associated with ex-plant harvesting.
- Facilitate contacts and communication to enable specific cooperative ex-plant harvesting programs to be initiated.

## Workshop Topics:

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

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

**Contacts:** Robert Tregoning, [Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)  
Matthew Hiser, [Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)  
Patrick Purtscher, [Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)



be



## Draft Agenda – March 7-8, 2017 Harvesting Workshop

**Tuesday, March 7, 2017**

### Introduction

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

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

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

BREAK 9:45 - 10:00

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

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

LUNCH 12:00 – 1:00

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

BREAK 2:15 – 2:30

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

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

**Wednesday, March 8, 2017**

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

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

LUNCH 12:00 – 1:00

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

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

**From:** [Tregoning, Robert](#)  
**To:** [Hiser, Matthew](#); [Purtscher, Patrick](#)  
**Subject:** FW: RE: [External] FW: Harvesting Workshop  
**Date:** Tuesday, December 20, 2016 9:05:32 AM

---

Guys:

FYI.

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](mailto:sbernhoft@epri.com)]

**Sent:** Tuesday, December 20, 2016 8:59 AM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Subject:** [External\_Sender] RE: [External] FW: Harvesting Workshop

I think between Robin and I we can handle the discussion points for EPRI. Our cable person will not be able to attend – he will be at an IAEA meeting and we may have a concrete person there.

Please keep in mind that for the forward looking all we will have to say is that we will evaluate each harvesting opportunity on a case-by-case basis to determine if it adds value for our members and even then the project needs to be priorities with all our other projects to determine if we can fund the efforts.

Take care and have a Happy Holidays,

Sherry Bernhoft

**Electric Power Research Institute**

EPRI, Senior Program Manager

1300 West WT Harris Boulevard | Charlotte, NC 28262

704.595.2740 (office)

 (cell) (b)(6)

Email: [sbernhoft@epri.com](mailto:sbernhoft@epri.com)

[www.epri.com](http://www.epri.com)

*Together...Shaping the Future of Electricity*

---

**From:** Tregoning, Robert [mailto:[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)]

**Sent:** Tuesday, December 20, 2016 5:48 AM

**To:** Bernhoft, Sherry <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Subject:** [External] FW: Harvesting Workshop

Sherry:

As requested, here are the announcement and agenda again.

Cheers,

Rob

Robert Tregoning

Technical Advisor for Materials

US Nuclear Regulatory Commission

Two White Flint North, M/S T-10 A36

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

---

**From:** Tregoning, Robert

**Sent:** Thursday, December 15, 2016 3:54 PM

**To:** Bernhoft, Sherry [sbernhoft@epri.com] ([sbernhoft@epri.com](mailto:sbernhoft@epri.com)) <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>

**Cc:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>; 'Dyle, Robin' <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Subject:** Harvesting Workshop

Sherry/Rich:

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

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

1. Could you provide me with any additional changes to the workshop agenda that you recommend? Just mark-up and send back the attached agenda. I'll consolidate and address any remaining suggestions from you both.
2. Could you provide me with a POC for coordinating each of the 5 workshop sessions? The idea is for the POCs to work together for planning each session. Here are the POCs from the NRC:
  - a. Session 1 – Rob Tregoning
  - b. Session 2 – Matt Hiser
  - c. Session 3 – Pat Purtscher
  - d. Session 4 – Matt Hiser
  - e. Session 5 – Rob Tregoning

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

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

Rob

Robert Tregoning

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Two White Flint North, M/S T-10 A36

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ph: 301-415-2324

fax: 301-415-6671

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**From:** [坂本 一信](#)  
**To:** [Tregoning, Robert](#); [Soneda, Naoki](#); [Hiser, Matthew](#)  
**Cc:** [Rosseel, Thomas M.](#); [Sokolov, Mikhail A.](#); [Arai, Taku](#)  
**Subject:** [External\_Sender] RE: Harvesting Workshop Announcement  
**Date:** Tuesday, December 20, 2016 8:25:19 PM

---

Rob,

Thanks for cc me.

I believe that CRIEPI's participation is essential for this matter.

