From: Tregoning, Robert
Sent: Thu, 28 May 2015 10:20:51 -0400
To: Hull, Amy;Frankl, Istvan
Cc: Hiser, Matthew
Subject: RE: Harvesting Efforts June NRC-Industry materials mtg 5-28-15 mah.abh.pptx

All:

Please just let me know when this is final so that I can send it to NRR for placing in ADAMS.

Thanks,

Rob

Robert Tregoning
Technical Advisor for Materials
US Nuclear Regulatory Commission
21 Church Street, M/S CS-5A24
Rockville, MD 20850
ph: 301-251-7662
Blackberry: [redacted] (b)(6)
fax: 301-251-7425

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

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

From: Frankl, Istvan
Sent: Fri, 29 May 2015 10:03:42 -0400
To: Tregoning, Robert;Hiser, Matthew;Hull, Amy
Subject: RE: Harvesting Efforts June NRC-Industry materials mtg 5-28-15 mah.abh.pptx

Rob,

This presentation can be put in the public ADAMS as is. The document in ADAMS can be replaced if we can fix slide 15 on Monday.

Thanks,

Steve

From: Tregoning, Robert
Sent: Friday, May 29, 2015 10:03 AM
To: Hiser, Matthew; Hull, Amy; Frankl, Istvan
Subject: Re: Harvesting Efforts June NRC-Industry materials mtg 5-28-15 mah.abh.pptx

Matt:

Can I go ahead and put this version in ADAMS? We can still use the clean version for the presentation on Wednesday.

Rob

Sent from an NRC Blackberry
Robert Tregoning
(b)(6)

From: Hiser, Matthew
Sent: Friday, May 29, 2015 09:39 AM
To: Hull, Amy; Frankl, Istvan
Cc: Tregoning, Robert
Subject: RE: Harvesting Efforts June NRC-Industry materials mtg 5-28-15 mah.abh.pptx

Hi Rob, Steve, Amy,

I have made the changes in accordance with Kathy's comments as relayed by Steve in the attached PP. One final tweak Amy and I will try to make on Monday is to Slide 15 – if we can clean up the source slide from DOE, just so the information comes through clearly.

Thanks!
Matt

From: Hull, Amy
Sent: Thursday, May 28, 2015 10:03 AM

To: Frankl, Istvan
Cc: Tregoning, Robert; Hiser, Matthew
Subject: Harvesting Efforts June NRC-Industry materials mtg 5-28-15 mah.abh.pptx

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

From: Hiser, Matthew
Sent: Mon, 3 Oct 2016 12:58:23 +0000
To: Lyon, Fred
Subject: RE: Harvesting Materials from Fort Calhoun

Great, thanks Fred! My contact has been with Kristen Jacobsen at OPPD.

I will let you know if I need anything – just wanted to make sure there weren't any surprises if something got mentioned to you or the residents/region.

Thanks!
Matt

From: Lyon, Fred
Sent: Saturday, October 01, 2016 7:36 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Materials from Fort Calhoun

Thanks for the info, Matt. Please let me know who your engineering contact is at FCS, so that if his name comes up with my licensing contact, I'll know who it is. Otherwise, just let me know if you need anything. Fred

---

From: Hiser, Matthew
Sent: Friday, September 30, 2016 12:39 PM
To: Lyon, Fred <Fred.Lyon@nrc.gov>
Subject: Harvesting Materials from Fort Calhoun

Hi Fred,

I am a materials engineer in the Office of Research and am involved in a project to look into opportunities to harvest materials from decommissioning plants. I have been working with Bob Hardies (an SL in NRR/DE), who is retiring today.

Through Bob's contacts at Exelon, we reached out to an engineer at Fort Calhoun to inquire about what components they may have available for harvesting from Fort Calhoun, particularly from the vessel and internals. We have had one phone call with their vessel and internals engineer to discuss what materials they have in their vessel and internals. On this call, Bob and I made it very clear that this was purely an information-gathering exercise for research purposes and they were under no obligation to provide any information.

As the NRC PM for Fort Calhoun, I wanted to make you aware of this contact with Fort Calhoun and the potential for some further interaction to discuss harvesting possibilities at Fort Calhoun. Please advise if there is anything I should be aware of with reaching out to my contact at Fort Calhoun.

Thanks!
Matt

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

From: Doutt, Clifford
Sent: Wed, 3 Feb 2016 17:55:08 -0500
To: Hiser, Matthew
Subject: RE: Harvesting meeting placeholder

Hi Matt,

Thanks - - will do.

CLiff

From: Hiser, Matthew
Sent: Wednesday, February 03, 2016 4:08 PM
To: Doutt, Clifford <Clifford.Doutt@nrc.gov>; Abogunde, Maryann <Maryann.Abogunde@nrc.gov>
Subject: RE: Harvesting meeting placeholder

Hi Cliff,

For this working group, we were piloting focusing on metallic components. I think our goal will be to expand to electrical and structural components over time.

So it probably won't make as much sense to attend at this point, but it would be good to talk to Roger and stay in the loop. He can share with you where we are heading and hopefully we can really expand as time goes on.

Thanks!
Matt

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

From: Doutt, Clifford
Sent: Wednesday, February 03, 2016 3:53 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Abogunde, Maryann <Maryann.Abogunde@nrc.gov>
Subject: Harvesting meeting placeholder

Hi Matthew,

Roger forwarded the meeting place holder to me. I thought I would check and see whether you wanted DLR electrical at the meeting or is this for none components?

Thanks,

Cliff

From: Hiser, Matthew
Sent: Tue, 15 May 2018 18:36:13 +0000
To: Purtscher, Patrick
Subject: RE: Harvesting Meeting Prep / Alignment

Hi Pat, will you be attending or should we call you?

Thanks!
Matt

-----Original Appointment-----
From: Hiser, Matthew
Sent: Monday, May 07, 2018 4:09 PM
To: Hiser, Matthew; Purtscher, Patrick; Tregoning, Robert; Audrain, Margaret
Subject: Harvesting Meeting Prep / Alignment
When: Tuesday, May 15, 2018 3:30 PM-4:30 PM (UTC-05:00) Eastern Time (US & Canada).
Where: T10D40

Prep / Alignment for meeting with electrical / concrete folks the following day.

Note to requester: Attachment is immediately following. The box with the red X in the first email is the PDF attachment (PDF Adobe icon and the file name) imbedded into the body of the email.

From: Moyer, Carol
Sent: Thu, 19 Oct 2017 07:56:02 -0400
To: Hiser, Matthew
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants
Attachments: PLiM 2017 guidelines.pdf

Hi Matt,

Thank you for doing this. I will take a look at the content for possible suggested improvements. In the meantime, you should review the style guide sent from PLiM, and consider some formatting changes in your file (headers, e.g.).

-Carol

From: Hiser, Matthew
Sent: Wednesday, October 18, 2017 4:44 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Ramuhalli, Pradeep (Pradeep.Ramuhalli@pnnl.gov) <Pradeep.Ramuhalli@pnnl.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

<< File: IAEA PLiM Hiser 10-18-2017.docx >>
Hi Rob, Amy, Pat, Pradeep,

I have adapted our previous poster / presentation into a paper (attached) on very short notice. The deadline for PLiM papers is technically today, but given the extremely late notice, hopefully they can live with receiving it early next week following staff and management review here.

If you can possibly take a look at this by tomorrow (Thursday) or Friday and provide any feedback, that would be great.

I still need to clean up the references section, so don't mind the very casual state of it now. I'll clean that up tomorrow hopefully…

Thanks!
Matt

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

From: Hiser, Matthew
Sent: Tuesday, October 10, 2017 4:41 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

<< File: NRC PLiM slides on Harvesting.pptx >>
Hi Rob, Amy, Pat,

Here's is my adaptation of the poster info (along with some additional insights from the workshop) into slides for PLiM.

Please feel free to comment and edit freely. Ideally, we'd like to have these mostly agreed on at a technical level by COB tomorrow (Wednesday) to be able to discuss with NRR on Thursday and enter into management review and concurrence.

Thanks!
Matt

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

From: Tregoning, Robert
Sent: Tuesday, October 10, 2017 8:32 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>
Cc: Thomas, Brian <Brian.Thomas@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>;

Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Allen:

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

Cheers,

Rob

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

From: Hiser, Allen
Sent: Tuesday, October 10, 2017 7:27 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>
Cc: Thomas, Brian <Brian.Thomas@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>
Subject: FW: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants
Importance: High

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

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

A couple of questions on this topic:

1. Can RES pull together a presentation in the next day or two, that we can discuss Thursday AM?

2. Has a paper been prepared (it appears from below that this is possible for inclusion in the conference proceedings)? If so, can I get a copy of it, or other background information.

3. When will the poster be available to be mailed to Lyon? (Can I get a copy of what it will look like?)

I am sure that other questions will arise.

Allen

-----Original Message-----
From: KANG, Ki-Sig [mailto:K.S.Kang@iaea.org]
Sent: Tuesday, October 10, 2017 7:17 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Cc: KHAELSS, Martina <M.Khaelss@iaea.org>; KRIVANEK, Robert <R.Krivanek@iaea.org>; 4th PLiM Conference - Contact Point <4th-PLiM-Conference.Contact-Point@iaea.org>
Subject: [External_Sender] Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Dear Allen,

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

I think all of participants will be very interesting to this topic. But we have no time slot to present in oral session. Thus I recommend to arrange a side event to introduce this topic from 13:20 -14:00 on 24, Oct (Tuesday) if you want.
We can arrange the meeting room for presentation and discussion. Please think about and let me know.

Ki- Sig KANG

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

PAPER TITLE IN TIMES NEW ROMAN 12 POINT BOLD CAPITALS, INDENTED BY 1 cm WITH NO MORE THAN 40 CHARACTERS PER LINE INCLUDING SPACES

Subtitle if needed in Times New Roman 12 point bold italic, sentence case

A.N. AUTHOR
Organization
Town/City, Country
Email: address@correspondingauthor.com

A.N. OTHER-AUTHOR
Organization
Town/City, Country

Abstract

This is an example of how to format an abstract. The title is Times New Roman 10 point bold, indented by 1 cm. The text is Times New Roman 9 point, with a first line indent of 1 cm. The abstract is a single paragraph which may be up to 300 words long. It should not contain information not included in the paper. The abstract may not contain references, equations or the word 'we'. Write 'the paper', not 'this paper'.

1. INTRODUCTION

This is an example of how a paper for the Proceedings Series should be formatted. The text above shows how the running head, title, subtitle (if applicable), author names and affiliations, and abstracts should be formatted. The heading immediately above this paragraph is a first level paper heading; it is Times New Roman 10 point regular capitals. The body text of the paper is Times New Roman 10 point regular, with a first line indent of 1 cm.

Please use these examples to format your paper. Applying the styles saved in this document to your text should format it correctly. Your word processing software may also contain a tool such as a 'format painter' that will enable you to copy the formatting from the example text to your own text. Alternatively, the information given in this template should enable to select the correct format for each section.

2. ORIGINALITY, COPYRIGHT AND PUBLICATION

The text of a paper submitted to this conference must be original and must not have been published elsewhere previously. All papers will be scanned to ensure originality; if they are found to contain non-original text, only their abstract will be included in the proceedings.

If text or images included in the paper have been published elsewhere, the paper must be accompanied by evidence that permission has been given for the reuse. If no such evidence is supplied, only the abstract will be included in the proceedings. In addition, text must be properly cited and images properly acknowledged.

Papers will only be included in the proceedings if the IAEA Form B has been submitted prior to the conference. If the Form B is not received, only the abstract may be included in the proceedings, but this may also be omitted.

3. HEADINGS AND SUBHEADINGS

If you need to subdivide the sections of your paper, use the headings shown below. You can use second and third level paper headings. To subdivide further, please use lists numbered (a), (b), and so on, but this is usually not necessary in a paper of normal length.

3.1. Second level paper heading

A second level paper heading is Times New Roman 10 point bold, in sentence case.

3.1.1. Third level paper heading

A third level paper heading is Times New Roman 10 point italic, in sentence case.

4. PAGE AND SECTION BREAKS

If you need to move a heading to the following page, please use a page break (usually found in word processing software under the 'insert/page break' menu. Please do not press return several times to move text onto a new page.

5. TABLES

Tables must be numbered consecutively and include a table heading. There is no full stop at the end of the heading. IAEA style is to use table borders and lines sparingly. Tables must be mentioned (called out) in the text and should be inserted following the end of the paragraph in which they are mentioned, or on the next page if there is not enough space. Tables are formatted in Times New Roman 9 point regular. For an example, see Table 1.

TABLE 1. EXAMPLE TABLE

Column 1	Column 2	Column 3
Align text left	Centre text	Centre text
Align text left	Centre text	Centre text

6. FIGURES

The figures you use in your publication must be original. If they have been published elsewhere (even in other papers authored by you or one of your co-authors) they cannot be used unless a permission is obtained and sent with the paper.

The figures must be numbered consecutively and mentioned in the text in the order in which they are numbered, using the abbreviation Fig. They should be inserted into the paper without a border and immediately below the paragraph in which they are mentioned, or on the next page if there is no space. They should have a caption, which is set in Times New Roman 9 point italic; the caption should be centred if it is a single line or aligned left if it is two lines or more long. An example of a caption can be seen below Fig. 1. Note the capitalization of 'Fig.' in the figure caption.

7. REFERENCES

In accordance with good academic practice, reference sources should be cited in the text to support the assertions it contains. IAEA style is to use numbered references in square brackets. There are different formats for sources such as books [1], internal reports [2], personal communication [3], unpublished data [4], single chapters from books [5], journal articles [6], websites and on-line databases [7], papers from a proceedings [8], presentations including slides and handouts [9], and INFCIRCs [10]. Sources 'in preparation' or 'in press' use these terms in place of the year. Titles are given in their original languages if these use Latin alphabets, or translated into English for languages that do not use Latin alphabets. Please see the reference list below for examples of how to format the sources numbered [1–11]. The text in the reference list is Times New Roman 9 point regular.

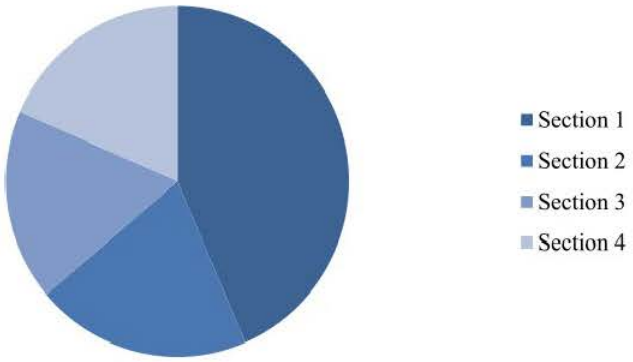


FIG. 1. Chart showing the number of words in each section of this example paper.

8. BIBLIOGRAPHY

A bibliography is an optional section. If a source is not cited in the text but may nevertheless be of interest to the reader, it can be included in a bibliography, which follows the reference list. Sources that appear in the reference list should not be included in the bibliography. Please see the example bibliography at the end of this paper. The text in the bibliography is Times New Roman 9 point regular.

9. FURTHER INFORMATION

9.1. Author affiliation

Put the email address after the affiliation of the corresponding author, whether he or she is the first author or not. Please put the name of the authors' organization(s) in English. Do not give the organization's street address or postal code. For international organizations, no country is given. Please use the name of the country as it is given in the IAEA Member State list (for example, use 'Russian Federation', not 'Russia').

If there is a long list of author names and some of them are from the same organizations or same States, please seek advice from the conference organizer on how to format such a list to save space.

9.2. Bulleted lists

If you use a bulleted list in your paper, please format it as below:

— First bullet point;
— Section bullet point;
— Third bullet point.

If you need to use subpoints, please use this format:

— First bullet point.
— Section bullet point.
  - First subpoint;
  - Second subpoint.
— Third bullet point.

Please note the punctuation at the end of the points.

9.3. Numbered lists

If you use a numbered list in your paper, please format it as below, noting the punctuation at the end of the points:

(a) First bullet point.
(b) Section bullet point.
    (i) First subpoint;
    (ii) Second subpoint.
(c) Third bullet point.

Please use (a), (b), etc., unless your text refers to the points elsewhere as 'the first point', 'the second point' and so on — in this case, please use (1), (2), etc.

9.4. General formatting

Only the font Times New Roman should be used in the paper. The font Symbol should never be used in files intended for publication as it is not a Unicode font and letters may change during production (for example, μSv may print as mSv if the character μ is inserted in Symbol font).

Underlining should not be used. Bold and italic may be used for emphasis, but should be used sparingly. Paragraph line spacing is 12 point for 9 point text, 13 point for 10 point text and 14 point for 12 point text, as used in this example paper. Only one space is used following a full stop.

Footnotes[1] should be used only where necessary. They should be inserted at the end of each page, and not at the end of the paper as endnotes.

ACKNOWLEDGEMENTS

The heading of the acknowledgements section is Times New Roman 10 point bold capitals, centred. The acknowledgements section is an optional section and can be used to list funding bodies and other sponsors of the research, and to mention people who supported the research but whose contribution was not of a type to merit authorship of the paper.

REFERENCES

[1] AUTHOR, A., Book Title in Title Case, Series No. if applicable, Publisher, Place of Publication (Year).
[2] AUTHOR, A., Internal Report Title in Title Case, internal report, Organization, Location, Year.
[3] LETTER-WRITER, A., Organization, personal communication, Year.
[4] RESEARCHER, A., Organization, unpublished data.
[5] CHAPTER-AUTHOR, A., "Title of chapter in sentence case", Book Title in Title Case, Publisher, Place of Publication (Year).
[6] AUTHOR, A., AUTHOR, B., AUTHOR, C., Journal article title in sentence case, Abb. J. Title **1** 2 (Year) 120–123.
[7] AUTHOR, A., Title of Web Page or On-line Database in Title Case (Year), www.webpage.com/exact-subpage-being-cited
[8] AUTHOR, A., "Paper title in sentence case", Conference Title in Title Case (Proc. Int. Conf. Place of Conference, year), Publisher, Place of Publication (Year).
[9] PRESENTER, A., "Title of presentation in sentence case", Paper No., paper presented at Organization seminar on subject, Location, year.
[10] Title of INFCIRC in Title Case, INFCIRC No., IAEA, Vienna (Year).

[1] Text in a footnote is Times New Roman 9 point regular.

BIBLIOGRAPHY

AUTHOR, A., Book Title in Title Case, Series No. if applicable, Publisher, Place of Publication (Year).
— Title of Book by Same Author in Title Case, Series No. if applicable, Publisher, Place of Publication (Year).

AUTHOR, A., AUTHOR, B., Book Title in Title Case, Series No. if applicable, Publisher, Place of Publication (Year).

ORGANIZATION A (Location)

Book Title in Title Case, Series No. if applicable (Year).
Book Title in Title Case, Series No. if applicable (Year).
Book Title in Title Case, Series No. if applicable (Year).

ORGANIZATION B (Location)

Book Title in Title Case, Series No. if applicable (Year).
Book Title in Title Case, Series No. if applicable (Year).
Book Title in Title Case, Series No. if applicable (Year).
Book Title in Title Case, Series No. if applicable (Year).
Book Title in Title Case, Series No. if applicable (Year).

From: Hiser, Matthew
Sent: Thu, 12 Oct 2017 18:33:24 +0000
To: Hiser, Allen
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Thank you!

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

From: Hiser, Allen
Sent: Thursday, October 12, 2017 12:22 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Lyon Marriott Hotel Cité Internationale
70 Quai Charles de Gaulle
Lyon 69463 France

From: Hiser, Matthew
Sent: Thursday, October 12, 2017 9:46 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

For further background info, here is the workshop summary report and latest version of PNNL harvesting report.

Thanks!
Matt

From: Hiser, Allen
Sent: Wednesday, October 11, 2017 7:57 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Per IAEA:

All presentations will be uploaded in advance to the conference PC. Please email your presentation and the full paper to email address: PLIM2@iaea.org by Wednesday, 18 October.

See attached 2 of the NRR papers as examples.

Allen

From: Hiser, Matthew
Sent: Tuesday, October 10, 2017 4:52 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

<< File: Harvesting NRC Poster for PLiM_cem_ptp (IF).pptx >> << File: Harvesting IAEA PLim 2 page synopsis final draft.docx >>
I can address #2 and #3.

2. No paper has been prepared, perhaps we can ask IAEA about whether that is still possible. If so, we could pull something together.

For background info, we have the draft PNNL report and workshop summary report that I can share. I've also attached the two page extended abstract that was originally submitted.

3. I am picking up the poster today as I leave and will try to get it mailed as soon as possible. (see attached PP) Do you have an address to where it should be sent?

Thanks!
Matt

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

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

Allen:

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

Cheers,

Rob

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

From: Hiser, Allen
Sent: Tuesday, October 10, 2017 7:27 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>
Cc: Thomas, Brian <Brian.Thomas@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>
Subject: FW: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants
Importance: High

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

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

A couple of questions on this topic:

1. Can RES pull together a presentation in the next day or two, that we can discuss Thursday AM?

2. Has a paper been prepared (it appears from below that this is possible for inclusion in the conference proceedings)? If so, can I get a copy of it, or other background information.

3. When will the poster be available to be mailed to Lyon? (Can I get a copy of what it will look like?)

I am sure that other questions will arise.