Best,

Kazu

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

From: Tregoning, Robert [<mailto:Robert.Tregoning@nrc.gov>]  
Sent: Tuesday, December 20, 2016 11:47 PM  
To: Soneda, Naoki; Hiser, Matthew  
Cc: Rosseel, Thomas M.; Sokolov, Mikhail A.; Arai, Taku; 坂本 一信; Tregoning, Robert  
Subject: RE: Harvesting Workshop Announcement

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.
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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](mailto:soneda@criepi.denken.or.jp)

**From:** [Rosseel, Thomas M.](#)  
**To:** [Tregoning, Robert](#)  
**Cc:** [Hiser, Matthew](#); [Sokolov, Mikhail A.](#)  
**Subject:** [External\_Sender] Re: Harvesting Workshop Announcement  
**Date:** Tuesday, December 20, 2016 10:59:09 AM  
**Importance:** High

---

Rob,

The LWRS program has an existing collaboration with CRIEPI through the CNWG on testing Zion RPV base metal using subsize fracture toughness specimens.

Tom

Thomas M. Rosseel, Ph. D.  
Past Chair, International Committee on Irradiated Concrete and  
Materials Aging and Degradation, Deputy Pathway Lead  
Light Water Reactor Sustainability Program

Materials, Science and Technology Division  
Oak Ridge National Laboratory  
4500S MS 6132  
PO Box 2008  
Oak Ridge, TN 37831

TEL: 1-865-574-5380  
[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)

On 12/20/16, 9:47 AM, "Tregoning, Robert" <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)> wrote:

>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  
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>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,  
>  
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>characterization of RPV materials from Zion Unit 1 under the US-Japan  
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>harvesting from decommissioned Japanese LWRs because some of the Japanese  
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>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

>

**From:** [Tregoning, Robert](#)  
**To:** [Soneda, Naoki](#); [Hiser, Matthew](#)  
**Cc:** [Rosseel, Thomas M.](#); [Sokolov, Mikhail A.](#); [Arai, Taku](#); [坂本 一信](#); [Tregoning, Robert](#)  
**Subject:** RE: Harvesting Workshop Announcement  
**Date:** Tuesday, December 20, 2016 9:47:19 AM  
**Attachments:** [Condensed Workshop Agenda 12-12-16.docx](#)  
[Harvesting Workshop Announcement.docx](#)

Note to requester: Attachments  
are immediately following.

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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](mailto:Robert.Tregoning@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>  
Cc: Rosseel, Thomas M. <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>; Sokolov, Mikhail A. <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>; Arai, Taku <[arait@criepi.denken.or.jp](mailto:arait@criepi.denken.or.jp)>  
Subject: [External\_Sender] Harvesting Workshop Announcement

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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



## Draft Agenda – March 7-8, 2017 Harvesting Workshop

### **Tuesday, March 7, 2017**

#### **Introduction**

- Overview of workshop purpose and objectives

#### **Session 1: Motivation for Harvesting**

- Solicited presentations from EPRI, DOE, NRC, and international organizations followed by panel discussion

#### **Session 2: Technical data needs best addressed by harvesting**

- Solicited presentations from EPRI, DOE, NRC, and international organizations followed by open discussion

#### **Session 3: Sources of Materials**

- Solicited presentations from EPRI, DOE, NRC, and international organizations followed by open discussion

### **Wednesday, March 8, 2017**

#### **Session 4: Harvesting Experience: Lessons learned and practical aspects**

- Solicited presentations from EPRI, DOE, NRC, U.S. utility, decommissioning companies, and international organizations followed by open discussion

#### **Session 5: Future Harvesting Program Planning**

- Solicited presentations from EPRI, DOE, NRC, and international organizations followed by open and panel discussion

# Ex-Plant Materials Harvesting Workshop

**Location:** NRC Headquarters in Rockville, MD, USA

**Dates:** March 7-8, 2017

## Motivation:

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

## Purpose and Objective:

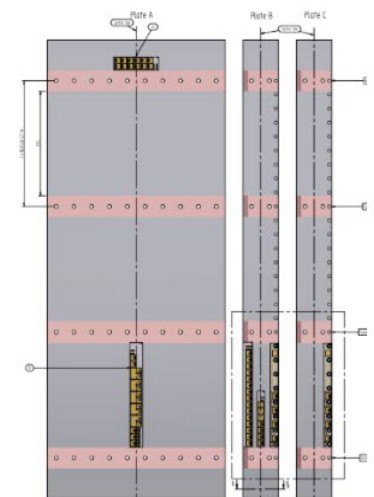
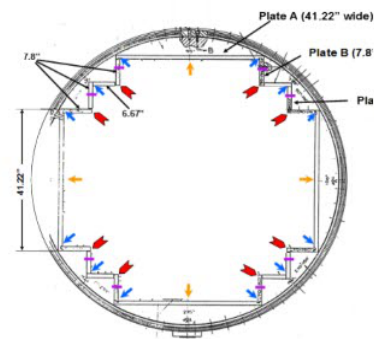
- For NRC staff and interested stakeholders to have greater awareness and knowledge of the benefits and challenges associated with ex-plant harvesting.
- Facilitate contacts and communication to enable specific cooperative ex-plant harvesting programs to be initiated.

## Workshop Topics:

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

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

**Contacts:** Robert Tregoning, [Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)  
Matthew Hiser, [Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)  
Patrick Purtscher, [Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)



**From:** [Tregoning, Robert](#)  
**To:** [Purtscher, Patrick](#); [Hiser, Matthew](#)  
**Subject:** FW: RE: Harvesting Workshop  
**Date:** Tuesday, December 20, 2016 10:34:50 AM

---

Okay, guys. You can start working with the DOE guys to plan your sessions.....

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:** Tuesday, December 20, 2016 10:22 AM

**To:** Tregoning, Robert <Robert.Tregoning@nrc.gov>

**Cc:** Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>;  
Dyle, Robin <rdyle@epri.com>; Bernhoft, Sherry [sbernhoft@epri.com] (sbernhoft@epri.com)  
<sbernhoft@epri.com>

**Subject:** [External\_Sender] RE: Harvesting Workshop

Rob:

For DOE I would recommend the following POCs:

Session 1: Rich Reister

Session 2: Keith Leonard (ORNL)

Session 3: Tom Rosseel (ORNL)

Session 4: Tom Rosseel

Session 5: Rich Reister

Regarding the draft agenda, I don't have any further comments at this point, but the speakers and timing still need some work. I'm sure this will come together based on further discussions as we line up speakers and attendees.

Rich

---

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

**Sent:** Thursday, December 15, 2016 3:54 PM

**To:** Bernhoft, Sherry [sbernhoft@epri.com] ([sbernhoft@epri.com](mailto:sbernhoft@epri.com)) <[sbernhoft@epri.com](mailto:sbernhoft@epri.com)>; Reister, Richard <[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>

**Cc:** Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>; Purtscher, Patrick <[Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)>;  
Dyle, Robin <[rdyle@epri.com](mailto:rdyle@epri.com)>

**Subject:** Harvesting Workshop

Sherry/Rich:

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

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

1. Could you provide me with any additional changes to the workshop agenda that you recommend? Just mark-up and send back the attached agenda. I'll consolidate and address any remaining suggestions from you both.

2. Could you provide me with a POC for coordinating each of the 5 workshop sessions?

The idea is for the POCs to work together for planning each session. Here are the POCs from the NRC:

- a. Session 1 – Rob Tregoning
- b. Session 2 – Matt Hiser
- c. Session 3 – Pat Purtscher
- d. Session 4 – Matt Hiser
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We're hoping to get the planning teams in place before Christmas so that we can hit the ground running in early January to line up all the speakers.

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

**Rob**

Robert Tregoning

Technical Advisor for Materials

US Nuclear Regulatory Commission

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11545 Rockville Pike

Rockville, MD 20852-2738

ph: 301-415-2324

fax: 301-415-6671



**From:** [Tregoning, Robert](#)  
**To:** [Chaouadi Rachid](#); [Hiser, Matthew](#)  
**Cc:** [van Walle Eric](#); [Purtscher, Patrick](#); [Rosseel, Thomas M.](#)  
**Subject:** RE: RE: [External] FW: Harvesting Workshop Announcement  
**Date:** Tuesday, December 20, 2016 10:05:45 AM  
**Attachments:** [Harvesting Workshop Announcement.docx](#)  
[Condensed Workshop Agenda 12-12-16.docx](#)

---

Dear Rachid:

Thank you so much for your email last week and your inquiry about the harvesting workshop. I apologize for not responding to you sooner, but last week was very busy for me. Unfortunately, the dates have been set for March 7 and 8<sup>th</sup>, 2016 and we can't change them at this point, but hopefully this doesn't preclude participation. 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.

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We are interested in having a talk or two to summarize past harvesting efforts and your proposed talk is consistent with this. However my only concern is that a talk just focused on past RPV efforts is narrower than we were initially planning for.

Do you think this talk could be part of a broader talk on past harvesting programs?

Or, now that you have a bit more information on the workshop sessions and what we hope to achieve with each session, do you think that a slightly different presentation topic would fit within one of the sessions above?