Allen

-----Original Message-----
From: KANG, Ki-Sig [mailto:K.S.Kang@iaea.org]
Sent: Tuesday, October 10, 2017 7:17 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Cc: KHAELSS, Martina <M.Khaelss@iaea.org>; KRIVANEK, Robert <R.Krivanek@iaea.org>; 4th PLiM Conference - Contact Point <4th-PLiM-Conference.Contact-Point@iaea.org>
Subject: [External_Sender] Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Dear Allen,

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

I think all of participants will be very interesting to this topic. But we have no time slot to present in oral session. Thus I recommend to arrange a side event to introduce this topic from 13:20 - 14:00 on 24, Oct (Tuesday) if you want.
We can arrange the meeting room for presentation and discussion. Please think about and let me know.

Ki- Sig KANG

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

Note to requester: Attachments are immediately following. The boxes with the red X in them in the first email are a Power Point and a Word attachment (Power Point icon with its file name, Word icon with its file name) that are both imbedded into the body of the email.

From: Hiser, Matthew
Sent: Tue, 10 Oct 2017 20:52:15 +0000
To: Tregoning, Robert;Hiser, Allen;Hull, Amy;Moyer, Carol
Cc: Frankl, Istvan
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants
Attachments: Harvesting NRC Poster for PLiM_cem_ptp (IF).pptx, Harvesting IAEA PLim 2 page synopsis final draft.docx

I can address #2 and #3.

2. No paper has been prepared, perhaps we can ask IAEA about whether that is still possible. If so, we could pull something together.

For background info, we have the draft PNNL report and workshop summary report that I can share. I've also attached the two page extended abstract that was originally submitted.

3. I am picking up the poster today as I leave and will try to get it mailed as soon as possible. (see attached PP) Do you have an address to where it should be sent?

Thanks!
Matt

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

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

Allen:

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

Cheers,

Rob

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

From: Hiser, Allen
Sent: Tuesday, October 10, 2017 7:27 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>
Cc: Thomas, Brian <Brian.Thomas@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>
Subject: FW: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants
Importance: High

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

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

A couple of questions on this topic:

1. Can RES pull together a presentation in the next day or two, that we can discuss Thursday AM?

2. Has a paper been prepared (it appears from below that this is possible for inclusion in the conference proceedings)? If so, can I get a copy of it, or other background information.

3. When will the poster be available to be mailed to Lyon? (Can I get a copy of what it will look like?)

I am sure that other questions will arise.

Allen

-----Original Message-----
From: KANG, Ki-Sig [mailto:K.S.Kang@iaea.org]
Sent: Tuesday, October 10, 2017 7:17 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Cc: KHAELSS, Martina <M.Khaelss@iaea.org>; KRIVANEK, Robert <R.Krivanek@iaea.org>; 4th PLiM Conference - Contact Point <4th-PLiM-Conference.Contact-Point@iaea.org>
Subject: [External_Sender] Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Dear Allen,

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

I think all of participants will be very interesting to this topic. But we have no time slot to present in oral session. Thus I recommend to arrange a side event to introduce this topic from 13:20 -14:00 on 24, Oct (Tuesday) if you want.
We can arrange the meeting room for presentation and discussion. Please think about and let me know.

Ki- Sig KANG

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

Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

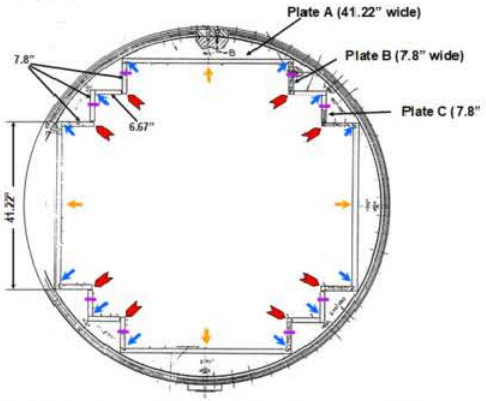
M. Hiser[a], P. Purtscher[a], P. Ramuhalli[b], A. B. Hull[a], and R. Tregoning[a]
[a]U.S. Nuclear Regulatory Commission (NRC), Washington, D.C., USA
[b]Pacific Northwest National Laboratory (PNNL), Richland, WA, USA

Background and Motivation

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

Current Activities

- NRC has recently undertaken an effort, with the assistance of Pacific Northwest National Laboratory (PNNL), to develop a strategic approach to harvesting aged materials from NPPs. Due to limited opportunities, past harvesting efforts have been reactive to individual plants shutting down and beginning decommissioning. Given the expected availability of materials from numerous plants and anticipated research needs to better understand aging out to 80 years of operation, the NRC is pursuing a more proactive approach to prioritize the data needs best addressed by harvesting and identify the best sources of materials to address high-priority data needs for regulatory research.
- The first step in this strategic approach is to prioritize data needs for harvesting. A data need describes a particular degradation scenario and should be defined with as much detail as appropriate in terms of the material (alloy, composition, etc.) and environment (temperature, fluence, chemistry, etc.).



Potential Criteria for Harvesting Prioritization

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

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

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

Harvesting Database

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

Path Forward

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

Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

M. Hiser[a], P. Purtscher[a], P. Ramuhalli[b], A. B. Hull[a], R. Tregoning[a], and C. E. Moyer[a]
[a]U.S. Nuclear Regulatory Commission (NRC), Washington, D.C., USA
[b]Pacific Northwest National Laboratory (PNNL), Richland, WA, USA

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

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

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

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

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

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

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

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

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

Note to requester: Attachments are immediately following. The "IAEA-CN-246-082 Hiser 10-24-2017-FINAL.docx" attachment is also publicly available in ADAMS at ML17285A687. The "IAEA-CN-246-KS-6 Wilson 10-24-2017-FINAL.docx" attachment is also publicly available in ADAMS at ML17285A712.

From: Hiser, Allen
Sent: Wed, 11 Oct 2017 05:56:39 -0600
To: Hiser, Matthew;Tregoning, Robert;Hull, Amy;Moyer, Carol
Cc: Frankl, Istvan
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants
Attachments: IAEA-CN-246-082 Hiser 10-24-2017 - FINAL.docx, IAEA-CN-246-KS-6 Wilson 10-24-2017 - FINAL.docx

Per IAEA:

> All presentations will be uploaded in advance to the conference PC. Please email your presentation and the full paper to email address: PLIM2@iaea.org by Wednesday, 18 October.

See attached 2 of the NRR papers as examples.

Allen

From: Hiser, Matthew
Sent: Tuesday, October 10, 2017 4:52 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

<< File: Harvesting NRC Poster for PLiM_cem_ptp (IF).pptx >> << File: Harvesting IAEA PLim 2 page synopsis final draft.docx >>
I can address #2 and #3.

2. No paper has been prepared, perhaps we can ask IAEA about whether that is still possible. If so, we could pull something together.

For background info, we have the draft PNNL report and workshop summary report that I can share. I've also attached the two page extended abstract that was originally submitted.

3. I am picking up the poster today as I leave and will try to get it mailed as soon as possible. (see attached PP) Do you have an address to where it should be sent?

Thanks!
Matt

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

Matthew.Hiser@nrc.gov

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

Allen:

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

Cheers,

Rob

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

From: Hiser, Allen
Sent: Tuesday, October 10, 2017 7:27 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Iyengar, Raj <Raj.Iyengar@nrc.gov>
Cc: Thomas, Brian <Brian.Thomas@nrc.gov>; Wilson, George <George.Wilson@nrc.gov>
Subject: FW: Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants
Importance: High

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

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

A couple of questions on this topic:

1. Can RES pull together a presentation in the next day or two, that we can discuss Thursday AM?

2. Has a paper been prepared (it appears from below that this is possible for inclusion in the conference proceedings)? If so, can I get a copy of it, or other background information.

3. When will the poster be available to be mailed to Lyon? (Can I get a copy of what it will look like?)

I am sure that other questions will arise.

Allen

-----Original Message-----
From: KANG, Ki-Sig [mailto:K.S.Kang@iaea.org]
Sent: Tuesday, October 10, 2017 7:17 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>
Cc: KHAELSS, Martina <M.Khaelss@iaea.org>; KRIVANEK, Robert <R.Krivanek@iaea.org>; 4th PLiM Conference - Contact Point <4th-PLiM-Conference.Contact-Point@iaea.org>
Subject: [External_Sender] Harvesting of Aged Materials from Operating and Decommissioning Nuclear Power Plants

Dear Allen,

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

I think all of participants will be very interesting to this topic. But we have no time slot to present in oral session. Thus I recommend to arrange a side event to introduce this topic from 13:20 - 14:00 on 24, Oct (Tuesday) if you want.
We can arrange the meeting room for presentation and discussion. Please think about and let me know.

Ki- Sig KANG

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

Applying the United States License Renewal Approach to an International Environment

Allen L. Hiser, Jr.

U. S. Nuclear Regulatory Commission
Division of Materials and License Renewal
Washington, DC

Abstract. The approach used in the United States for license renewal (plant operation to 60 years) and subsequent license renewal (plant operation to 80 years) is implemented within a structured regulatory framework that includes regulatory process "essential elements" which are integrated to ensure continued safe plant operation. This integrated approach was evaluated by an International Atomic Energy Agency (IAEA) Integrated Regulatory Review Service mission in 2010, in part using the IAEA Periodic Safety Review for comparison. This mission identified only one suggestion related to license renewal: the NRC should incorporate lessons learned from Periodic Safety Reviews performed in other countries as an input to the NRC's assessment processes. For international regulatory frameworks that do not include these regulatory process "essential elements" or similar provisions, use of the license renewal approach followed in the United States may necessitate enhancement of the framework to include activities which achieve similar objectives, in order to ensure continued safe long term plant operation.

1. Background

In accordance with Section 103c of the Atomic Energy Act (AEA) of 1954, as amended, nuclear power plants in the United States are licensed to operate for a term not exceeding 40 years, and may be renewed for up to 20 years. The NRC's regulations related to renewal of operating licenses for nuclear power plants are provided in Part 54 of Title 10 of the Code of Federal Regulations (10 CFR Part 54), "Requirements for Renewal of Operating Licenses for Nuclear Power Plants" [1]. 10 CFR 54.31(b) specifies that licenses may be renewed for a specified period not to exceed 20 years, with the renewed license term not to exceed 40 years. In addition, 10 CFR 54.31(d) states that a renewed license may be subsequently renewed in accordance with all applicable requirements, with no explicit limit to the number of "subsequent" renewals for each license.

2. U.S. License Renewal Review Process

The license renewal review implemented in the U.S. is a "limited scope" review, that focuses on aging management of long-lived, passive structures and components in nuclear power plants, such as the reactor pressure vessel, steam generators, piping, seismic Category I structures, electrical cables and connections, among others. The scope of the license renewal review includes:

(1) safety-related systems, structures, and components (SSCs)

(2) all nonsafety-related SSCs whose failure could adversely impact functionality of safety-related SSCs

(3) all SSCs relied on in certain safety analyses or plant evaluations for specific NRC regulations.

This scope is generally consistent with IAEA safety guidance [2]. After in-scope SSCs have been identified, those structures and components (SCs) that are long-lived and passive are subject to aging management review (AMR). SCs that are not subject to AMR are those that are active, such that their failure will be identified during surveillance and testing in accordance with the Maintenance Rule of 10 CFR 50.65, or replaced on a fixed schedule.

The safety principles of the license renewal rule are:

(1) The ongoing regulatory process is adequate to ensure the safety of operating plants.

(2) The same plant operating rules apply during the renewal term (i.e., the plant current licensing basis (CLB) is to be maintained).

The combination of these principles means that plants are safe (or the CLB for each plant is adequate) and the regulatory framework in place will ensure that plants will continue to be safe, in part by ensuring that the plant CLB is maintained. The CLB includes the NRC requirements applicable to a specific plant; a licensee's written commitments for ensuring compliance with and operation within the applicable NRC requirements and the plant-specific design basis; orders; license conditions; exemptions; technical specifications; the plant-specific design-basis information documented in the most recent final safety analysis report, and the licensee's commitments remaining in effect that were made in docketed licensing correspondence such as responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.

The on-going regulatory process of NRC, and how it works to ensure plant safety, will be described in a later section.

To assist in the implementation of the license renewal rule and to provide assurance that the CLB of each plant will be maintained, the NRC has developed several documents to aid in effective and efficient evaluation of license renewal applications (LRAs). The Generic Aging Lessons Learned (GALL) Report (NUREG-1801) [3] provides generic evaluations of materials and environments to identify applicable aging effects and aging mechanisms, along with acceptable aging management approaches (e.g., aging management programs (AMPs)). Use of the GALL report by applicants and NRC staff facilitates NRC review of LRAs and provides for a stable review process, subject to findings such as emergent technical issues.

The "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," or SRP-LR (NUREG-1800) [4], provides guidance to the NRC staff reviewers in performing safety reviews of applications to renew nuclear power plant licenses in accordance with 10 CFR Part 54. The SRP-LR was developed to assure quality and uniformity of staff reviews and to present a well defined technical basis from which to evaluate a licensee's application. Availability of the SRP-LR aids in the transparency of NRC staff reviews of LRAs such that applicants can understand the types and detail of information needed by the staff in its reviews. The SRP-LR incorporates by reference the GALL Report.

Both the SRP-LR and the GALL Report were initially issued in 2001 and the last revision, Revision 2, was issued in 2011. Subsequent incremental changes to both the SRP-LR and the GALL Report have been implemented through the License Renewal Interim Staff Guidance (LR-ISG) process. A total of 10 LR-ISGs have been issued for Revision 2 of these documents, as listed on the NRC website.

Since 93 out of 99 operating units either have renewed licenses or have submitted LRAs, further full revisions of the SRP-LR and the GALL Report, e.g., Revision 3, will not be issued because of the limited number of plants that would use these reports.

With some plants in the U.S. approaching 50 years of operation, interest in extending licenses for a subsequent operating period to 80 years has been raised. To support subsequent license

renewal (SLR), the NRC has developed guidance documents analogous to those for license renewal, although they specifically address operating conditions to 80 years. The "Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report" (NUREG-2191) [5] provides acceptable methods to manage aging effects for 80 years of plant operation. The "Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants" (SRP-SLR) (NUREG-2192) [6] provides guidance to NRC staff reviewers to perform safety reviews of SLR applications.

A more detailed description of the U.S. license renewal process, which also applies to SLR, is provided in [7].

3. NRC On-going Regulatory Process

The NRC on-going regulatory process includes a number of activities. Foremost are the requirements in regulations at Part 50 of Title 10 of the U.S. Code of Federal Regulations (10 CFR Part 50) [8], which plants are obliged to meet at all times. In particular, the Maintenance Rule of 10 CFR 50.65, the Quality Assurance Program of Appendix B to 10 CFR Part 50, and the requirements of 10 CFR 50.55a, Codes and standards, provide the basic framework for aging management that apply from initial plant licensing.

The Maintenance Rule focuses on monitoring and testing activities to ensure that systems, structures and components are capable of performing their intended functions. The Quality Assurance Program requirements ensure that licensees programs meet quality standards and incorporate effective corrective actions on operating experience gained from their inspection and testing. 10 CFR 50.55a focuses on implementation of consensus industry standards, for inspection and testing as well as analysis of results to inform future inspections.

Other provisions to 10 CFR Part 50 that provide aging management functions include regulations related to fire protection (10 CFR 50.48), environmental qualification of electrical equipment (10 CFR 50.49), acceptance criteria for fracture prevention measures for light-water nuclear power reactors for normal operation (10 CFR 50.60), fracture toughness requirements for protection against pressurized thermal shock events (10 CFR 50.61), and alternate fracture toughness requirements (10 CFR 50.61a), fracture toughness requirements (Appendix G to 10 CFR Part 50), the reactor vessel materials surveillance program requirements (Appendix H to 10 CFR Part 50), and primary reactor containment leakage testing for water-cooled power reactors (Appendix J to 10 CFR Part 50).

Besides compliance with the regulations outlined above, other elements of the NRC regulatory process that provide a strong regulatory program to ensure safe plant operation include:

- Resident inspectors who are located on-site at each plant.
- Frequent inspections out of our regional offices to assess performance at each site, include such topics as plant security, emergency planning, radiation protection, environmental monitoring, and inservice inspection and testing.
- A daily assessment of plant events, both domestic and international.
- Safety issue resolutions for both generic issues and plant-specific issues.

In particular for materials aging and degradation issues that are important to safety, resolution of these issues can occur through a variety of approaches, including rule changes, generic communications, issuance of orders, and voluntary actions by plants themselves.

As described in [7], several other countries also utilize the U.S. license renewal process, in some cases as a combination with the periodic safety review (PSR) approach of SSG-25 [9]. All countries utilizing the U.S. approach should ensure that their regulatory framework achieves the same objectives as the U.S. on-going regulatory process essential elements outlined in this section.

4. Comparison with IAEA Long Term Operation Framework

The IAEA framework for aging management and long term operation (LTO) stems from Specific Safety Requirements No. SSR-2/2 Rev. 1 [10]. Requirement 14: Ageing Management specifies "The operating organization shall ensure that an effective ageing management programme is implemented to ensure that required safety functions of systems, structures and components are fulfilled over the entire operating lifetime of the plant." In addition, Requirement 16: Programme for long term operation states "Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

To implement these requirements, the IAEA has issued Specific Safety Guide No. SSG-25, entitled "Periodic Safety Review," [9] and (in publication) SSG-48, entitled "Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants" [2]. Supporting these SSGs are two Safety Reports and a Services Series report. One of the Safety Reports is Safety Reports Series No. SRS-82, entitled "Ageing Management for Nuclear Power Plants: International Generic Ageing Lessons Learned (IGALL)" [11].

The scope of license renewal review is nearly equivalent to that of the IAEA guidance [2]. The license renewal exclusion of active SCs from aging management review is consistent with a provision (paragraph 5.17) of [2]. In addition, paragraph 4.7 of [2] states "If national requirements do not require periodic safety review [in accordance with [2]], an alternative systematic comprehensive safety assessment that meets the objectives of the periodic safety review is recommended to be performed." The NRC on-going regulatory process activities described above represent the NRC activities that NRC contends are sufficient to meet the objectives of the PSR.

From the perspective of aging management, the elements of Chapter 5 of SSG-48 [2] are very consistent with the license renewal approach. Specifically, the scoping process (and screening of active SCs in license renewal), the aging management review (AMR), AMPs, and time limited aging analyses described in Chapter 5 of SSG-48 [2] match those of the license renewal process. Further, the AMR master table, AMPs, and TLAAs of SRS-82 are closely aligned with their counterparts in the GALL [3] and SRP-LR [4] reports.

5. IAEA International Regulatory Review Service Mission to U.S.

The IAEA conducted an Integrated Regulatory Review Service (IRRS) mission to the NRC in 2010. The purpose of this IRRS mission was to review the regulatory framework for safety of the operating nuclear power plants in the United States and the effectiveness of regulatory functions implemented by NRC. The review compared NRC standards against IAEA safety standards as the international benchmark for safety. The mission also provided exchange of information and experience between the IRRS Review Team and the U.S. counterparts in the areas covered by the IRRS mission. The IRRS mission also included Long-term Operation and Aging Management of nuclear power plants as a Regulatory Policy Issue for discussion.

The NRC prepared several documents for the IRRS that directly relate to license renewal [12]:

- Elective Policy Issue #2: Long-Term Operation and Aging Management of Nuclear Facilities [13]
- Module 11A: Periodic Safety Review [14]
- Module 11B: Feedback of Operating Experience [15]
- White Paper: U.S. Approach to Enhancing Safety [16]

Module 11A on periodic safety review (PSR) provided NRC's perspective on how the NRC achieves the objectives of IAEA SSG-25 [9], through its comprehensive set of regulations, inspections and safety review programs. As stated in the paper: "This paper presents an overview of the U.S. regulatory structure, salient features of the U.S. regulation consistent with the PSR approach, and a comparison between the safety factors in the PSR Safety Guide, and the comparable U.S. activities." From a self-assessment described in the paper, the NRC identified the need to review the findings from other PSRs more systematically to verify that international experience is fully evaluated for potential applicability to U.S. licensees. The IRRS mission report identified that the NRC has chosen an alternative approach to PSR, as described in paragraph 2.8 of SSG-25.

The IRRS mission identified the following Good Practices (GP) related to license renewal [17]:

- GP5: The NRC licensing process, and in particular the license renewal process is carried out in a very transparent manner, providing opportunities for hearing and public involvement. A number of meetings are held in the vicinity of the plants to provide the public with information on the license renewal process, solicit input on the environmental review, and to provide the results of the NRC's inspections.
- GP11: NRC has developed and implemented a robust operational experience feedback programme, including also guidance for safety enhancement and corrective actions recommended on the basis of lessons learned. The programme and a unique database are available for sharing experiences with all interested parties both nationally and internationally.
- GP12: NRC collects and documents unique generic lessons learned in U.S. from aging management, and is committed to continue to share them with nuclear community through the IAEA and other international channels as essential contribution to maintaining safety during long term operation of nuclear power plants.

In addition, the mission identified one suggestion related to license renewal [17], which is consistent with the NRC's self-assessment:

- S9: NRC should incorporate lessons learned from PSRs performed in other countries as an input to the NRC's assessment processes.