Thank you again for your interest. I'm looking forward to working with you on the workshop. 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

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**From:** Chaouadi Rachid [mailto:[rachid.chaouadi@sckcen.be](mailto:rachid.chaouadi@sckcen.be)]

**Sent:** Wednesday, December 14, 2016 4:36 AM

**To:** Tregoning, Robert <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>; Hiser, Matthew <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** van Walle Eric <[eric.van.walle@sckcen.be](mailto:eric.van.walle@sckcen.be)>

**Subject:** [External\_Sender] RE: [External] FW: Harvesting Workshop Announcement

Dear Bob, dear Matt

As you probably know, SCK•CEN is willing to attend the harvesting workshop USNRC is preparing and that would take place in the US in March 2017. If the workshop can be scheduled week 13 (27 to 31 March), that would be great because Eric and myself will be in the US. If case another date is selected, I will be able to attend but not Eric (other commitments). We are preparing a presentation that overviews what was already done worldwide in the field of post-mortem tests on decommissioned vessel materials. Please let us know as soon as possible the final planning that we can start with the necessary arrangements.

Looking forward to see you and discuss future actions for a fruitful international collaboration.

Best regards

Rachid

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**From:** Rosseel, Thomas M. [<mailto:rosseeltm@ornl.gov>]

**Sent:** dinsdag 13 december 2016 23:23

**To:** Naoki Soneda; van Walle Eric; Chaouadi Rachid

**Cc:** [Jan.BENS@FANC.FGOV.BE](mailto:Jan.BENS@FANC.FGOV.BE); Sokolov, Mikhail A.; Leonard, Keith J.

**Subject:** FW: [External] FW: Harvesting Workshop Announcement

**Importance:** High

Dear Naoki, Eric and Rachid,

As noted below, Rob Tregoning has requested that you contact him ( [Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov) ) and Matt Hiser ( [Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov) ) directly concerning the latest workshop planning information and possible speaking opportunities.

Kind regards and best wishes for happy holidays,

Tom

Thomas M. Rosseel, Ph. D.

Past Chair, International Committee on Irradiated Concrete and

Materials Aging and Degradation, Deputy Pathway Lead

Light Water Reactor Sustainability Program

Materials, Science and Technology Division

Oak Ridge National Laboratory

4500S MS 6132

PO Box 2008

Oak Ridge, TN 37831

TEL: 1-865-574-5380

[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)

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**From:** "Tregoning, Robert" <[Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)>

**Date:** Tuesday, December 13, 2016 at 1:24 PM

**To:** "T. M. Rosseel" <[rosseeltm@ornl.gov](mailto:rosseeltm@ornl.gov)>, "Hiser, Matthew" <[Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)>

**Cc:** Mikhail Sokolov <[sokolovm@ornl.gov](mailto:sokolovm@ornl.gov)>, "Leonard, Keith J." <[leonardk@ornl.gov](mailto:leonardk@ornl.gov)>, Kathryn

Mccarthy <[kathryn.mccarthy@inl.gov](mailto:kathryn.mccarthy@inl.gov)>, Richard Reister

<[Richard.Reister@nuclear.energy.gov](mailto:Richard.Reister@nuclear.energy.gov)>

**Subject:** RE: FW: [External] FW: Harvesting Workshop Announcement

Tom:

Thanks for the email letting us know about the inquiries you've received. We actually want foreign participation.

Could you put Eric and Naoki in touch with me or Matt? We'll then share the latest workshop planning information with them and see if there's a good fit for them to come and speak or possibly attend. We've been working with Rich and Sherry from EPRI to develop a preliminary agenda, which we're hoping will be mature enough to

share with you shortly so that you can start planning as well. Let me know if you have any other questions.

Regards,

Rob

Robert Tregoning

Technical Advisor for Materials

US Nuclear Regulatory Commission

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Rockville, MD 20852-2738

ph: 301-415-2324

fax: 301-415-6671

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# Ex-Plant Materials Harvesting Workshop