6. U.S. Participation in IAEA LTO Activities

The IAEA has many activities related to LTO, including the establishment of related IAEA Safety Standards, the International Generic Aging Lessons Learned (IGALL) program, Safety Aspects of Long Term Operation (SALTO) missions, and aging management and LTO workshops. The NRC has had strong participation in each of these activities, to support the sharing of technical information, operating experience, and perspectives on aging management and LTO.

From a recent perspective, the NRC has supported the development of SSG-48 [2], bringing its perspective and extensive experience basis on aging management and LTO review for consideration in the development of the standard.

For the IGALL program, the NRC has been a consistent contributor within the working groups and steering committee since the inception of the program. The initial development of the IGALL program was built upon the basis of the GALL Report, Revision 2, report, in particular the aging management review table (which describes materials, environments, aging effects and degradation mechanisms, and appropriate aging management programs) providing the starting point for the IGALL master table, and the GALL Report, Revision 2, AMPs. The influence of the GALL Report has continued in Phase 3 of the IGALL program, where the draft GALL-SLR document was used as one source of information in updating the IGALL master table, AMPs, and report. This participation has included serving as chairmen of working groups and subgroups, members of working groups and subgroups, and chairman of the steering committee.

The NRC has participated in numerous SALTO missions around the world, including reviews of mechanical components, and civil structures, using its technical knowledge from participation in the IGALL program and reviews of license renewal applications. Similarly, the NRC has participated in numerous aging management and LTO, for both international regulators and for plant operators.

7. Summary

The License Renewal Program in the U.S. is implemented within a larger on-going regulatory process with essential elements that ensures safe plant operation in all operating periods, from the initial 40 year operating period through operating periods with renewed licenses. The efficacy of the U.S. approach was validated through an IAEA IRRS mission, which identified several good practices and one suggestion.

Countries that rely on the U.S. license renewal approach should evaluate their overall regulatory framework to ensure that the functions of the U.S. on-going regulatory process essential elements are implemented within their framework, or consider enhancements to their framework.

References

1. UNITED STATES NUCLEAR REGULATORY COMMISSION, 10 CFR Part 54, Requirements for renewal of operating licenses for nuclear power plants, National Archives and Records Administration, USNRC (2017).
2. INTERNATIONAL ATOMIC ENERGY AGENCY, Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants, SSG-48 (to be published).
3. UNITED STATES NUCLEAR REGULATORY COMMISSION, Generic Aging Lessons Learned (GALL) Report, NUREG-1801, Revision 2, USNRC (2010).
4. UNITED STATES NUCLEAR REGULATORY COMMISSION, Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants, NUREG-1800, Revision 2, USNRC (2010).
5. UNITED STATES NUCLEAR REGULATORY COMMISSION, Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report, NUREG-2191, Vols. 1 and 2, USNRC (2017).

6. UNITED STATES NUCLEAR REGULATORY COMMISSION, Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants, NUREG-2192, USNRC (2017).
7. INTERNATIONAL ATOMIC ENERGY AGENCY, Approaches to Ageing Management in Member States: International Generic Ageing Lessons Learned (IGALL) Final Report, IAEA-TECDOC-1736 (2014).
8. UNITED STATES NUCLEAR REGULATORY COMMISSION, 10 CFR Part 50, Domestic licensing of production and utilization facilities, National Archives and Records Administration, USNRC (2017).
9. INTERNATIONAL ATOMIC ENERGY AGENCY, Periodic Safety Review for Nuclear Power Plants, SSG-25 (2013).
10. INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Power Plants: Commissioning and Operation, Specific Safety Requirements No. SSR-2/2, Revision 1 (2016).
11. INTERNATIONAL ATOMIC ENERGY AGENCY, Ageing Management for Nuclear Power Plants: International Generic Ageing Lessons Learned (IGALL), SRS-82 (2015).
12. UNITED STATES NUCLEAR REGULATORY COMMISSION, 2011 Integrated Regulatory Review Service Mission to the United States - Executive Summaries, USNRC, Agencywide Documents Access and Management System (ADAMS) Accession No. ML112510045 (2011).
13. UNITED STATES NUCLEAR REGULATORY COMMISSION, Elective Policy Issue # 2: Long-Term Operation and Aging Management of Nuclear Facilities, USNRC, ADAMS Accession No. ML112510163 (2011).
14. UNITED STATES NUCLEAR REGULATORY COMMISSION, Module 11A: Periodic Safety Review, USNRC, ADAMS Accession No. ML112510453 (2011).
15. UNITED STATES NUCLEAR REGULATORY COMMISSION, Module 11B: Feedback of Operating Experience, USNRC, ADAMS Accession No. ML112510459 (2011).
16. UNITED STATES NUCLEAR REGULATORY COMMISSION, White Paper: U.S. Approach to Enhancing Safety, USNRC, ADAMS Accession No. ML112510467 (2011).
17. INTERNATIONAL ATOMIC ENERGY AGENCY, Integrated Regulatory Review Service (IRRS) Report to the United States of America, IAEA-NS-IRRS-2010/02 (2010).

Assuring Safe Subsequent License Renewal for Commercial Nuclear Power Reactors in the USA

George A. Wilson

U. S. Nuclear Regulatory Commission
Division of Materials and License Renewal
Washington, DC

Abstract. Renewal of licenses for operating nuclear power plants in the United States is a mature, stable process, with 86 reactors possessing renewed licenses for operation to 60 years. Using the same regulatory process as initial license renewal, the U. S. Nuclear Regulatory Commission issued guidance documents to address subsequent license renewal, for plant operation to 80 years, in July 2017. Although the license renewal (and subsequent license renewal) review is a limited scope review that focuses on managing the effects of aging for long-lived, passive structures and components in nuclear power plants during the period of extended operation, the U. S. Nuclear Regulatory Commission has in place a number of regulatory programs (e.g., the analysis of the operating experience, the Reactor Oversight Process, the generic upgrades and regulatory changes, and the use of risk informed regulation) that are integrated to ensure safe plant operation at all stages, including the initial operating license period, the period of extend operation, and the subsequent period of extended operation. The combination of the existing on-going NRC regulatory processes with the detailed license renewal and subsequent license renewal reviews will continue to ensure safe plant operation through the 80 year operating period.

1. Background

In accordance with Section 103c of the Atomic Energy Act (AEA) of 1954, as amended, nuclear power plants in the United States are licensed to operate for a term not exceeding 40 years, and may be renewed. This original 40-year license term for reactor licenses was based on economic and antitrust considerations – not on limitations of nuclear technology.

The NRC's regulations related to renewal of operating licenses for nuclear power plants are provided in Part 54 of Title 10 of the Code of Federal Regulations (10 CFR Part 54). 10 CFR 54.31(b) specifies that licenses may be renewed for a specified period not to exceed 20 years, with the renewed license term not to exceed 40 years. In addition, 10 CFR 54.31(d) states that a renewed license may be subsequently renewed in accordance with all applicable requirements, with no explicit limit to the number of "subsequent" renewals for each license.

2. Assuring Plant Safety in the First 40 Years of Operation

From a regulatory perspective, plant safety is assured throughout the first 40 years of plant operation by an interrelated combination of regulations and guidance, licensing processes, oversight activities and consideration of operating experience, which provide for adequate protection of public health and safety at every point during the plant's life. The role of operating experience is a key element because it provides valuable information to adjust our oversight activities and, when necessary, to change regulations or requirements. This is accomplished as the issues are identified for both specific and generic plant activities.

Aging management begins during the plant design and construction phases, and is accomplished through a variety of means, within the context of our existing regulatory processes. Aging management is primarily accomplished through implementation of the NRC's regulations in Part 50 of Title 10 of the U.S. Code of Federal Regulations (10 CFR Part 50) [1]. In particular, the Maintenance Rule of 10 CFR 50.65, the Quality Assurance Program of Appendix B to 10 CFR Part 50, and the requirements of 10 CFR 50.55a, Codes and standards, provide the basic framework that assures adequate aging management for both active and passive components and structures.

The Maintenance Rule focuses on monitoring and testing activities to ensure that systems, structures and components are capable of performing their intended functions. The Quality Assurance Program requirements ensure that licensees programs meet quality standards and incorporate effective corrective actions on operating experience gained from their inspection and testing. 10 CFR 50.55a focuses on implementation of consensus industry standards, for inspection and testing as well as analysis of results to inform future inspections. Other provisions to 10 CFR Part 50 also provide aging management, such as the environmental qualification of electrical equipment (10 CFR 50.49) and the reactor vessel materials surveillance program requirements (Appendix H to 10 CFR Part 50).

There are other elements of our regulatory process that provide reasonable assurance of safe plant operation. These elements include:

- Resident inspectors who are located on-site at each plant.
- Frequent inspections out of our regional offices to assess performance at each site, include such topics as plant security, emergency planning, radiation protection, environmental monitoring, and inservice inspection and testing.
- A daily assessment of plant events, both domestic and international.
- Safety issue resolutions for both generic issues and plant-specific issues.

In particular for materials aging and degradation issues that are important to safety, resolution of these issues can occur through a variety of approaches, including rule changes, generic communications, issuance of orders, and voluntary plant actions.

3. Assuring Plant Safety from 40 to 60 Years - License Renewal Review and Guidance

Plant safety in the operating period from 40 to 60 years follows the same processes and framework identified previously for the first 40 years, with the exception that additional aging management is implemented for operation beyond 40 years. The requirements to identify and implement the additional aging management are established through development of a specific regulation for license renewal, 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants" [2]. The NRC licensing process ensures the implementation of both generic and plant-specific aging management programs (AMPs) that include operating experience to ensure components continue to perform their intended functions. The NRC's inspection programs verify licensee implementation of the aging management programs.

The scope of license renewal includes (1) safety-related systems, structures, and components (SSCs); (2) all nonsafety-related SSCs whose failure could adversely impact functionality of safety-related SSCs; and (3) all SSCs relied on in certain safety analyses or plant evaluations for specific NRC regulations. After in-scope SSCs have been identified, those structures and components (SCs) that long-lived and passive, such as the reactor pressure vessel, steam generators, piping, seismic Category I structures, electrical cables and connections, among others, are subject to aging management review (AMR). SCs that are not subject to AMR are those that are active, such that their failure will be identified during surveillance and testing in accordance with the Maintenance Rule, or replaced on a fixed schedule.

The fundamental premise of the License Renewal Rule, provided at 10 CFR Part 54, is that the current licensing basis (CLB) for plants is adequate to ensure the safety of operating plants. In this case the CLB includes the NRC requirements applicable to a specific plant; a licensee's written commitments for ensuring compliance with and operation within the applicable NRC requirements and the plant-specific design basis; orders; license conditions;

exemptions; technical specifications; the plant-specific design-basis information documented in the most recent final safety analysis report, and the licensee's commitments remaining in effect that were made in docketed licensing correspondence such as responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.

A basic aspect of the License Renewal Rule is a licensee's integrated plant assessment that demonstrates that the SCs requiring AMR have been identified and the effects of aging on their functionality will be managed in order to maintain the CLB such that there is an acceptable level of safety during the period of extended operation from 40 to 60 years. License renewal also involves applicant consideration of time-limited aging analyses (TLAAs), which are those licensee calculations and analyses in the CLB for the SSCs within the scope of license renewal. Each application must include a supplement to the environmental report that complies with the requirements of Subpart A of 10 CFR Part 51 [3].

The NRC has developed several documents to aid in effective and efficient evaluation of license renewal applications (LRAs). The Generic Aging Lessons Learned (GALL) Report (NUREG-1801) [4] provides generic evaluations of materials and environments to identify applicable aging effects and aging mechanisms, along with acceptable aging management approaches (e.g., AMPs). Use of the GALL Report by applicants and NRC staff facilitates NRC review of LRAs and provides for a stable review process, subject to findings such as emergent technical issues.

The "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," or SRP-LR (NUREG-1800) [5], provides guidance to the NRC staff reviewers in performing safety reviews of applications to renew nuclear power plant licenses in accordance with 10 CFR Part 54. The SRP-LR was developed to assure quality and uniformity of staff reviews and to present a well defined technical basis from which to evaluate a licensee's application. Availability of the SRP-LR aids in the transparency of NRC staff reviews of LRAs such that applicants can understand the types and detail of information needed by the staff in its reviews. The SRP-LR incorporates by reference the GALL Report.

Both the SRP-LR and the GALL Report were initially issued in 2001 and the last revision, Revision 2, was issued in 2011. Subsequent changes to both the SRP-LR and the GALL Report have been implemented through the License Renewal Interim Staff Guidance (LR-ISG) process, wherein incremental changes are made to these documents. A total of 10 LR-ISGs have been issued for Revision 2 of these documents, as listed on the NRC website.

It should be noted that further full revisions of the SRP-LR and the GALL Report, e.g., Revision 3, will not be issued because of the limited number of plants that would use these reports.

A more detailed description of the license renewal process is provided in TECDOC-1736 [6].

4. Assuring Plant Safety from 40 to 60 Years - Subsequent License Renewal

With the maturity of license renewal, utilities have expressed an interest in renewing their licenses for an additional 20 years. This is called "subsequent license renewal," or SLR, consistent with the terminology of 10 CFR 54.31(d). The Commission has stated that the license renewal rule has provided an effective basis for ensuring safe operation during the license renewal period and will continue to be an effective basis for SLR. Thus the process for SLR is the same as that for license renewal. Consistent with the license renewal rule, the focus

of SLR is on the adequacy of additional aging management activities to ensure safe plant operation during the subsequent period of extended operation.

To support SLR, the NRC has developed guidance documents analogous to those for license renewal, although they specifically address operating conditions to 80 years. The "Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report" (NUREG-2191) [7] provides acceptable methods to manage aging effects for 80 years of plant operation. The "Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants" (SRP-SLR) (NUREG-2192) [8] provides guidance to NRC staff reviewers to perform safety reviews of SLR applications.

Revisions of the license renewal guidance documents have focused on operating experience, specifically the lessons learned and findings from these events. Because plants have operated for less than 50 years, other information beyond an exclusive reliance on operating experience was used to identify and address the aging concerns for the operating period up to 80 years.

In 2014, the NRC Office of Nuclear Regulatory Research, in collaboration with the U.S. Department of Energy, published the five volume "Expanded Materials Degradation Assessment," known as the EMDA [9]. This study covered 80 years of operation and systems, structures, and components, including core internals, piping systems, the reactor pressure vessel (RPV), electrical cables, and concrete and civil structures. The EMDA used the phenomena identification and ranking table, the PIRT approach, wherein an expert panel is convened to rank potential degradation scenarios according to their judgment of susceptibility and current state of knowledge.

At the invitation of Constellation Energy and Duke Energy, NRC staff conducted "AMP Effectiveness Audits" at three plants that were operating in their period of extended operation. The purpose of these information collection audits was to understand how their AMPs have been implemented and how effective their AMPs were in identifying aging and unexpected aging phenomena. The findings from these audits were used with information from other sources to inform the AMPs for subsequent license renewal.

The staff also searched international and national operating experience databases for age-related operating experience since the last revision of the license renewal guidance in 2011. In addition, comments from stakeholders were collected during public meetings and a public comment period, as well as comments from the staff.

To develop the SLR guidance document, the NRC created ninety-seven internal expert panels to review and disposition the comments and issues. These panels started with the Revision 2 versions of the GALL Report and the SRP-LR that were developed for license renewal. The panels then reviewed and deliberated on the information provided by the sources identified above. Draft SLR guidance documents (the GALL-SLR Report and the SRP-SLR) were then made available for public comment. Subsequently, the staff held public meetings to provide interested stakeholders information on the disposition of the expert panels and to solicit stakeholder comments. The SRP-SLR and GALL-SLR Report were issued as final documents in July 2017.

5. Status of License Renewal and Subsequent License Renewal

As of the September 2017, licenses have been renewed for a total of 89 nuclear power plant units in the U.S., with 86 units out of a population of 99 units operating with renewed licenses. An additional 7 units have applications under review and 4 units have stated an

intent to apply for license renewal between 2020 and 2022. Forty-seven units will be in the operating period beyond 40 years by the end of 2017.

The U.S. nuclear industry has expressed intent to apply for subsequent license renewal, to enable plant operation to 80 years. These include one application by the end of 2017, and one application each in 2018 and 2019.

6. Technical Issues for Subsequent License Renewal

Based on various workshops, evaluations and public discussion, there has been a consensus that the top four technical issues to provide assurance of safe operation of nuclear power plants for operation from 60 to 80 years are:

- Neutron embrittlement of the reactor pressure vessel
  - Confirm predictive methods using operating experience and
  - Assess embrittlement at higher fluence levels
- Stress corrosion cracking and other types of degradation of reactor pressure vessel internals
  - Evaluate impacts of irradiation assisted stress corrosion cracking, loss of fracture toughness, and void swelling
  - Test materials at higher fluence levels
- Concrete and containment degradation to
  - Evaluate effects of alkali-silica reaction on structural performance of concrete
  - Confirm structural integrity for susceptible plant configurations
- Electrical cable qualification and condition monitoring to
  - Evaluate effects of gamma radiation and thermal exposure in low voltage cables
  - Confirm assessment of medium voltage cable submergence qualification

It is industry's responsibility to develop the technical basis for long-term operation. Lacking resolution of these issues on a generic basis, the first SLR applications will need to address each of these issues on a plant-specific basis as necessary. Once generic resolutions of these topics are identified, the NRC will implement the technical resolutions into the SLR process.

The NRC Office of Nuclear Regulatory Research is collaborating on research activities to address these topics with both domestic industry organizations (i.e., Electric Power Research Institute (EPRI), Nuclear Energy Institute (NEI)) as well as international partners.

7. Conclusions

The NRC's License Renewal Program has successfully evaluated and renewed licenses for more than 80% of the fleet of operating nuclear power plants in the United States. These reviews have focused on ensuring that licensees have adequate aging management in place to ensure safe plant operation during the period of extended operation to 60 years. The limited focus review of license renewal is supported by many other activities in the NRC's on-going regulatory process, including some essential elements identified previously.

With the development of guidance documents for subsequent license renewal, the U. S. Nuclear Regulatory Commission is positioned to review SLR applications, subject to plant-specific consideration of certain technical issues. In conjunctions with the on-going regulatory process, this will ensure safe plant during the subsequent period of extended operation, out to a possible 80 years of operating time.

References

1. UNITED STATES NUCLEAR REGULATORY COMMISSION, 10 CFR Part 50, Domestic licensing of production and utilization facilities, National Archives and Records Administration, USNRC, 2017.
2. UNITED STATES NUCLEAR REGULATORY COMMISSION, 10 CFR Part 54, Requirements for renewal of operating licenses for nuclear power plants, National Archives and Records Administration, USNRC, 2017.
3. UNITED STATES NUCLEAR REGULATORY COMMISSION, subpart A of 10 CFR Part 51, National Environmental Policy Act—Regulations Implementing Section 102(2), National Archives and Records Administration, USNRC, 2012.
4. UNITED STATES NUCLEAR REGULATORY COMMISSION, Generic Aging Lessons Learned (GALL) Report, NUREG-1801, Revision 2, USNRC, December 2010.
5. UNITED STATES NUCLEAR REGULATORY COMMISSION, Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants, NUREG-1800, Revision 2, USNRC, December 2010.
6. "Approaches to Ageing Management in Member States: International Generic Ageing Lessons Learned (IGALL) Final Report," IAEA-TECDOC-1736, 2014.
7. UNITED STATES NUCLEAR REGULATORY COMMISSION, Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report, NUREG-2191, Vols. 1 and 2, USNRC, July 2017.
8. UNITED STATES NUCLEAR REGULATORY COMMISSION, Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants, NUREG-2192, USNRC, July 2017.
9. UNITED STATES NUCLEAR REGULATORY COMMISSION, Expanded Materials Degradation Assessment (EMDA), NUREG/CR-7153, Volume 1-5, USNRC, October 2014.

From: Hiser, Matthew
Sent: Fri, 29 Jan 2016 19:07:56 +0000
To: Frankl, Istvan
Cc: Hull, Amy
Subject: RE: Harvesting One Pager

Hi Steve,

That sounds good to me. I also would have no problem with Aloysius taking over GSI-191 as well. It matches his background in CSGB well. At this point, it has mostly been supporting NRR as requested on reviewing submittals with the support of our chemical effects expert.

I am [redacted] and my calendar should be up to date for next week.

(b)(6)

Thanks!
Matt

From: Frankl, Istvan
Sent: Friday, January 29, 2016 12:53 PM
To: Hiser, Matthew
Cc: Hull, Amy
Subject: RE: Harvesting One Pager

Thanks, Matt.

I implemented your clarifications in the attachment.

I will schedule meeting with Aloysius and you for early next week to discuss this assignment. I am also thinking about reassigning the GSI-191 effort to him. Any thoughts on this?

Steve

From: Hiser, Matthew
Sent: Friday, January 29, 2016 12:16 PM
To: Frankl, Istvan
Cc: Hull, Amy
Subject: RE: Harvesting One Pager

Hi Steve,

OK, I accepted your revisions (attached). To answer your questions:

1. What is the status of UNR?
    a. As far as I know, Amy has had some limited discussion with DLR staff and management and they support this effort and would like to put in UNR. I don't think there has been much more progress made on that front, which is something that Aloysius could hopefully lead.
2. Is this a different UNR, or the new one?

a. I was referring to the same one as above. There are already UNRs for RES support for SLR, so whether it is "updating" those old ones or creating a "new" UNR from scratch is not much different in my mind.

Thanks!
Matt

From: Frankl, Istvan
Sent: Friday, January 29, 2016 12:00 PM
To: Hiser, Matthew
Cc: Hull, Amy
Subject: RE: Harvesting One Pager

Thanks, Matt.

Nice one-pager.

I have a few comments and revisions. Please see the attachment for details.

Thanks,

Steve

From: Hiser, Matthew
Sent: Friday, January 29, 2016 10:05 AM
To: Frankl, Istvan; Hull, Amy
Subject: Harvesting One Pager

Hi Steve and Amy,

Please find attached the one-pager on the harvesting project to help facilitate transition with Aloysius.

Thanks!
Matt

From: Hiser, Matthew
Sent: Fri, 29 Jan 2016 17:16:14 +0000
To: Frankl, Istvan
Cc: Hull, Amy
Subject: RE: Harvesting One Pager
Attachments: Harvesting One Pager.docx

Note to requester: Attachment is immediately following.

Hi Steve,

OK, I accepted your revisions (attached). To answer your questions:

1. What is the status of UNR?
    a. As far as I know, Amy has had some limited discussion with DLR staff and management and they support this effort and would like to put in UNR. I don't think there has been much more progress made on that front, which is something that Aloysius could hopefully lead.
2. Is this a different UNR, or the new one?
    a. I was referring to the same one as above. There are already UNRs for RES support for SLR, so whether it is "updating" those old ones or creating a "new" UNR from scratch is not much different in my mind.

Thanks!
Matt

From: Frankl, Istvan
Sent: Friday, January 29, 2016 12:00 PM
To: Hiser, Matthew
Cc: Hull, Amy
Subject: RE: Harvesting One Pager

Thanks, Matt.

Nice one-pager.

I have a few comments and revisions. Please see the attachment for details.

Thanks,

Steve

From: Hiser, Matthew
Sent: Friday, January 29, 2016 10:05 AM
To: Frankl, Istvan; Hull, Amy
Subject: Harvesting One Pager

Hi Steve and Amy,

Please find attached the one-pager on the harvesting project to help facilitate transition with Aloysius.

Thanks!
Matt

Strategic Approach to Ex-Plant Harvesting (1/29/2016)

Background

- Understanding the causes and control of degradation mechanisms forms the basis for developing aging management programs (AMPs) to ensure the functionality and safety margins of NPP systems, structures, and components (SSC). The resolution to these issues should provide reasonable assurance of safe operation of the components in the scope of license renewal during the subsequent period of extended operation.
- In many cases, the scientific basis for understanding and predicting long-term environmental degradation behavior of materials in NPPs is incomplete. A strategic approach to the harvesting, examination and testing of materials and components from decommissioned reactors can dramatically increase our knowledge-acquisition rate in this very important area.
- This project is to develop a strategic approach to ex-plant harvesting and was originally conceived and initiated through the NRC's Long-Term Research Program (LTRP).

Facts

- A new task order (NRC-HQ-60-15-T-0023) was placed with the Pacific Northwest National Lab (PNNL) Enterprise Wide Agreement (NRC-HQ-25-14-D-0001) in September 2015 to support NRC in developing a strategic approach to ex-plant harvesting. Task 1 focuses on a scoping study to pull in information from other sources (EMDA, GALL, ASME code, etc.) to populate an information tool that will allow the prioritization of harvesting opportunities.
- An internal NRC working group consisting of staff from RES and NRR was formed to advise the strategic harvesting effort.
- NRR/DLR staff and management have expressed strong support and interest in this project and intend to develop a user need request (UNR) to support this effort in the context of Subsequent License Renewal (SLR).

Status

- Under Task 1 of the task order, PNNL is currently working on developing examples for dissimilar metal welds and cables of what type of information will be captured and how it will be presented.
- The working group has met once in December and has another meeting scheduled for February to review some information put together by PNNL.

Next Steps

- By mid-February, PNNL should provide examples for dissimilar metal welds and cables in the information tool. This will allow NRC (likely through the working group) to review what type of information will be captured and how it will be presented.
- NRC staff should work with PNNL to organize a public workshop to discuss the topic of ex-plant harvesting and engage relevant stakeholders, particularly EPRI, industry, and DOE that can help provide information and cooperation in these efforts.
- RES staff should work with NRR staff to develop an updated UNR incorporating this strategic harvesting effort.

From: Hiser, Allen
Sent: Mon, 23 Oct 2017 07:02:32 -0600
To: Hiser, Matthew;Tregoning, Robert
Subject: RE: Harvesting Poster

All's well . . .

-------- Original Message --------
From: "Hiser, Matthew" <Matthew.Hiser@nrc.gov>
Date: Mon, October 23, 2017 3:00 PM +0200
To: "Hiser, Allen" <Allen.Hiser@nrc.gov>, "Tregoning, Robert" <Robert.Tregoning@nrc.gov>
Subject: RE: Harvesting Poster

They should be the same ones I sent to IAEA…

About the poster, I followed the size requirement – didn't catch until just now that it was supposed to be portrait orientation…. Oops!

http://www-pub.iaea.org/MTCD/Meetings/PDFplus/2017/cn246/cn246PosterGuidelines.pdf

---

From: Hiser, Allen
Sent: Monday, October 23, 2017 8:54 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Harvesting Poster

Poster arrived in good condition. Poster space was 1 meter wide, but there was an internal corner bay "next door" that I could utilize.

Hopefully the slides I am prepared for are the same ones IAEA has! 😂

-------- Original Message --------
From: "Hiser, Matthew" <Matthew.Hiser@nrc.gov>
Date: Mon, October 23, 2017 2:45 PM +0200
To: "Tregoning, Robert" <Robert.Tregoning@nrc.gov>, "Hiser, Allen" <Allen.Hiser@nrc.gov>
Subject: RE: Harvesting Poster

Here's the latest version of the paper (at division level management for approval).

I also attached the slides, which I had sent a couple weeks back.

Did the poster make it to the hotel?

Thanks for presenting and good luck!

Matt

From: Tregoning, Robert
Sent: Monday, October 23, 2017 8:41 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Poster

Allen:

Do you have the final presentation and latest version of the paper? I'll ask Matt to send you the latest version just in case. Then you can peruse the paper for some additional information. Thanks again for covering……

RT

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

From: Hiser, Allen
Sent: Monday, October 23, 2017 8:38 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting Poster
Importance: High

FYI - The poster presentation has gone from lunchtime to in-session in 1.5 hours due to a cancellation.

Any last minute thoughts to convey?

From: Tregoning, Robert
Sent: Mon, 23 Oct 2017 06:55:50 -0600
To: Hiser, Matthew
Subject: RE: Harvesting Poster

Thanks matt for closing the loop on this; I didn't think I had the latest version of the paper to send….

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, October 23, 2017 8:45 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>
Subject: RE: Harvesting Poster

Here's the latest version of the paper (at division level management for approval).

I also attached the slides, which I had sent a couple weeks back.

Did the poster make it to the hotel?

Thanks for presenting and good luck!

Matt

From: Tregoning, Robert
Sent: Monday, October 23, 2017 8:41 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Poster

Allen:

Do you have the final presentation and latest version of the paper? I'll ask Matt to send you the latest version just in case. Then you can peruse the paper for some additional information. Thanks again for covering……

RT

Robert Tregoning
Technical Advisor for Materials

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

From: Hiser, Allen
Sent: Monday, October 23, 2017 8:38 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting Poster
Importance: High

FYI - The poster presentation has gone from lunchtime to in-session in 1.5 hours due to a cancellation.

Any last minute thoughts to convey?

From: Frankl, Istvan
Sent: Tue, 26 Sep 2017 11:44:21 -0400
To: Moyer, Carol
Cc: Hull, Amy;Hiser, Matthew
Subject: RE: Harvesting poster abstract

Thanks, Carol.

The proposal for the poster looks good. I will pass it along to the TA.

Steve

From: Moyer, Carol
Sent: Tuesday, September 26, 2017 7:52 AM
To: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Cc: Hull, Amy <Amy.Hull@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting poster abstract

Steve,

The attached abstract is for a RIC poster on harvesting. Please edit it, if necessary.

I am planning to go to the Standards Forum this morning, so if this needs changes, please feel free to make them.

At the Standards Forum, I will mention that we are starting to look at standards for AM, including having participated in an ANSI collaborative program kick-off. I will not specifically "plug" the public meeting that we are planning for this fall, since we do not have full management buy-in on that just yet.

Carol

From: Hiser, Allen
Sent: Mon, 23 Oct 2017 13:28:14 -0600
To: Tregoning, Robert;Hiser, Matthew
Subject: RE: Harvesting Poster

Yep, I knew most of the "facts", but I was not going to share that in a later discussion with an IAEA staffer from Japan!

From: Tregoning, Robert
Sent: Monday, October 23, 2017 3:26 PM
To: Hiser, Allen <Allen.Hiser@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Poster

Thanks for feedback Allen and once again for covering the presentation for us.

Just FYI, we did consider the Japanese effort a few years ago but the driver behind that program was basically the Japanese industry and government looking to get funding out of a decommissioning plant without considering whether the materials in the plant had any real worth w.r.t. outstanding technical issues. Also, cloaking this effort as an IAEA-CRP, at least in the US, was viewed negatively because it didn't appear that IAEA was adding any substantive value and would only add to the cost of such an effort. The outcome of that "effort" was to make it clear that the Japanese should pursue any harvesting partners directly, outside of IAEA. Not surprisingly, nothing else came of the activity when it became apparent that countries were not going to line up to hand out money for something so ill-defined. In fact, it was, in part, the abject failure of this particle effort that made it apparent that we needed a better strategy related to harvesting and not what we've done in the past which is to just grab stuff from plants that present themselves as "opportunity targets". Note that my bias and cynicism has been added to the summary of this effort.

Cheers,

Rob

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

From: Hiser, Allen
Sent: Monday, October 23, 2017 2:42 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Harvesting Poster

The presentation went OK.

The session was scheduled to end at 5:40 but I didn't start until 5:55 and ended at about 6:15. I am not sure of how they managed to get so far behind, since I had a GALL/GALL-SLR paper in a different session at the same time.

The only substantive comment was a question about whether we had considered the Japanese effort a few years ago that was cloaked in an IAEA CRP. My response was that we prefer multilateral collaborations. I said that I would pass the comment on – here it is.

Allen

From: Hiser, Matthew
Sent: Monday, October 23, 2017 9:01 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Harvesting Poster

They should be the same ones I sent to IAEA…

About the poster, I followed the size requirement – didn't catch until just now that it was supposed to be portrait orientation…. Oops!

http://www-pub.iaea.org/MTCD/Meetings/PDFplus/2017/cn246/cn246PosterGuidelines.pdf

---

From: Hiser, Allen
Sent: Monday, October 23, 2017 8:54 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Harvesting Poster

Poster arrived in good condition. Poster space was 1 meter wide, but there was an internal corner bay "next door" that I could utilize.

Hopefully the slides I am prepared for are the same ones IAEA has! 😊

-------- Original Message --------
From: "Hiser, Matthew" <Matthew.Hiser@nrc.gov>
Date: Mon, October 23, 2017 2:45 PM +0200
To: "Tregoning, Robert" <Robert.Tregoning@nrc.gov>, "Hiser, Allen" <Allen.Hiser@nrc.gov>
Subject: RE: Harvesting Poster

Here's the latest version of the paper (at division level management for approval).

I also attached the slides, which I had sent a couple weeks back.

Did the poster make it to the hotel?

Thanks for presenting and good luck!

Matt

From: Tregoning, Robert
Sent: Monday, October 23, 2017 8:41 AM
To: Hiser, Allen <Allen.Hiser@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Poster

Allen:

Do you have the final presentation and latest version of the paper? I'll ask Matt to send you the latest version just in case. Then you can peruse the paper for some additional information. Thanks again for covering……

RT

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

From: Hiser, Allen
Sent: Monday, October 23, 2017 8:38 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting Poster
Importance: High

FYI - The poster presentation has gone from lunchtime to in-session in 1.5 hours due to a cancellation.

Any last minute thoughts to convey?

From: Hiser, Matthew
Sent: Wed, 5 Sep 2018 17:59:15 +0000
To: Tregoning, Robert;Purtscher, Patrick;Audrain, Margaret
Subject: RE: harvesting presentation for NRC/NRA meeting

Yeah, I just looked back – there was no second sub-bullet there on the first version of what we sent you. Somehow I managed to add that second sub-bullet when I was adding the slide on the workshop… I don't think there was any burning point there I was trying to add

---

From: Tregoning, Robert
Sent: Wednesday, September 05, 2018 1:53 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: RE: harvesting presentation for NRC/NRA meeting

I might add something there but just wanted to see if there was a burning point that you guys were meaning to make….

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, September 05, 2018 1:15 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: RE: harvesting presentation for NRC/NRA meeting

I would just delete that second sub-bullet, I think the first bullet covers the thought we were trying to convey…

Thanks!
Matt

From: Purtscher, Patrick
Sent: Wednesday, September 05, 2018 11:07 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: RE: harvesting presentation for NRC/NRA meeting

You could consider replacing "Developing" with " Proposing new protocol for harvesting"?

Pat

From: Tregoning, Robert
Sent: Wednesday, September 05, 2018 10:56 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: harvesting presentation for NRC/NRA meeting

Guys:

Slide 6, 2nd sub-bullet of first bullet just says "Developing". What point did you want to articulate here?

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: Wed, 5 Sep 2018 18:53:03 +0000
To: Sircar, Madhumita
Subject: RE: Harvesting Prioritization Follow-up

Sure ☺

From: Sircar, Madhumita
Sent: Wednesday, September 05, 2018 2:53 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Prioritization Follow-up

Matt,
Can we move this meeting to Monday, Sep 10th?
Thanks,
Mita

-----Original Appointment-----
From: Hiser, Matthew
Sent: Tuesday, August 21, 2018 10:14 AM
To: Hiser, Matthew; Sircar, Madhumita
Subject: Harvesting Prioritization Follow-up
When: Thursday, September 06, 2018 11:00 AM-11:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-10A73-8p

Note to requester: The attachments are immediately following.

From: Hiser, Matthew
Sent: Fri, 14 Sep 2018 18:09:23 +0000
To: Kirk, Mark
Cc: Gordon, Matthew;Tregoning, Robert;Raynaud, Patrick
Subject: RE: Harvesting prioritization for RPV
Attachments: Copy of Harvesting Needs Prioritization 8-31-18 rlt.xlsx, Harvesting Needs Prioritization 8-31-18 [+MTK].xlsx

Hi Mark,

Thank you for taking a look at this prioritization and providing your input. I took a look at this for the sake of consistency with how we've done the ranking in other areas (not that it will ever be perfect, but just a high-level look). I had a couple comments / questions that stood out to me:

1. For the "regulatory considerations" field, you didn't put a ranking and indicated RPV embrittlement isn't (and realistically can't be) inspected for. For that field, we're thinking about the context for regulating the relevant component. In many instances, it is inspections. (For example, if there is no good way to inspect a component, we'd probably rate it high for harvesting since we need to have high confidence in how it will behave if we can't inspect for flaws.) However, for the RPV, although it isn't directly inspected, the use of surveillance specimens is a critical aging management activity that provides confidence in the material performance during extended operations. That, along with specific considerations for 80 years (how well will surveillance specimens be able to address higher fluences?), would be what I would focus on for that criteria. In my mind, that's probably driving you to a M or ML given the surveillance specimens, but that's from a non-RPV expert perspective.
2. For the second row on comparing Charpy to direct measurement approaches, you've got a MH for the importance of harvested materials over lab aging. Do you really have to have harvested materials in order to compare the Charpy and direct measurement approaches? That seems to me like something that doesn't really have to be done with harvested materials, but could be accomplished through a test reactor irradiation as well. But maybe there's a good reason it would need to be from real ex-plant materials.

(b)(6)

I also received some input from Rob, which I wanted to share with this group for consideration and consolidation with Mark's input. I know Rob and Patrick are [redacted] so this might take a little while to get everyone's thoughts incorporated, but appreciate your efforts to give us your input. Hopefully with everyone back the week after next we can finalize this for RES.
Thanks!
Matt

From: Kirk, Mark
Sent: Monday, September 10, 2018 9:28 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Gordon, Matthew <Matthew.Gordon@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Raynaud, Patrick <Patrick.Raynaud@nrc.gov>
Subject: Re: Harvesting prioritization for RPV

Matt -

See attached. I added some explanations for my ranking, although they may be somewhat cryptic.

Let me know if you need more explanation.

mark

From: Hiser, Matthew
Sent: Monday, September 10, 2018 8:40 AM
To: Kirk, Mark
Subject: RE: Harvesting prioritization for RPV

Thanks Mark!

From: Kirk, Mark
Sent: Monday, September 10, 2018 8:36 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Gordon, Matthew <Matthew.Gordon@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: Re: Harvesting prioritization for RPV

Matt -

Thanks for the reminder. This fell off of my radar. I will reply later today.

mark

From: Hiser, Matthew
Sent: Monday, September 10, 2018 7:27 AM
To: Kirk, Mark; Gordon, Matthew; Tregoning, Robert
Cc: Purtscher, Patrick; Audrain, Margaret
Subject: RE: Harvesting prioritization for RPV

Hi guys,

I just wanted to follow up on this earlier email to see if you have had the opportunity to take a look at this. Ideally we'd like to have something to compile with the other areas by the end of this week.

Thanks!
Matt

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

From: Hiser, Matthew
Sent: Friday, August 31, 2018 9:36 AM
To: Kirk, Mark <Mark.Kirk@nrc.gov>; Gordon, Matthew <Matthew.Gordon@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: RE: Harvesting prioritization for RPV

I should also say, please feel free to add or subtract from the rows (ie propose new or eliminate from consideration certain RPV harvesting needs) and to provide feedback (edits, comments, etc.) on the criteria and the guidance to use the criteria.

Thanks!
Matt

From: Hiser, Matthew
Sent: Friday, August 31, 2018 9:33 AM
To: Kirk, Mark <Mark.Kirk@nrc.gov>; Gordon, Matthew <Matthew.Gordon@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: Harvesting prioritization for RPV

Hi Mark, Matt, and Rob,

We would like to request your input as the RPV technical experts on the prioritization of harvesting opportunities for RPV materials. I have attached a template of the prioritization of harvesting needs in the non-RPV metals area. Can you follow that template (check the scoring guidance on the first sheet) to provide input for the RPV technical area?

Ideally, it would be good if we could receive your input in the next two weeks by September 14. We're hoping to pull all of the input from the different areas into a broader harvesting draft deliverable to share with NRR for feedback by October.

Please 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

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

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Technical Priority			Timeliness of results	Availability of materials for harvesting
RPV			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
RPV - High fluence & high shift vessel with well-established unirradiated properties	Measure fluence, toughness, & chemistry as a function of through-thickness position	Through thickness section to validate fluence & attenuation models	M	This work has been done before but the additional work should focus on higer fluences to verify that the attenuation trends expected are maintained.	MH	There are not many studies that irradiate 6 to 9 inches of steel so, from that standpoint, getting specimens from an RPV are important for studying attenuation	M	While the information should be generically appricable, if, for some reason, the results are only applicable to "high fluence" materials/locations, this might result in less relevance to lower fluence plants (including BWRs).	ML	The attenuation models have the least amount of supporting information compared to other aspects related to RPV embrittlement. However, studies to date have validated the conservativism of existing atttenuation models used in regulatory applications.	M	The attenuation study is slightly more important to me, just because there are fewer such studies that have been done. Being able to confirm expected trends at higher fluence levels would therefore be useful.	MH	Material is irradiated which will affect all aspects of specimen preparation and testing. Further, taking specimens at several through-thickness locations will increase cost.	The results would be timely if they are developed before 2024 or so to coincide with the additional information being collected from industry surviellance programs.	Other than Zion materials, I'm not aware of other RPVs that are available for harvesting.
RPV - Samples from virtually any vessel	Enable measurement of both the Charpy transition curve and master curve transition temperature T0	Provides data supporting evolution from the use of correlative (Charpy-based) to direct measurement (fracture toughness-based) approaches	M	enough data has been developed from both test and surveillance specimens such	ML	my mind for having vessel material for this study is that there are no questions about the representativeness of any	MH	Any information developed should be generically applicable	ML	confidence in RPV embrittlement than virtually any other degradation that we study. The only real issue is making sure that	M - ML	While it's always useful to have more data, especially on RPV materials, I feel that our models already have a good technical basis.	MH	Material is irradiated which will affect all aspects of specimen preparation and testing.	would be timely if they are developed before 2024 or so to coincide	materials, I'm not aware of other RPVs that are available for harvesting.

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

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Priority			Timeliness of results	Availability of materials for harvesting
ELECTRICAL			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
Low and medium voltage cables																
Cables protected with fire retardant coating																
1E MOVs from harsh and mild environments																
1E Air operated valves; 4160 1E breakers																
1E Molded case breakers 480V, 250V DC, 125 VDC,																
1E Relays from mild environment GE – HFA, Agastat timing relays, any from Westinghouse, Potter Brumfield, Stuthers Dunn etc.,																
Batteries																
Electrical penetrations																
Fire research interest																
Electrical enclosures																
Distribution: switchgear, MCCs, LCs | Control: Horseshoe, SSCP, ASP, etc.																