**Location:** NRC Headquarters in Rockville, MD, USA

**Dates:** March 7-8, 2017

## Motivation:

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

## Purpose and Objective:

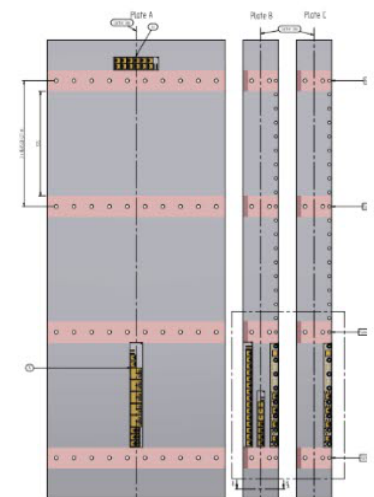
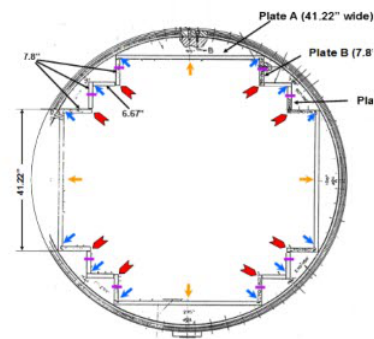
- For NRC staff and interested stakeholders to have greater awareness and knowledge of the benefits and challenges associated with ex-plant harvesting.
- Facilitate contacts and communication to enable specific cooperative ex-plant harvesting programs to be initiated.

## Workshop Topics:

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

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

**Contacts:** Robert Tregoning, [Robert.Tregoning@nrc.gov](mailto:Robert.Tregoning@nrc.gov)  
Matthew Hiser, [Matthew.Hiser@nrc.gov](mailto:Matthew.Hiser@nrc.gov)  
Patrick Purtscher, [Patrick.Purtscher@nrc.gov](mailto:Patrick.Purtscher@nrc.gov)





## Draft Agenda – March 7-8, 2017 Harvesting Workshop

### **Tuesday, March 7, 2017**

#### **Introduction**

- Overview of workshop purpose and objectives

#### **Session 1: Motivation for Harvesting**

- Solicited presentations from EPRI, DOE, NRC, and international organizations followed by panel discussion

#### **Session 2: Technical data needs best addressed by harvesting**

- Solicited presentations from EPRI, DOE, NRC, and international organizations followed by open discussion

#### **Session 3: Sources of Materials**

- Solicited presentations from EPRI, DOE, NRC, and international organizations followed by open discussion

### **Wednesday, March 8, 2017**

#### **Session 4: Harvesting Experience: Lessons learned and practical aspects**

- Solicited presentations from EPRI, DOE, NRC, U.S. utility, decommissioning companies, and international organizations followed by open discussion

#### **Session 5: Future Harvesting Program Planning**

- Solicited presentations from EPRI, DOE, NRC, and international organizations followed by open and panel discussion

Note to requester: The slides are immediately following.

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**From:** Hiser, Matthew  
**Sent:** Monday, February 13, 2017 11:41 AM  
**To:** Brady, Bennett  
**Cc:** Tregoning, Robert; Rao, Appajosula; Frankl, Istvan  
**Subject:** RE: Prep for Division Director/Deputy Director Quarterly Interface Meeting



Hi Bennett,

Here are updated slides for IAD and harvesting (if that should be on the agenda for this meeting).

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:** Brady, Bennett  
**Sent:** Monday, January 23, 2017 2:32 PM  
**To:** Brady, Bennett; 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 (UTC-05:00) Eastern Time (US & Canada).  
**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.

<< File: DLR-RES-DE Quarterly Meeting November 9 2016- R1.pptx >>

# **NRR/DLR, NRR/DE, RES/DE DIVISION DIRECTOR AND DEPUTY DIRECTOR QUARTERLY INTERFACE MEETING ON SLR ACTIVITIES**

**November 9, 2016  
2:30 – 4:00 PM  
O 4 B6**

**Office of Nuclear Reactor Regulation  
Division of License Renewal**

# Agenda

	Agenda Item	Lead	Time (PM)
1	Opening remarks	Jane	2:30
2	Overview of RES upcoming activities	Brian	2:40
3	Overview of DLR upcoming activities	Steve	2:50
4	Action Items from Last Quarterly Interface Meeting	Bennett	2:55
5	Update on status of UNRs		
	• ASR	Jake	3:00
	• Irradiation of concrete	Dogan	3:05
	• Cable condition monitoring (report from meeting on Nov. 3)	Bernie	3:10
	• RPV fluence evaluation methodology	Matt Hardgrove	3:15
	• Irradiation Assisted Degradation	Matt Hiser	3:20
6	• Materials Harvesting	Matt Hiser	3:25
7	Other RES research of interest for SLR	Amy	3:30
8	DLR UNR for SLR	Bennett	3:35
9	Status of concurrence process	Heather	3:40
10	Schedule for GALL-SLR and SRP-SLR	Araceli	3:45
11	Action Items and Adjourn	Bennett	3:50