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Priority			Timeliness of results	Availability of materials for harvesting
CONCRETE			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
Structures exposed to high radiation																
Post-tensioned structures																
Corrosion of reinforcing steel, tendon, liner, embedment																
Spent fuel pool and transfer canal-boric acid attack on concrete in PWRs																
Alkali Aggregate Reaction																
Large structural sections for testing																

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

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Technical Priority			Timeliness of results	Availability of materials for harvesting
RPV			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
RPV - High fluence & high shift vessel with well-established unirradiated properties	Measure fluence, toughness, & chemistry as a function of through- thickness position	Through thickness section to validate fluence & attenuation models	MH	Score is MH within the beltline. Change to H beyond the beltline	MH	Again change to H outside of beltline	MH		#N/A	embrittlement is not inspected for			MH	Both	Attenuation formula has been used for years. Inside the beltline it's accepted and believed conservative, and this is probably true. Greater impact associated with harvested data outside of beltline.	
RPV - Samples from virtually any vessel	Enable measurement of both the Charpy transition curve and master curve transition temperature T0	Provides data supporting evolution from the use of correlative (Charpy-based) to direct measurement (fracture toughness-based) approaches	MH		MH		H		#N/A	embrittlement is not inspected for			MH		Very limited ex-plant data exists worldwide (perhaps 6 plants) to compare to surveillance data. Those data that do exist compare reasonably well, &/or have explainable reasons for disagreement. We have little physical reason to expect differences between ex-plant (harvested) data and surveillance data ... but (as noted) we have not checked in that many cases.	

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

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Priority			Timeliness of results	Availability of materials for harvesting
ELECTRICAL			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
Low and medium voltage cables																
Cables protected with fire retardant coating																
1E MOVs from harsh and mild environments																
1E Air operated valves; 4160 1E breakers																
1E Molded case breakers 480V, 250V DC, 125 VDC,																
1E Relays from mild environment GE – HFA, Agastat timing relays, any from Westinghouse, Potter Brumfield, Stuthers Dunn etc.,																
Batteries																
Electrical penetrations																
Fire research interest																
Electrical enclosures																
Distribution: switchgear, MCCs, LCs | Control: Horseshoe, SSCP, ASP, etc.																

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Priority			Timeliness of results	Availability of materials for harvesting
CONCRETE			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
Structures exposed to high radiation																
Post-tensioned structures																
Corrosion of reinforcing steel, tendon, liner, embedment																
Spent fuel pool and transfer canal-boric acid attack on concrete in PWRs																
Alkali Aggregate Reaction																
Large structural sections for testing																

From: Kirk, Mark
Sent: Mon, 10 Sep 2018 13:27:39 +0000
To: Hiser, Matthew
Cc: Gordon, Matthew;Tregoning, Robert;Raynaud, Patrick
Subject: Re: Harvesting prioritization for RPV
Attachments: Harvesting Needs Prioritization 8-31-18 [+MTK].xlsx

Note to requester: Attachment is immediately following.

Matt -
See attached. I added some explanations for my ranking, although they may be somewhat cryptic.
Let me know if you need more explanation.
mark

From: Hiser, Matthew
Sent: Monday, September 10, 2018 8:40 AM
To: Kirk, Mark
Subject: RE: Harvesting prioritization for RPV

Thanks Mark!

From: Kirk, Mark
Sent: Monday, September 10, 2018 8:36 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Gordon, Matthew <Matthew.Gordon@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: Re: Harvesting prioritization for RPV

Matt -

Thanks for the reminder. This fell off of my radar. I will reply later today.

mark

From: Hiser, Matthew
Sent: Monday, September 10, 2018 7:27 AM
To: Kirk, Mark; Gordon, Matthew; Tregoning, Robert
Cc: Purtscher, Patrick; Audrain, Margaret
Subject: RE: Harvesting prioritization for RPV

Hi guys,

I just wanted to follow up on this earlier email to see if you have had the opportunity to take a look at this. Ideally we'd like to have something to compile with the other areas by the end of this week.

Thanks!
Matt

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

From: Hiser, Matthew
Sent: Friday, August 31, 2018 9:36 AM
To: Kirk, Mark <Mark.Kirk@nrc.gov>; Gordon, Matthew <Matthew.Gordon@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: RE: Harvesting prioritization for RPV

I should also say, please feel free to add or subtract from the rows (ie propose new or eliminate from consideration certain RPV harvesting needs) and to provide feedback (edits, comments, etc.) on the criteria and the guidance to use the criteria.

Thanks!
Matt

From: Hiser, Matthew
Sent: Friday, August 31, 2018 9:33 AM
To: Kirk, Mark <Mark.Kirk@nrc.gov>; Gordon, Matthew <Matthew.Gordon@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Cc: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: Harvesting prioritization for RPV

Hi Mark, Matt, and Rob,

We would like to request your input as the RPV technical experts on the prioritization of harvesting opportunities for RPV materials. I have attached a template of the prioritization of harvesting needs in the non-RPV metals area. Can you follow that template (check the scoring guidance on the first sheet) to provide input for the RPV technical area?

Ideally, it would be good if we could receive your input in the next two weeks by September 14. We're hoping to pull all of the input from the different areas into a broader harvesting draft deliverable to share with NRR for feedback by October.

Please 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

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

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Technical Priority			Timeliness of results	Availability of materials for harvesting
RPV			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
RPV - High fluence & high shift vessel with well-established unirradiated properties	Measure fluence, toughness, & chemistry as a function of through- thickness position	Through thickness section to validate fluence & attenuation models	MH	Score is MH within the beltline. Change to H beyond the beltline	MH	Again change to H outside of beltline	MH		#N/A	embrittlement is not inspected for			MH	Both	Attenuation formula has been used for years. Inside the beltline it's accepted and believed conservative, and this is probably true. Greater impact associated with harvested data outside of beltline.	
RPV - Samples from virtually any vessel	Enable measurement of both the Charpy transition curve and master curve transition temperature T0	Provides data supporting evolution from the use of correlative (Charpy-based) to direct measurement (fracture toughness-based) approaches	MH		MH		H		#N/A	embrittlement is not inspected for			MH		Very limited ex-plant data exists worldwide (perhaps 6 plants) to compare to surveillance data. Those data that do exist compare reasonably well, &/or have explainable reasons for disagreement. We have little physical reason to expect differences between ex-plant (harvested) data and surveillance data ... but (as noted) we have not checked in that many cases.	

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

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Priority			Timeliness of results	Availability of materials for harvesting
ELECTRICAL			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
Low and medium voltage cables																
Cables protected with fire retardant coating																
1E MOVs from harsh and mild environments																
1E Air operated valves; 4160 1E breakers																
1E Molded case breakers 480V, 250V DC, 125 VDC,																
1E Relays from mild environment GE – HFA, Agastat timing relays, any from Westinghouse, Potter Brumfield, Stuthers Dunn etc.,																
Batteries																
Electrical penetrations																
Fire research interest																
Electrical enclosures																
Distribution: switchgear, MCCs, LCs | Control: Horseshoe, SSCP, ASP, etc.																

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Priority			Timeliness of results	Availability of materials for harvesting
CONCRETE			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
Structures exposed to high radiation																
Post-tensioned structures																
Corrosion of reinforcing steel, tendon, liner, embedment																
Spent fuel pool and transfer canal-boric acid attack on concrete in PWRs																
Alkali Aggregate Reaction																
Large structural sections for testing																

From: Hiser, Matthew
Sent: Fri, 14 Sep 2018 12:08:29 +0000
To: Miller, Kenneth A
Subject: RE: Harvesting Prioritization Status

Hi Kenn,

I just wanted to check back in on this harvesting prioritization table and see how it's going. I'll be out much of next week for a trip to ORNL, but may try to schedule a meeting with you the following week if that would be helpful.

Thanks!
Matt

PS No pressure, but Mita did get me the concrete input yesterday ;)

From: Miller, Kenneth A
Sent: Tuesday, September 04, 2018 7:56 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Prioritization Status

Thanks for the reply Matt. I [(b)(6)]

I can call in Friday for sure…calendar is open (9a-2p).

Thanks for your understanding.

Kenneth A. Miller, Senior Electrical Engineer (Electrical Team Leader)
U.S. Nuclear Regulatory Commission
RES/DE/Instrumentation, Controls & Electrical Engineering Branch, T-10E02
Mail Stop: T-10A36
Washington, DC 20555
(301) 415-2127 Cell: [redacted] Fax: (301) 415-6671
kenn.miller@nrc.gov (b)(6)

From: Hiser, Matthew
Sent: Tuesday, September 04, 2018 7:35 AM
To: Miller, Kenneth A <KennethA.Miller@nrc.gov>
Subject: RE: Harvesting Prioritization Status

Sounds good Kenn! Have a good trip to Philly! If it's alright, I'll throw a scheduler for you and Mita for next week…

Thanks!
Matt

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

-----Original Appointment-----
From: Miller, Kenneth A
Sent: Tuesday, September 04, 2018 7:34 AM
To: Hiser, Matthew
Subject: Declined: Harvesting Prioritization Status
When: Tuesday, September 04, 2018 9:00 AM-9:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-10A73-8p

Hi Matt,

I have a full plate today. I don't have anything to report.

I am leaving this evening for HEAF testing for the next week near Philadelphia but am taking harvesting matrix with me to work on in the evenings.

Can I bow out of this meeting today? I will email you an update next Monday evening if that is ok.

Thanks,

Kenn Miller

From: Hiser, Matthew
Sent: Tue, 4 Sep 2018 12:11:55 +0000
To: Miller, Kenneth A
Subject: RE: Harvesting Prioritization Status

Looking at my calendar now, we can play it by ear. I'll try to check in via email probably, because I'll be [redacted] and then on travel most of the following week…

(b)(6)

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

From: Miller, Kenneth A
Sent: Tuesday, September 04, 2018 7:56 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Prioritization Status

Thanks for the reply Matt. I [redacted]

(b)(6)

I can call in Friday for sure…calendar is open (9a-2p).

Thanks for your understanding.

Kenneth A. Miller, Senior Electrical Engineer (Electrical Team Leader)
U.S. Nuclear Regulatory Commission
RES/DE/Instrumentation, Controls & Electrical Engineering Branch, T-10E02
Mail Stop: T-10A36
Washington, DC 20555
(301) 415-2127 Cell: [redacted] Fax: (301) 415-6671
kenn.miller@nrc.gov

(b)(6)

From: Hiser, Matthew
Sent: Tuesday, September 04, 2018 7:35 AM
To: Miller, Kenneth A <KennethA.Miller@nrc.gov>
Subject: RE: Harvesting Prioritization Status

Sounds good Kenn! Have a good trip to Philly! If it's alright, I'll throw a scheduler for you and Mita for next week…

Thanks!
Matt

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

-----Original Appointment-----
From: Miller, Kenneth A
Sent: Tuesday, September 04, 2018 7:34 AM
To: Hiser, Matthew
Subject: Declined: Harvesting Prioritization Status
When: Tuesday, September 04, 2018 9:00 AM-9:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-10A73-8p

Hi Matt,

I have a full plate today. I don't have anything to report.

I am leaving this evening for HEAF testing for the next week near Philadelphia but am taking harvesting matrix with me to work on in the evenings.

Can I bow out of this meeting today? I will email you an update next Monday evening if that is ok.

Thanks,

Kenn Miller

From: Hiser, Matthew
Sent: Wed, 22 Nov 2017 12:21:23 +0000
To: Purtscher, Patrick
Subject: RE: harvesting report

Hi Pat,

Sorry for the very delayed response, but I took a look at the harvesting report and don't have any major concerns. I think it's ready to go to Steve...

Thanks!
Matt

-----Original Message-----
From: Purtscher, Patrick
Sent: Tuesday, October 31, 2017 1:52 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: harvesting report

Draft from Pradeep on harvesting.

Pat

-----Original Message-----
From: Purtscher, Patrick
Sent: Tuesday, October 31, 2017 1:49 PM
To: 'Ramuhalli, Pradeep' <Pradeep.Ramuhalli@pnnl.gov>
Subject: RE: You have files ready for pickup

Thanks, I got the file.

My idea to finish everything now is for us (Amy, Matt, Rob, Meg, and myself) to read through it one more time and then send it to my branch chief for his information. Then you can get a PNNL lab report # and complete phase 1 of the project.

Pat

-----Original Message-----
From: Ramuhalli, Pradeep [mailto:collaboration@pnnl.gov]
Sent: Tuesday, October 31, 2017 10:41 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: [External_Sender] You have files ready for pickup

Hello,

Ramuhalli, Pradeep (Pradeep.Ramuhalli@pnnl.gov) has sent you the following 1 file(s:)

Subject: TLR - resending draft

Comments: Patrick,

(b)(6)

The TLR update should be available via the link below. Just saw your email from last week ([redacted] and then playing catchup). Resending this via FTP instead of email attachment.

Pradeep

The following files have been uploaded to the MassTransit Web File Transfer Services. You can download them by going to:

(b)(4)

and selecting the file(s) and clicking Download (All/Selected).
NOTE: This link and contained passkey are only good for 14 days.

Harvesting-TLR-DRAFT.docx (5.07M bytes)

From: Purtscher, Patrick
Sent: Thu, 20 Jul 2017 15:02:28 -0400
To: Hiser, Matthew
Subject: RE: harvesting report

No answer, I left a voice message.

Pat

From: Purtscher, Patrick
Sent: Tuesday, July 18, 2017 7:08 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: FW: harvesting report

From: Purtscher, Patrick
Sent: Friday, June 30, 2017 10:13 AM
To: Ramuhalli, Pradeep (Pradeep.Ramuhalli@pnnl.gov) <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: Audrain, Margaret
Sent: Wed, 1 Nov 2017 12:13:33 -0400
To: Purtscher, Patrick;Hiser, Matthew;Hull, Amy;Tregoning, Robert
Subject: RE: harvesting report

Pat,

I think it looks good and have no comments.

Meg

-----Original Message-----
From: Purtscher, Patrick
Sent: Tuesday, October 31, 2017 1:52 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>; Hull, Amy <Amy.Hull@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: harvesting report

Draft from Pradeep on harvesting.

Pat

-----Original Message-----
From: Purtscher, Patrick
Sent: Tuesday, October 31, 2017 1:49 PM
To: 'Ramuhalli, Pradeep' <Pradeep.Ramuhalli@pnnl.gov>
Subject: RE: You have files ready for pickup

Thanks, I got the file.

My idea to finish everything now is for us (Amy, Matt, Rob, Meg, and myself) to read through it one more time and then send it to my branch chief for his information. Then you can get a PNNL lab report # and complete phase 1 of the project.

Pat

-----Original Message-----
From: Ramuhalli, Pradeep [mailto:collaboration@pnnl.gov]
Sent: Tuesday, October 31, 2017 10:41 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: [External_Sender] You have files ready for pickup

Hello,

Ramuhalli, Pradeep (Pradeep.Ramuhalli@pnnl.gov) has sent you the following 1 file(s:)

Subject: TLR - resending draft

Comments: Patrick,

The TLR update should be available via the link below. Just saw your email from last week ((b)(6) and then playing catchup). Resending this via FTP instead of email attachment.

Pradeep

The following files have been uploaded to the MassTransit Web File Transfer Services. You can download them by going to:

(b)(4)

and selecting the file(s) and clicking Download (All/Selected).
NOTE: This link and contained passkey are only good for 14 days.

Harvesting-TLR-DRAFT.docx (5.07M bytes)

From: Audrain, Margaret
Sent: Wed, 30 May 2018 14:10:46 +0000
To: Tregoning, Robert;Purtscher, Patrick;Hiser, Matthew
Subject: RE: harvesting report

Pat,

I'm working on putting together my site visit to PNNL in July. Do you think it'd be easiest to have Steve Bruemmer coordinate with Pradeep on timing/etc? Does Pradeep have the latest version of the spreadsheet to work with in advance of my coming there?

Thanks,

Meg

From: Tregoning, Robert
Sent: Tuesday, May 29, 2018 7:38 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: harvesting report

Pat:

Thanks, they have the slides and summary and we indicated during the meeting last week that the final report is largely consistent with that information. They obviously want the final report however because it will provide much more context and detail and also reflect at least some level of NRC review….

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: Purtscher, Patrick
Sent: Tuesday, May 29, 2018 7:34 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: harvesting report

All,

I will contact Pradeep today to see how the revision is coming. In fact, the slides and summary of the workshop (already available to EPRI) would be more valuable to industry than the report itself; these files include slides from Pradeep that reflect the report.

Pat

From: Hiser, Matthew
Sent: Thursday, May 24, 2018 12:09 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: RE: harvesting report

I agree it would be good to move the publishing of that report ahead expeditiously to help our coordination with EPRI. Last I heard Pat said PNNL was working on addressing NRR's comments – not sure what the timeline was for doing that though.

Thanks!
Matt

From: Tregoning, Robert
Sent: Thursday, May 24, 2018 8:37 AM
To: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Frankl, Istvan <Istvan.Frankl@nrc.gov>
Subject: harvesting report

All:

Yesterday, during Steve's presentation, EPRI (Dyle and Demma) expressed interest in getting the PNNL report once it's published. We're also planning to have some discussions with EPRI next week during the NRC/EPRI materials meeting to promote future collaboration on harvesting opportunities. Therefore, I think we should make publishing that report a higher priority and we can possibly use it in part to help frame our discussions with EPRI moving forward.

Thoughts?

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: Wed, 18 Jan 2017 15:02:50 -0500
To: Hiser, Matthew;Purtscher, Patrick
Subject: RE: Harvesting service irradiated material from NPPs

Matt:

When we put together our high-priority needs for harvesting, we should have an internal meeting including Mita, Tom Koshy, and Darrell Murdock, at a minimum. They can add items related to concrete, I&C, and electrical. While we don't need to be comprehensive at this point, it would be good to have some examples…..

Cheers,

Rob

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

From: Hiser, Matthew
Sent: Wednesday, January 18, 2017 11:53 AM
To: Sircar, Madhumita <Madhumita.Sircar@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Harvesting service irradiated material from NPPs

Hi Mita,

Yes, we're planning for March 7 and 8 in 3WFN. I've attached the meeting announcement and a draft agenda.

Thanks!
Matt

From: Sircar, Madhumita
Sent: Wednesday, January 18, 2017 11:51 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: Harvesting service irradiated material from NPPs

Matt,

Rob Tregoning suggested me to contact you regarding the meeting on harvesting service irradiated material from NPPs. Is the meeting in March?

Thanks,
Mita Sircar
Tel: 301-415-1804

From: Hiser, Matthew
Sent: Wed, 18 Jan 2017 16:52:45 +0000
To: Sircar, Madhumita
Cc: Tregoning, Robert
Subject: RE: Harvesting service irradiated material from NPPs
Attachments: Condensed Workshop Agenda.docx, Harvesting Workshop Announcement.docx

Note to requester: Attachments are immediately following.

Hi Mita,

Yes, we're planning for March 7 and 8 in 3WFN. I've attached the meeting announcement and a draft agenda.

Thanks!
Matt

From: Sircar, Madhumita
Sent: Wednesday, January 18, 2017 11:51 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: Harvesting service irradiated material from NPPs

Matt,

Rob Tregoning suggested me to contact you regarding the meeting on harvesting service irradiated material from NPPs. Is the meeting in March?

Thanks,
Mita Sircar
Tel: 301-415-1804

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

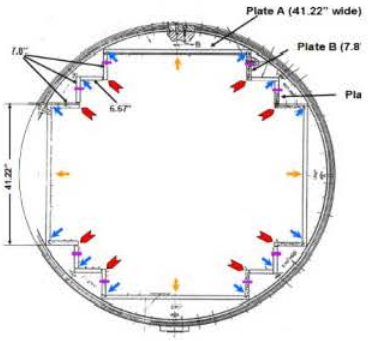
Session 5: Future Harvesting Program Planning

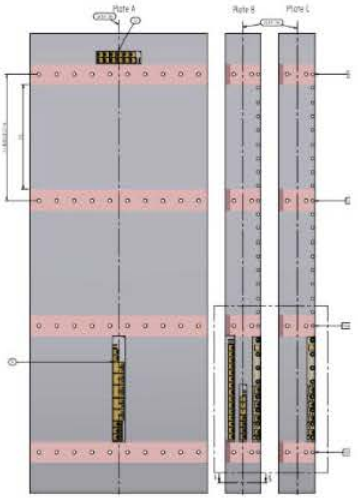
- Solicited presentations from EPRI, DOE, NRC, and international organizations followed by open and panel discussion

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
Matthew Hiser, Matthew.Hiser@nrc.gov
Patrick Purtscher, Patrick.Purtscher@nrc.gov

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

From: Hiser, Matthew
Sent: Fri, 3 Aug 2018 15:02:26 +0000
To: Audrain, Margaret;Purtscher, Patrick
Cc: Tregoning, Robert
Subject: RE: Harvesting Status
Attachments: Harvesting Needs Prioritization 8-3-18.xlsx

Hi guys,

Here is the prioritization table we discussed yesterday. Please take a look and if you have no comments, then I'd suggest we use this for our non-RPV metals input. I'll also be sharing this with the electrical and concrete folks as a template in terms of how to rank / comment…

Thanks!
Matt

From: Hiser, Matthew
Sent: Wednesday, August 01, 2018 10:28 AM
To: Audrain, Margaret <Margaret.Audrain@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Status

<< File: Harvesting Needs Prioritization mah 8-1-18.xlsx >>
In advance of our meeting tomorrow, I tried to pull together the ranking you guys did a few months ago with the comments I had written previously. I think it'd be good for us to talk through this a little tomorrow and then I can share with the electrical and concrete folks as an example.

Thanks!
Matt
-----Original Appointment-----
From: Hiser, Matthew
Sent: Friday, July 27, 2018 2:52 PM
To: Hiser, Matthew; Audrain, Margaret; Purtscher, Patrick
Subject: Harvesting Status
When: Thursday, August 02, 2018 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: 10th floor huddle rm

Sorry – I ended up in a briefing with BC and division managers that ran long. Can you guys do Thursday morning?

Topics:

- PNNL Report
- Meg's PNNL Visit / Boneyard
- Matt's upcoming PNNL Visit
- Harvesting "supply" spreadsheets
- Harvesting needs prioritization

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

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

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Priority			Timeliness of results	Availability of materials for harvesting
ELECTRICAL			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
Low and medium voltage cables																
Cables protected with fire retardant coating																
1E MOVs from harsh and mild environments																
1E Air operated valves; 4160 1E breakers																
1E Molded case breakers 480V, 250V DC, 125 VDC,																
1E Relays from mild environment GE – HFA, Agastat timing relays, any from Westinghouse, Potter Brumfield, Stuthers Dunn etc.,																
Batteries																
Electrical penetrations																
Fire research interest																
Electrical enclosures																
Distribution: switchgear, MCCs, LCs | Control: Horseshoe, SSCP, ASP, etc.																

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Priority			Timeliness of results	Availability of materials for harvesting
CONCRETE			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
Structures exposed to high radiation																
Post-tensioned structures																
Corrosion of reinforcing steel, tendon, liner, embedment																
Spent fuel pool and transfer canal-boric acid attack on concrete in PWRs																
Alkali Aggregate Reaction																
Large structural sections for testing																

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

From: Hiser, Matthew
Sent: Wed, 1 Aug 2018 14:27:46 +0000
To: Audrain, Margaret;Purtscher, Patrick
Subject: RE: Harvesting Status
Attachments: Harvesting Needs Prioritization mah 8-1-18.xlsx

In advance of our meeting tomorrow, I tried to pull together the ranking you guys did a few months ago with the comments I had written previously. I think it'd be good for us to talk through this a little tomorrow and then I can share with the electrical and concrete folks as an example.

Thanks!
Matt
-----Original Appointment-----
From: Hiser, Matthew
Sent: Friday, July 27, 2018 2:52 PM
To: Hiser, Matthew; Audrain, Margaret; Purtscher, Patrick
Subject: Harvesting Status
When: Thursday, August 02, 2018 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: 10th floor huddle rm

Sorry – I ended up in a briefing with BC and division managers that ran long. Can you guys do Thursday morning?

Topics:

- PNNL Report
- Meg's PNNL Visit / Boneyard
- Matt's upcoming PNNL Visit
- Harvesting "supply" spreadsheets
- Harvesting needs prioritization

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

	Basic Info		Technical Criteria										Cost / Complexity		Project Specific	
Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Criticalness of Technical Gap Addressed		Importance of Harvested Materials over Laboratory Aging		Applicability to US Operating Fleet		Regulatory Considerations Related to Inspections and AMPs		Score Average	Basis for Technical Priority			Timeliness of results	Availability of materials for harvesting
METALS			Score	Comment	Score	Comment	Score	Comment	Score	Comment			Score	Comment		
High fluence reactor internals	Void swelling, mechanical properties, IASCC	Likely extent of void swelling in PWRs during extended operation and impact on cracking	M	Fills data gap for extended plant operation	MH	Laboratory replication very difficult to impossible to achieve fluences with representative irradiation conditions	MH	Applicable to high-fluence components in most PWRs	MH	EPRI performing R&D on NDE for void swelling; MRP 227 uses primarily visual testing, which could detect void swelling once fairly significant	3.75	Significance of void swelling at higher fluences is uncertain, and inspections may detect onset of significant degradation	2	Very high cost for highly irradiated internals	4	TBD
Thermally aged unirradiated CASS	Fracture toughness and microstructure	Fracture toughness data in real conditions to compare to accelerated aging data	MH	Validate accelerated aging data	H	Purpose of work would be to provide real-world validation of accelerated aging in lab testing	MH	Applicable to PWRs more than BWRs (higher temps)	H	No ISI method available to measure loss of FT	4.5	Would greatly increase confidence in large set of accelerated aging data with testing of unirradiated materials	1	Moderate cost for contaminated, but not irradiated, primary stsem components	1	
Moderate fluence (1-2 dpa) CASS	Fracture toughness and microstructure	Fracture toughness data near limit requiring further evaluation	ML	Confirm regulatory position	MH	May be possible, but difficult to replicate long-term aging and irradiation effects	MH	Applicable to PWRs more than BWRs (higher temps and fluence)	H	No ISI method available to measure loss of FT	3.75	Would increase confidence in regulatory position	2	High cost for irradiated components	5	
Metallic components with known flaws	NDE and destructive examination	Determine whether SCC mitigation methods are effective at preventing SCC; effectiveness of NDE at detection and sizing	MH	Validate NDE and mitigation method effectiveness	MH	Purpose of work would be to provide real-world validation of lab testing	H	Applicable to all plants	ML	Purpose of this work is to assess inspection method effectiveness	3.75	Would greatly increase confidence in NDE and mitigation methods	2	Moderate cost for contaminated, but not irradiated, primary stsem components	2	
Metallic components with limiting fatigue life	NDE and destructive examination	Determine whether fatigue flaws are present in high usage locations	MH	Validate fatigue life methodologies	ML	Purpose of work would be to provide real-world validation of lab testing	H	Applicable to all plants	ML	Inspections could be performed for fatigue cracks, but are generally not done proactively	3.25	Would greatly increase confidence in fatigue life calculations	5	Moderate cost for contaminated, but not irradiated, primary stsem components	3	

Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Benefit / Significance	Cost	Alternative to Harvesting?	Priority / Value	Basis for Priority	Unique aspects of harvested materials	ISI availability?
METALS									
RPV - High fluence & high shift vessel with well-established unirradiated properties	Measure fluence, toughness, & chemistry as a function of through-thickness position	Through thickness section to validate fluence & attenuation models	Increases confidence in existing regulatory approach	High	No	**LOW**	High cost not justified by benefit given surveillance specimens and well-established emrittlement trend correlations	Vintage compositions and irradiation conditions	
RPV - Samples from virtually any vessel	Enable measurement of both the Charpy transition curve and master curve transition temperature T0	Provides data supporting evolution from the use of correlative (Charpy-based) to direct measurement (fracture toughness-based) approaches	Increases confidence in existing regulatory approach	High	No	**LOW**	High cost not justified by benefit given surveillance specimens and well-established emrittlement trend correlations	Vintage compositions and realistic irradiation conditions	

Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Benefit / Significance	Cost	Alternative to Harvesting?	Priority / Value	Basis for Priority	Unique aspects of harvested materials	ISI availabilility?
ELECTRICAL									
Low and medium voltage cables				Medium		**HIGH**			
Cables protected with fire retardant coating				Medium					
1E MOVs from harsh and mild environments				Medium					
1E Air operated valves; 4160									
1E breakers				Low					
1E Molded case breakers 480V, 250V DC, 125 VDC,				Low					
1E Relays from mild environment GE – HFA, Agastat timing relays, any from Westinghouse, Potter Brumfield, Stuthers Dunn etc.,				Low					
Batteries				Low					
Electrical penetrations									
Fire research interest									
Electrical enclosures									
Distribution: switchgear, MCCs, LCs | Control: Horseshoe, SSCP, ASP, etc.									

Need Description	Purpose / Testing Planned	Technical Knowledge Gained	Benefit / Significance	Cost	Alternative to Harvesting?	Priority / Value	Basis for Priority	Unique aspects of harvested materials	ISI availabilility?
METALS									
CONCRETE									
Structures exposed to high radiation	Change in properties due to irradiation effects	Loss of strength due to irradiation	Fills data gap for extended plant operation	High		**HIGH**			
Post-tensioned structures				Medium		**LOW**			
Corrosion of reinforcing steel, tendon, liner, embedment				Medium		**LOW**			
Spent fuel pool and transfer canal-boric acid attack on concrete in PWRs				Medium		**LOW**			
Alkali Aggregate Reaction				Medium		**LOW**			
Large structural sections for testing	Effects of concrete aging on structural capacity		Validate assumptions of aging effects at larger scales	High		**LOW**			

From: Purtscher, Patrick
Sent: Tue, 12 Sep 2017 09:42:08 -0400
To: Hiser, Matthew
Subject: RE: harvesting TLR

OK

From: Hiser, Matthew
Sent: Tuesday, September 12, 2017 9:14 AM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: harvesting TLR

Hi Pat,

Yeah, but I'm in early. I'll swing by your desk around 7 AM on Thursday.

Thanks!
Matt

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

From: Purtscher, Patrick
Sent: Tuesday, September 12, 2017 8:52 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: harvesting TLR

I revised the document to reflect most of Rob's comments, but there are a couple I wanted to talk to you about. Are you in training on Thursday?

Pat

From: Litkett, Bernard
Sent: Tue, 20 Sep 2016 12:37:15 -0400
To: Hiser, Matthew
Subject: RE: Harvesting Update

Hi Matt,

Thanks for the update. Last year's RIC there was a session on SLR and another by RES, then there was a meeting with Dr Reiner Mailander, Research Coordinator at the Swiss Federal Safety Inspectorate ENSI. He wanted to talk about de-commissioning/harvesting one of their BWRs.

I was not thinking the workshop would be a RIC session, the workshop should be separate but adjoining with the RIC to give the people who attend the workshop an opportunity to attend RIC session.

Also to prevent a person who wanted to attend the workshop and the RIC from traveling twice if the workshop and the RIC were held in different weeks.

I am not sure who would the best person to contact at a plant that will be decommissioning. My experience when a plant needs to be contacted, the PM in DORL for that plant is contacted first.

Bernie

From: Hiser, Matthew
Sent: Tuesday, September 20, 2016 11:15 AM
To: Litkett, Bernard <Bernard.Litkett@nrc.gov>
Subject: RE: Harvesting Update

Thanks Bernie!

We discussed the workshop a little more after you had to leave I think. We are not envisioning a whole RIC session for the workshop, but rather a single presentation in either a materials or SLR session. The workshop itself would be officially separate from the RIC, although we are hoping to have it adjoining the RIC to maximize participation.

For the decommissioning schedule, I have reached out to the decommissioning BC in NMSS. He said most plants are going into SAFSTOR, but he didn't much information himself, so it will be a matter of reaching out to plants individually to get any real solid information.

Thanks!

Matt

From: Litkett, Bernard
Sent: Monday, September 19, 2016 3:55 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Collins, Jay <Jay.Collins@nrc.gov>; Cumblidge, Stephen <Stephen.Cumblidge@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Oberson, Greg <Greg.Oberson@nrc.gov>; Hardies, Robert <Robert.Hardies@nrc.gov>; Karwoski, Kenneth <Kenneth.Karwoski@nrc.gov>
Cc: Rudland, David <David.Rudland@nrc.gov>
Subject: RE: Harvesting Update

Hi Matt,
I was not present for the full meeting but I did hear some very good ideas.

1. For international participation, I suggest March 16-17 Thursday/Friday of the RIC. Would there be a RIC session on Harvesting?
2. Since the number of participants are unknown for now, I would reserve a large conference room.
3. I think making an inventory/list of harvesting items wanted and assigning an importance value to each item in order to make a specific list. Also consider NDE or harvesting.
4. Get the de-commissioning schedule. I don' know the point of contact for this Branch Chief. However, I thought the licensee's were required to keep records for a 10 year period and not destroy the records.

Bernie

From: Hiser, Matthew
Sent: Monday, September 19, 2016 3:29 PM
To: Collins, Jay <Jay.Collins@nrc.gov>; Cumblidge, Stephen <Stephen.Cumblidge@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Litkett, Bernard <Bernard.Litkett@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Oberson, Greg <Greg.Oberson@nrc.gov>; Hardies, Robert <Robert.Hardies@nrc.gov>; Karwoski, Kenneth <Kenneth.Karwoski@nrc.gov>
Cc: Rudland, David <David.Rudland@nrc.gov>
Subject: RE: Harvesting Update

Thanks everyone for attending the meeting this morning. I think it was a good discussion of how we can best utilize the harvesting opportunities and hopefully brought people up to speed on the activities we have ongoing.

My request is for you to provide input on two topics by Friday:

1. The workshop - 1 page "plan" attached to meeting notice. Any thoughts on topics, participants, location, dates, etc. are appreciated.
2. Contacts for people that should be invited to the workshop as well as people who could be useful for getting information from decommissioning plants.

Thanks!
Matt

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

-----Original Appointment-----
From:
Sent: Thursday, September 01, 2016 4:08 PM
To: Hiser, Matthew; Collins, Jay; Cumblidge, Stephen; Tregoning, Robert; Frankl, Istvan; Purtscher, Patrick; Litkett, Bernard; Poehler, Jeffrey; Oberson, Greg; Hardies, Robert; Karwoski, Kenneth
Cc: Rudland, David
Subject: Harvesting Update
When: Monday, September 19, 2016 9:00 AM-10:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-OWFN-09B02-12p

Placeholder for meeting to discuss ex-plant harvesting path forward.

Topics:

- Draft PNNL report on harvesting prioritization
- Public workshop in March 2017
- Information gathering from decommissioning plants

<< File: Harvesting Workshop Plan.docx >> << File: PNNL Report Summary Harvesting Update meeting 9-19-16.pptx >>

From: Oberson, Greg
Sent: Mon, 19 Sep 2016 17:04:01 -0400
To: Hiser, Matthew
Subject: RE: Harvesting Update

Matt,
I would explore the possibility of getting material for DOE complex of decommissioning facilities, as well as research/test reactors. Years ago I traveled to Savannah River for a workshop organized by Bob Sindelar and Andy Duncan to discuss getting concrete from some of the old weapons production buildings. I'm sure there are many other such things out there, though relevance to LWR is likely to be hit or miss. So I'd contact Bob or try to find someone at the DOE Environmental Management office who should be local to DC and maybe at RIC anyway, unfortunately I don't have a name. I mentioned to you previously that Al Ahluwalia knows some utility in South Korea that was interested in sharing materials. You may contact him about who or what that involves. Finally, I assume you have the Zion contacts, like Tom Rosseel at ORNL who managed that activity. If you want other ideas, please let me know.

Greg

From: Hiser, Matthew
Sent: Monday, September 19, 2016 3:29 PM
To: Collins, Jay <Jay.Collins@nrc.gov>; Cumblidge, Stephen <Stephen.Cumblidge@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Litkett, Bernard <Bernard.Litkett@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Oberson, Greg <Greg.Oberson@nrc.gov>; Hardies, Robert <Robert.Hardies@nrc.gov>; Karwoski, Kenneth <Kenneth.Karwoski@nrc.gov>
Cc: Rudland, David <David.Rudland@nrc.gov>
Subject: RE: Harvesting Update

Thanks everyone for attending the meeting this morning. I think it was a good discussion of how we can best utilize the harvesting opportunities and hopefully brought people up to speed on the activities we have ongoing.

My request is for you to provide input on two topics by Friday:

1. The workshop - 1 page "plan" attached to meeting notice. Any thoughts on topics, participants, location, dates, etc. are appreciated.
2. Contacts for people that should be invited to the workshop as well as people who could be useful for getting information from decommissioning plants.

Thanks!
Matt

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

-----Original Appointment-----
From:
Sent: Thursday, September 01, 2016 4:08 PM
To: Hiser, Matthew; Collins, Jay; Cumblidge, Stephen; Tregoning, Robert; Frankl, Istvan; Purtscher, Patrick; Litkett, Bernard; Poehler, Jeffrey; Oberson, Greg; Hardies, Robert; Karwoski, Kenneth
Cc: Rudland, David
Subject: Harvesting Update
When: Monday, September 19, 2016 9:00 AM-10:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-OWFN-09B02-12p

Placeholder for meeting to discuss ex-plant harvesting path forward.

Topics:

- Draft PNNL report on harvesting prioritization
- Public workshop in March 2017
- Information gathering from decommissioning plants

<< File: Harvesting Workshop Plan.docx >> << File: PNNL Report Summary Harvesting Update meeting 9-19-16.pptx >>

From: Poehler, Jeffrey
Sent: Mon, 19 Sep 2016 16:15:39 -0400
To: Hiser, Matthew
Subject: RE: Harvesting Update

Thanks Matt – let me know if you need any help getting plant contacts.

Jeff

From: Hiser, Matthew
Sent: Monday, September 19, 2016 3:29 PM
To: Collins, Jay <Jay.Collins@nrc.gov>; Cumblidge, Stephen <Stephen.Cumblidge@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Litkett, Bernard <Bernard.Litkett@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Oberson, Greg <Greg.Oberson@nrc.gov>; Hardies, Robert <Robert.Hardies@nrc.gov>; Karwoski, Kenneth <Kenneth.Karwoski@nrc.gov>
Cc: Rudland, David <David.Rudland@nrc.gov>
Subject: RE: Harvesting Update

Thanks everyone for attending the meeting this morning. I think it was a good discussion of how we can best utilize the harvesting opportunities and hopefully brought people up to speed on the activities we have ongoing.

My request is for you to provide input on two topics by Friday:

1. The workshop - 1 page "plan" attached to meeting notice. Any thoughts on topics, participants, location, dates, etc. are appreciated.
2. Contacts for people that should be invited to the workshop as well as people who could be useful for getting information from decommissioning plants.

Thanks!
Matt

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

-----Original Appointment-----
From:

Sent: Thursday, September 01, 2016 4:08 PM
To: Hiser, Matthew; Collins, Jay; Cumblidge, Stephen; Tregoning, Robert; Frankl, Istvan; Purtscher, Patrick; Litkett, Bernard; Poehler, Jeffrey; Oberson, Greg; Hardies, Robert; Karwoski, Kenneth
Cc: Rudland, David
Subject: Harvesting Update
When: Monday, September 19, 2016 9:00 AM-10:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-OWFN-09B02-12p

Placeholder for meeting to discuss ex-plant harvesting path forward.

Topics:

- Draft PNNL report on harvesting prioritization
- Public workshop in March 2017
- Information gathering from decommissioning plants

<< File: Harvesting Workshop Plan.docx >> << File: PNNL Report Summary Harvesting Update meeting 9-19-16.pptx >>

From: Hiser, Matthew
Sent: Thu, 30 Aug 2018 20:26:11 +0000
To: Tregoning, Robert;Audrain, Margaret;Purtscher, Patrick
Subject: RE: Harvesting Update

Summary of today's meeting:

- Need to meet with NRR on alignment in late September before DD meeting in early October
- Have a larger follow-on meeting in October to harvesting deliverables

Actions

- PNNL Report:
  - Pat and Matt working to finalize with PNNL
- Prioritization:
  - Matt to email RPV staff (Rob, Mark, Matt G.) for input on prioritization
  - Matt to follow-up with electrical and concrete staff
- Inventory:
  - Pat and Matt to reach out to ANL and Battelle for input on reports tied to specific materials
  - Meg to harmonize lab inventories of previously harvested materials
  - Matt to look into LRAs and UFSAR for info on materials for harvesting from shutdown plants

Thanks!
Matt

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

-----Original Appointment-----
From: Hiser, Matthew
Sent: Wednesday, August 15, 2018 4:28 PM
To: Hiser, Matthew; Tregoning, Robert; Audrain, Margaret; Purtscher, Patrick
Subject: Harvesting Update
When: Thursday, August 30, 2018 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-10A73-8p

Align on status of:

- PNNL report
- Harvesting needs prioritization
- Inventory: boneyard and decommissioning plants

From: Hiser, Matthew
Sent: Fri, 21 Jul 2017 12:18:21 +0000
To: Purtscher, Patrick
Subject: RE: harvesting update

Without confirming receipt? [redacted] (b)(6)

From: Purtscher, Patrick
Sent: Friday, July 21, 2017 6:08 AM
To: Hiser, Matthew
Subject: harvesting update

B. Progress During the Reporting Period
During the June 2017 reporting period, brief discussions with NRC-RES personnel indicated that the submitted report had not been received (possible email problems). The revised TLR was re-sent.

Materials Engineer
US Nuclear Regulatory Commission | Office of Nuclear Regulatory Research
Division of Engineering | Corrosion and Metallurgy Branch
11545 Rockville Pike | Rockville, MD 20852-2738
Phone: 301-415-3942 | *Office: TWFN 10A49*
ptp1@nrc.gov

From: Hiser, Matthew
Sent: Tue, 20 Sep 2016 19:12:54 +0000
To: Hardies, Robert
Subject: RE: Harvesting Update

Thanks Bob! I know this has been mentioned to Robin Dyle at a couple times, so if nothing else I can start there…

From: Hardies, Robert
Sent: Tuesday, September 20, 2016 1:29 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Update

As far as topics, add a discussion of establishing and international project.