# Action Items from August Meeting

Action Item	Status
Directors or Deputy Directors should meet to discuss the benefit to NRC in providing FY-17 travel funds to participate in meetings on IGALL	Done. D & DDs will support travel to IGALL
Electrical staff should meet to discuss NIST's proposed test plans to determine the most appropriate condition monitoring techniques for projecting the life of cables. The work should also address equipment qualification methods during the subsequent period of extended operation.	Done. Will be discussed during this meeting
RES will provide NRR/DE the spreadsheets of the funding for the Irradiated-Assisted Degradation tasks and who is providing the funds	Done. Email from K Brock on August 20
Bennett will set up the next Quarterly Interface Meeting for mid-November for one and half hours	Done

# 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 2017 UNR from NRR: Research Assistance to Evaluate Irradiation-assisted Degradation of Reactor Vessel Internals
  - Task 1: Void swelling
  - Task 2: Monitor industry activities associated with IAD
  - Task 3: Technical support for ASME code and ongoing OpE as needed

# 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
- Updated UNR received from NRR in late January
  - RES preparing response to detail research activities to support NRR's request



# IAD Projects Overview

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



# Current Status and Path Forward

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

# 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
    - Finalizing agenda and confirming presenters/participants
- Task on harvesting expected in SLR UNR

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**From:** Brady, Bennett  
**Sent:** Friday, February 17, 2017 2:19 PM  
**To:** Sircar, Madhumita; Hiser, Matthew  
**Subject:** RE: Prep for Division Director/Deputy Director Quarterly Interface Meeting  
**Attachments:** DLR-RES-DE Quarterly Meeting 23Feb17-MS.PPTX

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](mailto: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](mailto: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.



# **NRR/DLR, NRR/DE, RES/DE DIVISION DIRECTOR AND DEPUTY DIRECTOR QUARTERLY INTERFACE MEETING ON SLR ACTIVITIES**

**February 23, 2017  
10:00AM – 11:30 AM  
O 7 B4**

**Office of Nuclear Reactor Regulation  
Division of License Renewal**

# Effects of Irradiation on Concrete Structures, UNR 2015-007



**UNR NRR-2015-007, May 2015, and Response to UNR, September 2015,**

- **Confirmatory Review of Radiation Damage Characterization**

**Status**

- Work contracted to Argonne National Laboratory, January 2016
- Duration: FY 2016-2019
- Interim Report at every 6 months.
- Second Interim Report submitted in February 2017.

- **Harvesting Zorita Concrete**

**Status**

- Contracted to Oak Ridge National Laboratory, March 2016
- Duration FY: 2016 -2019
- RFP from ORNL to Spanish Agency (ENRESA), April 2016
- ENRESA proposal pending
- Harvesting of cores from bio shield wall is complete

# Effects of Irradiation on Concrete Structures, UNR 2015-007



- **Testing Irradiated Specimens and Numerical Simulations**

**Current Status:**

- Phase 2 Research Program Development
- Expected Duration: FY2018 -2020

# Effects of Irradiation on Concrete Structures, UNR 2015-007

- **Estimate the level of fluence ( $E > 0.1$  MeV), gamma dose and temperature for plant operation up to 80 years**

## **Status:**

- Conducting in-house by RES/DSA/RSAB
- Duration: FY2016-2019
- RSAB comments received December, finalized February
- [EPRI Report 3002002676](#), “Expected Condition of Reactor Cavity Concrete After 80 Years of Radiation Exposure”
  - RSAB feedback: adequate “first cut” demonstration, but lacks sufficient detail to support regulatory decision making
- [Transware Report TWE-LPI1-001-R-001](#), “An Evaluation of Neutron, Gamma and Temperature Profiles in a Three Loop PWR Biological Shield” (supports EPRI 3002002676)
  - RSAB feedback: adequate evaluation in beltline region for a single statepoint – would need more work to predict end of life values
  - Beltline region may not be limiting for fluence structural requirements, methodology not applicable outside this region



# Effects of Irradiation on Concrete Structures, UNR 2015-007

- [EPRI Report 3002008128](#), “Structural Disposition of Neutron Radiation Exposure in [BWR Vessel](#) Support Pedestals” - received on July 28, 2016
  - RSAB Feedback: conservative evaluation of fluence on pedestals
  - Any application should demonstrate applicability of assumptions made in report, but appears to be adequate approach for most BWRs
- RSAB recommends suspending work on in-house confirmatory methods development for fluence evaluation
  - Requires a substantial effort and expertise that is simply not available in RSAB currently
  - RSAB (now FSCB) remains available for technical support on evaluating industry proposals