Invite EPRI, MAI, public, DOE, FANC, ASN, Japan, and maybe some national labs, plus affected and interested utilities.

Contacts for decommissioning plants:

Dominion (Kewaunee) Chuck Tomes Charles A Tomes (Generation - 6)
charles.a.tomes@dom.com
(b)(6) [redacted] cell
(b)(6) [redacted] home
804 – 273-4384 office

Exelon Jim Cirilli
Corporate Engineering Programs
Office:(610) 765-5786
James.cirilli@exeloncorp.com

Fort Calhoun JACOBSEN, KRISTEN G kjacobsen@oppd.com 402-533-6715

I will try to get you an EPRI contact.

Robert Hardies
Senior Level Advisor for Materials Engineering
Division of Engineering
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission

Office Phone 301 415-5802
Cell [redacted] (b)(6)

From: Hiser, Matthew
Sent: Monday, September 19, 2016 3:29 PM
To: Collins, Jay <Jay.Collins@nrc.gov>; Cumblidge, Stephen <Stephen.Cumblidge@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Litkett, Bernard <Bernard.Litkett@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Oberson, Greg <Greg.Oberson@nrc.gov>; Hardies, Robert <Robert.Hardies@nrc.gov>; Karwoski, Kenneth <Kenneth.Karwoski@nrc.gov>
Cc: Rudland, David <David.Rudland@nrc.gov>
Subject: RE: Harvesting Update

Thanks everyone for attending the meeting this morning. I think it was a good discussion of how we can best utilize the harvesting opportunities and hopefully brought people up to speed on the activities we have ongoing.

My request is for you to provide input on two topics by Friday:

1. The workshop - 1 page "plan" attached to meeting notice. Any thoughts on topics, participants, location, dates, etc. are appreciated.
2. Contacts for people that should be invited to the workshop as well as people who could be useful for getting information from decommissioning plants.

Thanks!
Matt

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

-----Original Appointment-----
From:
Sent: Thursday, September 01, 2016 4:08 PM
To: Hiser, Matthew; Collins, Jay; Cumblidge, Stephen; Tregoning, Robert; Frankl, Istvan; Purtscher, Patrick; Litkett, Bernard; Poehler, Jeffrey; Oberson, Greg; Hardies, Robert; Karwoski, Kenneth
Cc: Rudland, David

Subject: Harvesting Update
When: Monday, September 19, 2016 9:00 AM-10:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-OWFN-09B02-12p

Placeholder for meeting to discuss ex-plant harvesting path forward.

Topics:

- Draft PNNL report on harvesting prioritization
- Public workshop in March 2017
- Information gathering from decommissioning plants

<< File: Harvesting Workshop Plan.docx >> << File: PNNL Report Summary Harvesting Update meeting 9-19-16.pptx >>

From: Hiser, Matthew
Sent: Tue, 20 Sep 2016 12:01:50 +0000
To: Karwoski, Kenneth
Subject: RE: Harvesting Update

Thanks Ken!

I totally agree that regulatory use always needs to be at the front of our mind when committing NRC resources (time, money) to any of these activities.

Matt

From: Karwoski, Kenneth
Sent: Tuesday, September 20, 2016 5:33 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Update

Matt,

Although this may not be needed for the workshop, we (NRC) should always be able to articulate what the regulatory use of the results will be. If there is no use (updating a regulatory guide, approving a topical report,…..) or the results will not allow us to make a regulatory decision, we should question whether we should be involved.

Ken

From: Hiser, Matthew
Sent: Monday, September 19, 2016 3:29 PM
To: Collins, Jay <Jay.Collins@nrc.gov>; Cumblidge, Stephen <Stephen.Cumblidge@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Frankl, Istvan <Istvan.Frankl@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Litkett, Bernard <Bernard.Litkett@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Oberson, Greg <Greg.Oberson@nrc.gov>; Hardies, Robert <Robert.Hardies@nrc.gov>; Karwoski, Kenneth <Kenneth.Karwoski@nrc.gov>
Cc: Rudland, David <David.Rudland@nrc.gov>
Subject: RE: Harvesting Update

Thanks everyone for attending the meeting this morning. I think it was a good discussion of how we can best utilize the harvesting opportunities and hopefully brought people up to speed on the activities we have ongoing.

My request is for you to provide input on two topics by Friday:

1. The workshop - 1 page "plan" attached to meeting notice. Any thoughts on topics, participants, location, dates, etc. are appreciated.
2. Contacts for people that should be invited to the workshop as well as people who could be useful for getting information from decommissioning plants.

Thanks!
Matt

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

-----Original Appointment-----
From:
Sent: Thursday, September 01, 2016 4:08 PM
To: Hiser, Matthew; Collins, Jay; Cumblidge, Stephen; Tregoning, Robert; Frankl, Istvan; Purtscher, Patrick; Litkett, Bernard; Poehler, Jeffrey; Oberson, Greg; Hardies, Robert; Karwoski, Kenneth
Cc: Rudland, David
Subject: Harvesting Update
When: Monday, September 19, 2016 9:00 AM-10:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-OWFN-09B02-12p

Placeholder for meeting to discuss ex-plant harvesting path forward.

Topics:

- Draft PNNL report on harvesting prioritization
- Public workshop in March 2017
- Information gathering from decommissioning plants

<< File: Harvesting Workshop Plan.docx >> << File: PNNL Report Summary Harvesting Update meeting 9-19-16.pptx >>

From: Audrain, Margaret
Sent: Fri, 14 Sep 2018 18:43:05 +0000
To: Hiser, Matthew
Subject: RE: Harvesting Update

(b)(6)

Hahaha, nope. I had set myself a reminder to do it [redacted]

From: Hiser, Matthew
Sent: Friday, September 14, 2018 2:42 PM
To: Audrain, Margaret <Margaret.Audrain@nrc.gov>
Subject: RE: Harvesting Update

(b)(6)

Sounds good! Just wanted to make sure it hadn't fallen off your list [redacted]

From: Audrain, Margaret
Sent: Friday, September 14, 2018 2:39 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Harvesting Update

Yes, I'm working on it. I've been having a lot of computer problems this week and it's going slower than I'd like since my computer freezes randomly and closes the document...

Meg

From: Hiser, Matthew
Sent: Friday, September 14, 2018 2:36 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Audrain, Margaret <Margaret.Audrain@nrc.gov>
Cc: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: Harvesting Update

Hi Meg and Pat,

I just wanted to share with you guys the progress on the harvesting prioritization spreadsheet (attached). I've gotten good input for concrete and have a couple versions (one from Rob and one from Mark Kirk) for RPV. I'm still waiting on electrical input from Kenn Miller. I also added higher fluence SS welds on the "Metals" tab of the spreadsheet.

Feel free to take a look for consistency checks. Hopefully, we'll have electrical/RPV nailed down in the next couple weeks.

Also, Meg, were you going to compile/harmonize the inputs from ANL, PNNL, and Battelle?

Thanks!
Matt

From: Kirk, Mark
Sent: Thu, 2 Feb 2017 12:16:24 -0500
To: Hiser, Matthew
Subject: RE: Harvesting Workshop

Thanks – I'd appreciate it if my name could be added.

I know these guys really well

From: Hiser, Matthew
Sent: Thursday, February 02, 2017 11:12 AM
To: Kirk, Mark <Mark.Kirk@nrc.gov>
Subject: RE: Harvesting Workshop

	Name	Organization	Email	Contact
Japan	Taku Arai	CRIEPI	arait@criepi.denken.or.jp	Rob
	Sadao Higuchi	CRIEPI	higuchi@criepi.denken.or.jp	Rob
	Kazunobu Sakamoto	JNRA	kazunobu_sakamoto@nsr.go.jp	Rob
	Yasuhiro Chimi	JAEA	chimi.yasuhiro@jaea.go.jp	Rob
Europe	Julian Soulacroix	MAI	julian.soulacroix@edf.fr	Rob
	Rachid Chaouadi	SCK-CEN	rachid.chaouadi@sckcen.be	Rob
	Anders Jenssen	Studsvik	anders.jenssen@studsvik.se	Matt/Jean
Canada	Daniel Tello	CNSC	daniel.tello@canada.ca	Matt
	Désiré Ndomba	CNSC	desire.ndomba@canada.ca	
	Karen Huynh	AECL	khuynh@aecl.ca	
US industry	Gerry van Noordennen	Energy Solutions	gpvannoordennen@energysolutions.com	Matt
	Bill Zipp	Dominion	william.f.zipp@dom.com	Matt
EPRI	Sherry Bernhoft	EPRI	sbernhoft@epri.com	
	Robin Dyle	EPRI	rdyle@epri.com	
	Jean Smith	EPRI	jmsmith@epri.com	
	Al Ahluwalia	EPRI	kahluwal@epri.com	
DOE	Tom Rosseel	DOE	rosseeltm@ornl.gov	
	Rich Reister	DOE	Richard.Reister@nuclear.energy.gov	
	Keith Leonard	DOE	leonardk@ornl.gov	
	Mikhail A. Sokolov	DOE	sokolovm@ornl.gov	
	Leo Fyfeld	DOE/PNNL		
NRC/	Pat Purtscher	NRC	Patrick.Purtscher@nrc.gov	

contractor	Rob Tregoning	NRC	Robert.Tregoning@nrc.gov	
	Matt Hiser	NRC	Matthew.Hiser@nrc.gov	
	Pradeep Ramuhalli	PNNL	Pradeep.Ramuhalli@pnnl.gov	Pat
Maybe?	~~Heather Malikowski~~	PWROG	Heather.Malikowski@exeloncorp.com	Matt
	~~Jim Molkenthin~~	PWROG	molkenjp@westinghouse.com	Matt
	Uwe Jendrich	GRS	Uwe.Jendrich@grs.de	Rob

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

From: Kirk, Mark
Sent: Thursday, February 02, 2017 11:08 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Workshop

Thanks Matt

Would it be possible to also share your list of attendees?

Best

mark

From: Hiser, Matthew
Sent: Thursday, February 02, 2017 10:30 AM
To: Kirk, Mark <Mark.Kirk@nrc.gov>
Subject: Harvesting Workshop

Hi Mark,

The workshop is on March 7-8 in 3WFN 1C3. I've attached a few documents describing the workshop.

Thanks!
Matt

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

From: Hull, Amy
Sent: Wed, 8 Mar 2017 07:56:00 -0500
To: Hiser, Matthew;Moyer, Carol
Subject: RE: Harvesting Workshop

Thank you. I will be there this afternoon.

From: Hiser, Matthew
Sent: Wednesday, March 08, 2017 7:55 AM
To: Hull, Amy <Amy.Hull@nrc.gov>; Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: Harvesting Workshop

Feel free to come over for the workshop today. A few folks will not be here today, so there should be space.

From: Poehler, Jeffrey
Sent: Mon, 27 Feb 2017 13:34:54 -0500
To: Cheruvenki, Ganesh;Hiser, Matthew
Subject: RE: Harvesting Workshop

I guess it will be me-

Jeff

From: Cheruvenki, Ganesh
Sent: Monday, February 27, 2017 12:22 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>
Subject: RE: Harvesting Workshop

Matt,

I would recommend that Jeff should attend.

From: Hiser, Matthew
Sent: Monday, February 27, 2017 11:55 AM
To: Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Cheruvenki, Ganesh <Ganesh.Cheruvenki@nrc.gov>
Subject: Harvesting Workshop

Hi Jeff and Ganesh,

Just checking if you have nailed down who will be attending the harvesting workshop next week.

Thanks!
Matt

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

From: Poehler, Jeffrey
Sent: Tue, 28 Feb 2017 08:30:34 -0500
To: Hiser, Matthew
Subject: RE: Harvesting Workshop

Matt, can you send me the scheduler?

Thanks,

Jeff

From: Hiser, Matthew
Sent: Monday, February 27, 2017 11:55 AM
To: Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Cheruvenki, Ganesh <Ganesh.Cheruvenki@nrc.gov>
Subject: Harvesting Workshop

Hi Jeff and Ganesh,

Just checking if you have nailed down who will be attending the harvesting workshop next week.

Thanks!
Matt

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

From: Hiser, Matthew
Sent: Wed, 1 Mar 2017 20:38:40 +0000
To: Hiser, Allen;Yoo, Mark
Subject: RE: Harvesting Workshop

Sounds good, thanks!

From: Hiser, Allen
Sent: Wednesday, March 01, 2017 3:34 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Yoo, Mark <Mark.Yoo@nrc.gov>
Subject: RE: Harvesting Workshop

I will attend and Mark will use the webinar.

From: Hiser, Matthew
Sent: Tuesday, February 28, 2017 7:47 AM
To: Yoo, Mark <Mark.Yoo@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>
Subject: Harvesting Workshop

Have you guys decided who will be attending workshop?

Thanks!
Matt

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

From: Moyer, Carol
Sent: Wed, 23 Nov 2016 08:32:55 -0500
To: Hiser, Matthew
Subject: RE: Harvesting Workshop

Thanks, Matt. Happy Thanksgiving to you & yours, too!

Carol

From: Hiser, Matthew
Sent: Wednesday, November 23, 2016 8:29 AM
To: Moyer, Carol <Carol.Moyer@nrc.gov>
Subject: Harvesting Workshop

Hi Carol,

Here's the announcement we've been using to publicize the workshop.

Please let me know if you'd like more info ☺

Thanks and happy Thanksgiving!
Matt

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

From: Salley, MarkHenry
Sent: Fri, 24 Feb 2017 10:12:19 -0600
To: Hiser, Matthew;Koshy, Thomas
Cc: Taylor, Gabriel;Melly, Nicholas;Stroup, David;Gonzalez, Felix;Thaggard, Mark;Cheok, Michael
Subject: RE: Harvesting Workshop

Matt,

Fantastic ~ My branch could reap great benefits from a harvesting program like this ~ please keep Gabe involved and we will do everything we can to support the effort.

MHS

From: Hiser, Matthew
Sent: Thursday, February 23, 2017 8:36 AM
To: Salley, MarkHenry <MarkHenry.Salley@nrc.gov>; Koshy, Thomas <Thomas.Koshy@nrc.gov>
Cc: Taylor, Gabriel <Gabriel.Taylor@nrc.gov>; Melly, Nicholas <Nicholas.Melly@nrc.gov>; Stroup, David <David.Stroup@nrc.gov>; Gonzalez, Felix <Felix.Gonzalez@nrc.gov>; Thaggard, Mark <Mark.Thaggard@nrc.gov>; Cheok, Michael <Michael.Cheok@nrc.gov>
Subject: RE: Harvesting Workshop

Thanks Tom for sharing this with the right folks!

Mark, I actually remember this from when it was presented at an all-hands meeting last year I think. I'll meet with Gabe and Nick and be sure the insights from your experience are captured in our slides.

Thanks!
Matt

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

From: Salley, MarkHenry
Sent: Wednesday, February 22, 2017 4:34 PM
To: Koshy, Thomas <Thomas.Koshy@nrc.gov>; Hiser, Matthew <Matthew.Hiser@nrc.gov>
Cc: Taylor, Gabriel <Gabriel.Taylor@nrc.gov>; Melly, Nicholas <Nicholas.Melly@nrc.gov>; Stroup, David <David.Stroup@nrc.gov>; Gonzalez, Felix <Felix.Gonzalez@nrc.gov>; Thaggard, Mark <Mark.Thaggard@nrc.gov>; Cheok, Michael <Michael.Cheok@nrc.gov>
Subject: FW: Harvesting Workshop
Importance: High

Tom,

Thanx for bringing this to my attention!!

Matt,

Couple points:

1) For your success story, we had a very important one, and that is the Zion Bus duct Gabe Taylor procured a couple years ago from Zion Solutions through Oak Ridge Nat. Labs. Testing the duct in our International High Energy Arc Fault (HEAF) program illustrated the problems with Aluminum HEAFs and is now going through the Generic Issues program. Please see Nick Melly and he can show you the test video.
2) There is a large number of items we could use for further testing, namely, any Electrical component (Bus duct, switchgear, etc.) containing aluminum or aluminum clad components. Switchgear and other assorted electrical enclosures for HRR testing. Installed electrical cables protected with fire retardant coating.

Gabe, could you please take the lead for our branch and contact Matt to discuss?

Please let me know if you require any additional information from me.

Thanx

MHS
Mark Henry Salley P.E.
Chief, Fire and External Hazard Analysis Branch (FXHAB)
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Division of Risk Analysis
Washington, D.C. 20555-0001

Mail Stop: TWFN-10A12
Telephone: (301) 415-2474
FAX: (301) 415-6671
E-Mail: markhenry.salley@nrc.gov

From: Koshy, Thomas
Sent: Wednesday, February 22, 2017 2:28 PM
To: Salley, MarkHenry <MarkHenry.Salley@nrc.gov>
Subject: FW: Harvesting Workshop

Get into the process

Thomas Koshy,

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

From: Hiser, Matthew
Sent: Wednesday, February 22, 2017 8:36 AM
To: Sircar, Madhumita <Madhumita.Sircar@nrc.gov>; Koshy, Thomas <Thomas.Koshy@nrc.gov>
Subject: Harvesting Workshop

Hi Mita and Tom,

Just to follow up from our discussions yesterday, I've attached the slides for the 3 presentations in Sessions 2-4 of the workshop. The slides are fairly brief and intended to quickly lay out our ideas and input, but leave plenty of time for discussion.

For data needs and sources of materials, please fill in any additional input you have for electrical or concrete topics. For harvesting experience and lessons learned, please take a look and add any additional insights you think we should include in our presentation.

I've also copied below the expectations we have provided to participants for each session for your reference and awareness:

- Session 2 Technical Data Needs for Harvesting
  - Presenters share high-priority data needs that may be best addressed by harvesting
    - Where does harvesting hold particular value compared to other sources of technical data
  - 15-20 minute presentations followed by open discussion of technical data needs for harvesting
- Session 3 Sources of Materials
  - Information on previously harvested materials and future harvesting opportunities
    - Materials located at research and vendor facilities
    - Decommissioning plants that may allow for future harvesting
  - Short 5-10 minute presentations followed by open discussion
  - Starting point for potential database of previously harvested materials and future harvesting opportunities
- Session 4 Harvesting Experience: Lessons Learned and Practical Aspects
  - Improving future efforts with lessons learned from past programs
    - Pitfalls to avoid and strategies to improve likelihood of success
  - Practical perspective from non-researchers on how harvesting interfaces with the decommissioning process
  - International decommissioning and harvesting experience
  - 20-30 minute presentations followed by open discussion

Thanks!
Matt

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

From: Purtscher, Patrick
Sent: Fri, 27 Jan 2017 08:53:03 -0500
To: Hiser, Matthew;Tregoning, Robert
Subject: RE: Harvesting Workshop

I think the slides are good.

Pat

From: Hiser, Matthew
Sent: Friday, January 27, 2017 8:25 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop

<< File: Harvesting Workshop intro slides 1-23-17.pptx >> << File: Workshop Planning 1-26-17.docx >>

Hi Rob and Pat,

Just a quick reminder to take a look at the intro slides I've put together (updated after our meeting Monday). Once you guys are happy with them, my plan was to share with DOE and EPRI and the speakers as I am in contact with them.

I've also attached the latest version of the planning document. We are in pretty good shape for presenters. I am still tying down loose ends with the PWROG and EPRI/Korea. The other main question marks are MAI/JRC, SCK (depends on MAI/JRC), Japan, and Germany.

Thanks!
Matt

From: Hiser, Matthew
Sent: Monday, January 23, 2017 12:18 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop

<< File: Harvesting Workshop intro slides 1-23-17.pptx >> << File: Workshop Planning 1-23-17.docx >>

Hi Rob and Pat,

Thank you for meeting this morning to discuss the latest on the harvesting workshop planning.

I have updated the workshop planning document and the intro slides (attached). Please take a look at the slides and provide edits.

Action Items:

- Matt: follow-up with Energy Solutions, Dominion, ENSI, Ahluwalia, AV/transcription
- Rob: Follow-up with GRS, MAI, JNRA/CRIEPI
- Rob and Pat: review slides and provide feedback

Thanks!
Matt

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

-----Original Appointment-----
From:
Sent: Wednesday, January 18, 2017 9:05 AM
To: Hiser, Matthew; Tregoning, Robert; Purtscher, Patrick
Subject: Harvesting Workshop
When: Monday, January 23, 2017 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-10A73-8p

Adding latest workshop planning document and draft workshop intro slides.

Following my call with DOE and EPRI last week and additional contacts we've made, let's look at the agenda and try to finalize speakers for each slot.

<< File: Workshop Planning 1-17-17.docx >> << File: Harvesting Workshop intro slides.pptx >>

From: Tregoning, Robert
Sent: Thu, 12 Jan 2017 15:18:37 -0600
To: Hiser, Matthew;Purtscher, Patrick
Subject: RE: Harvesting Workshop

All:

I sent reminder emails today to JRC, JNRA, and EPRI (Lian). I'll let you know what I hear back.

RT

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

From: Hiser, Matthew
Sent: Thursday, January 12, 2017 1:44 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop

<< File: Workshop Planning.docx >>
Hi Rob and Pat,

Thanks for the productive meeting this morning. I've attached the latest version of the planning document.

Here were each of our action items:

Rob:

- Sessions 1/5 (mostly panel discussions)
- Contact international participants:
  - Oliver Martin – JRC
  - TG Lian – EPRI/MAI

- JNRA/CRIEPI

Pat:

- Contact PNNL
- Session 2 – work with DOE (Keith Leonard) and EPRI to plan

Matt:

- Sessions 3/4 – work with DOE (Rosseel) and EPRI to plan
- Contact speakers:
  - EnergySolutions
  - Dominion/utility
  - IAEA/Krivanek
- Transcription/AV

Thanks!
Matt

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

-----Original Appointment-----
From: Hiser, Matthew
Sent: Monday, January 09, 2017 10:00 AM
To: Hiser, Matthew; Tregoning, Robert; Purtscher, Patrick
Subject: Harvesting Workshop
When: Thursday, January 12, 2017 8:00 AM-9:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-10A73-8p

Can we move this a little earlier tomorrow since I now have a conflict at 9:00?

Here is a workshop planning document I've created with a list of contacts / expected attendees and a table laying out all the planned presentations and sessions to track confirmed speakers.

<< File: Workshop Planning.docx >>

From: Tregoning, Robert
Sent: Tue, 17 Jan 2017 08:25:49 -0500
To: Hiser, Matthew;Purtscher, Patrick
Subject: RE: Harvesting Workshop

Matt:

I think your message is fine and it doesn't hurt to query CNSC a bit about possible contributions. We should, of course, keep in mind that there will likely be less interest in a CANDU-perspective/opportunities/issues since our focus is LWR components. However, maybe there are other components, like cables or concrete, where there is enough similarities in operating conditions and pedigree.

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, January 17, 2017 8:12 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop

It was a voicemail with a phone number left, so I was planning to call him back later this morning.

My plan was to deliver a similar message as you have to the Japanese: non-public workshop; we are inviting/soliciting presentations; their attendance and participation is welcome, but we are trying to keep it small and focused. Do you think CNSC could present in one of the yellow or red slots below?

Session	Topic	Organization	Speaker	Status
1	Why our organization is interested in harvesting	EPRI		
		DOE		
		NRC	Robert Tregoning	
		MAI or JRC		
		JNRA		
	PANEL DISCUSSION			
2	Overview of data needs best addressed by harvesting	PNNL (for NRC)	Pradeep Ramuhalli	
	Perspective on detailed data needs from harvesting	EPRI		
		DOE		
		MAI or JRC		SCK-CEN?
		JNRA		CRIEPI?
3	Available materials from decommissioning plants and past harvesting programs	NRC	Matt Hiser	
	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?		
4	Perspective on Harvesting Lessons Learned / Prior Experience	EPRI		
		DOE		
		NRC		
	Decommissioning process and harvesting: schedule, site-specific, timing for different components	Energy Solutions	Gerry van Noordennen	

	Utility-Owner perspective on harvesting and decommissioning	Dominion?		
	International decommissioning and harvesting experience	Germany?		
5	Technical information needed for informed harvesting decisions	PNNL (for NRC)	Pradeep Ramuhalli	
	Perspective on future harvesting planning	EPRI		
		DOE		
		NRC	Robert Tregoning	
		MAI or JRC		
		JNRA		
	PANEL DISCUSSION			
	Discussion of Next Steps / Actions			

Thanks!
Matt

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

From: Tregoning, Robert
Sent: Tuesday, January 17, 2017 8:05 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop

Are you responding to CNSC?

RT

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

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

From: Hiser, Matthew
Sent: Tuesday, January 17, 2017 7:27 AM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop

Hi Rob,

I think that is an excellent idea. I'll draft up a few slides and share with you two.

Also, I received a message on Friday from someone at CNSC indicating their interest in possibly sending a couple people to the workshop.

Thanks!
Matt

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

From: Tregoning, Robert
Sent: Thursday, January 12, 2017 4:22 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop

Guys:

We haven't explicitly talked about this but I think it would be good to have a 5 – 10 minute talk at the very beginning of the workshop to provide the overall workshop objectives, and discuss the objectives and format/approach of the individual sessions. Maybe it would also be good to put a few slides together now that we can send to participants so that people are as aligned as possible heading into the workshop.

Thoughts about this idea?

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: Thursday, January 12, 2017 1:44 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop

<< File: Workshop Planning.docx >>
Hi Rob and Pat,

Thanks for the productive meeting this morning. I've attached the latest version of the planning document.

Here were each of our action items:

Rob:

- Sessions 1/5 (mostly panel discussions)
- Contact international participants:
  - Oliver Martin – JRC
  - TG Lian – EPRI/MAI
  - JNRA/CRIEPI

Pat:

- Contact PNNL
- Session 2 – work with DOE (Keith Leonard) and EPRI to plan

Matt:

- Sessions 3/4 – work with DOE (Rosseel) and EPRI to plan
- Contact speakers:
  - EnergySolutions
  - Dominion/utility
  - IAEA/Krivanek
- Transcription/AV

Thanks!
Matt

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

-----Original Appointment-----
From: Hiser, Matthew
Sent: Monday, January 09, 2017 10:00 AM
To: Hiser, Matthew; Tregoning, Robert; Purtscher, Patrick
Subject: Harvesting Workshop
When: Thursday, January 12, 2017 8:00 AM-9:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-10A73-8p

Can we move this a little earlier tomorrow since I now have a conflict at 9:00?

Here is a workshop planning document I've created with a list of contacts / expected attendees and a table laying out all the planned presentations and sessions to track confirmed speakers.

<< File: Workshop Planning.docx >>

From: Hiser, Matthew
Sent: Wed, **1** Mar 2017 14:25:24 +0000
To: Tregoning, Robert
Subject: RE: Harvesting Workshop

Hi Rob,

Not a problem – Pat, Steve, and I should be able to cover it.

Thanks!
Matt

-----Original Appointment-----
From: Tregoning, Robert **On Behalf Of** RES_DE_Cal Resource
Sent: Wednesday, March 01, 2017 8:38 AM
To: Hiser, Matthew
Subject: FW: Harvesting Workshop
When: Thursday, March 02, 2017 9:15 AM-9:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: T10-E16

Matt:

I just realized that I have a 9:30 meeting tomorrow in OWFN that I can't miss. Therefore, I'll have to miss this briefing tomorrow. It's not a big deal so I would go ahead with it unless you really feel that you want me there for support.

Rob

-----Original Appointment-----
From: RES_DE_Cal Resource
Sent: Thursday, February 23, 2017 9:20 AM
To: RES_DE_Cal Resource; Thomas, Brian; Tregoning, Robert; Frankl, Istvan; Hiser, Matthew; Vera, Graciela
Subject: Harvesting Workshop
When: Thursday, March 02, 2017 9:15 AM-9:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: T10-E16

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

Hi Malika,

Could you schedule a 15-minute briefing with Brian Thomas on the topic of “Harvesting Workshop” for some time next week?

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

Thanks!
Matt

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

From: Hiser, Matthew
Sent: Fri, 3 Feb 2017 17:03:28 +0000
To: Sircar, Madhumita
Subject: RE: Harvesting Workshop

Hi Mita,

Yeah, you were the only person whose calendar wasn't free, so I went with it hoping you might still make it. I also invited Dogan and Jake Philip in the concrete area, so hopefully you can work with them to provide input for concrete. I can fill you in more after you return from ASME.

Thanks!
Matt

From: Sircar, Madhumita
Sent: Friday, February 03, 2017 11:16 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: RE: Harvesting Workshop

Matt,
I'll be out for ASME meeting from Feb 13-15.

Thanks,
Mita Sircar
Tel: 301-415-1804

-----Original Appointment-----
From: Hiser, Matthew
Sent: Friday, February 03, 2017 10:54 AM
To: Koshy, Thomas; Sircar, Madhumita; Murdock, Darrell; Jung, Ian; Seber, Dogan; Philip, Jacob; Tregoning, Robert; Purtscher, Patrick
Subject: Harvesting Workshop
When: Tuesday, February 14, 2017 2:00 PM-3:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-10A73-8p

<< File: Ex-Plant Materials Harvesting Workshop.pptx >> << File: Sources of Materials.pptx >>

You may be aware of a workshop on ex-plant materials harvesting that we are planning at NRC HQ for March 7-8. The scope of this workshop includes metals, cables/electrical, and concrete. The purpose of the workshop and expectations for each session are captured in the PP slides attached above. We are expecting participants from DOE, EPRI, and Europe, Japan, and Canada. The goal is to have generally short presentations with ample time for discussion and interaction among meeting participants.

I am preparing NRC presentations for sessions on data needs for harvesting, sources of materials, and harvesting experience/lessons learned, which can be found below. The data needs and sources of materials presentations should be very short (5-10 min), while the lessons learned/experience talk should be about 20 min. I have drafted slides for these presentations, particularly including input for metals.

The purpose of this meeting is to make you aware of the workshop and solicit input/assistance in developing these slides for electrical/cables and concrete topics.

<< File: NRC Technical Data Needs for Harvesting.pptx >> << File: Harvesting Workshop Announcement.docx >> << File: NRC Perspective on Harvesting Experience and Lessons Learned.pptx >>

Note to requester: Attachments are immediately following. The boxes with the red X in the first email are a Power Point and a Word attachment (Power Point icon with its file name, and a Word icon with its file name) that are both imbedded into the body of the email.

From: Hiser, Matthew
Sent: Mon, 23 Jan 2017 17:18:12 +0000
To: Tregoning, Robert;Purtscher, Patrick
Subject: RE: Harvesting Workshop
Attachments: Harvesting Workshop intro slides 1-23-17.pptx, Workshop Planning 1-23-17.docx

Hi Rob and Pat,

Thank you for meeting this morning to discuss the latest on the harvesting workshop planning.

I have updated the workshop planning document and the intro slides (attached). Please take a look at the slides and provide edits.

Action Items:

- Matt: follow-up with Energy Solutions, Dominion, ENSI, Ahluwalia, AV/transcription
- Rob: Follow-up with GRS, MAI, JNRA/CRIEPI
- Rob and Pat: review slides and provide feedback

Thanks!
Matt

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

-----Original Appointment-----
From:
Sent: Wednesday, January 18, 2017 9:05 AM
To: Hiser, Matthew; Tregoning, Robert; Purtscher, Patrick
Subject: Harvesting Workshop
When: Monday, January 23, 2017 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-10A73-8p

Adding latest workshop planning document and draft workshop intro slides.

Following my call with DOE and EPRI last week and additional contacts we've made, let's look at the agenda and try to finalize speakers for each slot.

<< File: Workshop Planning 1-17-17.docx >> << File: Harvesting Workshop intro slides.pptx >>

Ex-Plant Materials Harvesting Workshop

March 7-8, 2017

USNRC HQ

Rockville, MD, USA

Motivation

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

Approach

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

Expected Outcome

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

Session Expectations

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

Session Expectations

- Session 3 Sources of Materials
  - Information on previously harvested materials and future harvesting opportunities
    - Materials in "boneyards" at research and vendor facilities
    - Decommissioning plants that may allow for future harvesting
  - Short 5-10 minute presentations followed by open discussion
  - Starting point for potential database of previously harvested materials and future harvesting opportunities
- Session 4 Harvesting Experience: Lessons Learned and Practical Aspects
  - Forward-looking lessons learned from past harvesting programs
    - Pitfalls to avoid and strategies to improve likelihood of success
  - Practical perspective from non-researchers on how harvesting interfaces with the decommissioning process
  - International decommissioning and harvesting experience
  - 20-30 minute presentations followed by open discussion

Session Expectations

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

Workshop Contacts

Name	Organization	Email	Contact Through
Naoki Soneda	CRIEPI	soneda@criepi.denken.or.jp	Rob
Rachid Chaouadi	SCK-CEN	rachid.chaouadi@sckcen.be	Rob
Kazunobu Sakamoto	JNRA	kazunobu_sakamoto@nsr.go.jp	Rob
Gerry van Noordennen	Energy Solutions	gpvannoordennen@energysolutions.com	Pat/Tom R.
Chuck Tomes	Dominion	charles.a.tomes@dom.com	Matt
Sherry Bernhoft	EPRI	sbernhoft@epri.com	
Robin Dyle	EPRI	rdyle@epri.com	
Jean Smith	EPRI	jmsmith@epri.com	
Al Ahluwalia	EPRI	kahluwal@epri.com	
Tom Rosseel	DOE	rosseeltm@ornl.gov	
Rich Reister	DOE	Richard.Reister@nuclear.energy.gov	
Keith Leonard	DOE	leonardk@ornl.gov	
Mikhail A. Sokolov	DOE	sokolovm@ornl.gov	
Leo Fyfeld	DOE/PNNL		
Pat Purtscher	NRC	Patrick.Purtscher@nrc.gov	
Rob Tregoning	NRC	Robert.Tregoning@nrc.gov	
Matt Hiser	NRC	Matthew.Hiser@nrc.gov	
Anders Jenssen	Studsvik	anders.jenssen@studsvik.se	Matt/Jean
Daniel Tello	CNSC	daniel.tello@canada.ca	Matt
Heather Malikowski	PWROG	Heather.Malikowski@exeloncorp.com	Matt
Jim Molkenthin	PWROG	molkenjp@westinghouse.com	Matt
Regis Nhili	MAI	regis.nhili@edf.fr	Rob
Uwe Jendrich	GRS	Uwe.Jendrich@grs.de	Rob
Pradeep Ramuhalli	PNNL	Pradeep.Ramuhalli@pnnl.gov	

Session	NRC Lead	DOE Lead	EPRI Lead
1	Rob Tregoning	Rich Reister	Sherry Bernhoft/Robin Dyle
2	Pat Purtscher	Keith Leonard (ORNL)	Sherry Bernhoft/Robin Dyle
3	Matt Hiser	Tom Rosseel (ORNL)	Sherry Bernhoft/Robin Dyle
4	Matt Hiser	Tom Rosseel (ORNL)	Sherry Bernhoft/Robin Dyle
5	Rob Tregoning	Rich Reister	Sherry Bernhoft/Robin Dyle

NRC Presentations

Session	Topic	Speaker
1	Why our organization is interested in harvesting	Tregoning
2	Overview of data needs best addressed by harvesting	Pradeep / PNNL
3	Available materials from decommissioning plants and past harvesting programs	Hiser
4	Perspective on Harvesting Lessons Learned / Prior Experience	TBD
5	Technical information needed for informed harvesting decisions	Pradeep / PNNL
5	Perspective on future harvesting planning	Tregoning

Session	Topic	Organization	Speaker	Status
1	Why our organization is interested in harvesting	EPRI		
		DOE	Rich Reister	
		NRC	Robert Tregoning	
		MAI		Emails exchanged
		JNRA/CRIEPI/JAEA		Emails exchanged
	PANEL DISCUSSION			
2	Overview of data needs best addressed by harvesting	PNNL (for NRC)	Pradeep Ramuhalli	
	Perspective on detailed data needs from harvesting	EPRI		
		DOE	Keith Leonard	
		SCK-CEN	CNSC?	Emails exchanged
		JNRA/CRIEPI/JAEA		Emails exchanged
3	Available materials from decommissioning plants and past harvesting programs	NRC	Matt Hiser	
	Available materials from operating reactors and past harvesting programs	EPRI		
		PWROG		Emails exchanged
	Available materials at DOE labs from past harvesting programs	DOE	Tom Rosseel	
	Upcoming decommissioning sites	Energy Solutions	Gerry van Noordennen	Contact through Tom R.
	International sources of materials	MAI		Emails exchanged
		JNRA/CRIEPI/JAEA		Emails exchanged
		Korea		Need to work w/ Ahluwalia
4	Perspective on Harvesting Lessons Learned / Prior Experience	EPRI		
		DOE	Tom Rosseel	
		NRC		
	Decommissioning process and harvesting: schedule, site-specific, timing for different components	Energy Solutions	Gerry van Noordennen	Contact through Tom R.
	Utility-Owner perspective on harvesting and decommissioning	Dominion or Exelon		Emails exchanged
	International decommissioning and harvesting experience	Germany?		Emails exchanged
5	Technical information needed for informed harvesting decisions	PNNL (for NRC)	Pradeep Ramuhalli	
	Perspective on future harvesting planning	EPRI		
		DOE	Rich Reister	
		NRC	Robert Tregoning	
		MAI		Emails exchanged
		JNRA/CRIEPI/JAEA		Emails exchanged
	PANEL DISCUSSION			
	Discussion of Next Steps / Actions			

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

From: Hiser, Matthew
Sent: Wed, 18 Jan 2017 16:59:19 +0000
To: Tregoning, Robert;Purtscher, Patrick
Subject: RE: Harvesting Workshop
Attachments: Harvesting Workshop intro slides.pptx

Hi Rob and Pat,

Please take a look at a few slides I pulled together and we can discuss on Monday.

Thanks!
Matt

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

From: Tregoning, Robert
Sent: Thursday, January 12, 2017 4:22 PM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop

Guys:

We haven't explicitly talked about this but I think it would be good to have a 5 – 10 minute talk at the very beginning of the workshop to provide the overall workshop objectives, and discuss the objectives and format/approach of the individual sessions. Maybe it would also be good to put a few slides together now that we can send to participants so that people are as aligned as possible heading into the workshop.

Thoughts about this idea?

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: Thursday, January 12, 2017 1:44 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>; Purtscher, Patrick <Patrick.Purtscher@nrc.gov>
Subject: RE: Harvesting Workshop

<< File: Workshop Planning.docx >>
Hi Rob and Pat,

Thanks for the productive meeting this morning. I've attached the latest version of the planning document.

Here were each of our action items:

Rob:

- Sessions 1/5 (mostly panel discussions)
- Contact international participants:
  - Oliver Martin – JRC
  - TG Lian – EPRI/MAI
  - JNRA/CRIEPI

Pat:

- Contact PNNL
- Session 2 – work with DOE (Keith Leonard) and EPRI to plan

Matt:

- Sessions 3/4 – work with DOE (Rosseel) and EPRI to plan
- Contact speakers:
  - EnergySolutions
  - Dominion/utility

    - IAEA/Krivanek
- Transcription/AV

Thanks!
Matt

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

-----Original Appointment-----
From: Hiser, Matthew
Sent: Monday, January 09, 2017 10:00 AM
To: Hiser, Matthew; Tregoning, Robert; Purtscher, Patrick
Subject: Harvesting Workshop
When: Thursday, January 12, 2017 8:00 AM-9:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-10A73-8p

Can we move this a little earlier tomorrow since I now have a conflict at 9:00?

Here is a workshop planning document I've created with a list of contacts / expected attendees and a table laying out all the planned presentations and sessions to track confirmed speakers.

<< File: Workshop Planning.docx >>

Ex-Plant Materials Harvesting Workshop

March 7-8, 2017

USNRC HQ

Rockville, MD, USA

Motivation

- With plants shutting down both in the U.S. and internationally, there are increasing opportunities to harvest components from decommissioning plants.
- Ex-plant materials are valuable because they have been exposed to actual in-service plant operating conditions unlike virgin materials tested under simulated conditions in the lab
  - Reduces the uncertainty associated with the applicability of the aging conditions
- Insights from research on harvested materials can address technical data needs identified for extended plant operation
- Lessons learned from past harvesting programs can help improve future harvesting efforts

Approach

- Two-day workshop with interested stakeholders to discuss benefits and challenges associated with ex-plant harvesting.
- Insights from domestic and international researchers, industry, regulators, and decommissioning companies' experience shared
  - Encourage sharing of lessons learned as well as areas of common interest for potential new research programs
- Topical sessions with several short presentations and significant time for open discussion
  - Goal is open discussion and engagement among all meeting participants, rather than presenter/audience mentality

Expected Outcome

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

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

From: Hiser, Matthew
Sent: Thu, 12 Jan 2017 18:44:23 +0000
To: Tregoning, Robert;Purtscher, Patrick
Subject: RE: Harvesting Workshop
Attachments: Workshop Planning.docx

Hi Rob and Pat,

Thanks for the productive meeting this morning. I've attached the latest version of the planning document.

Here were each of our action items:

Rob:

- Sessions 1/5 (mostly panel discussions)
- Contact international participants:
  - Oliver Martin – JRC
  - TG Lian – EPRI/MAI
  - JNRA/CRIEPI

Pat:

- Contact PNNL
- Session 2 – work with DOE (Keith Leonard) and EPRI to plan

Matt:

- Sessions 3/4 – work with DOE (Rosseel) and EPRI to plan
- Contact speakers:
  - EnergySolutions
  - Dominion/utility
  - IAEA/Krivanek
- Transcription/AV

Thanks!
Matt

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

-----Original Appointment-----
From: Hiser, Matthew
Sent: Monday, January 09, 2017 10:00 AM
To: Hiser, Matthew; Tregoning, Robert; Purtscher, Patrick
Subject: Harvesting Workshop
When: Thursday, January 12, 2017 8:00 AM-9:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-10A73-8p

Can we move this a little earlier tomorrow since I now have a conflict at 9:00?

Here is a workshop planning document I've created with a list of contacts / expected attendees and a table laying out all the planned presentations and sessions to track confirmed speakers.

<< File: Workshop Planning.docx >>

Workshop Contacts

Name	Organization	Email
Naoki Soneda	CRIEPI	soneda@criepi.denken.or.jp
Rachid Chaouadi	SCK-CEN	rachid.chaouadi@sckcen.be
Kazunobu Sakamoto	JNRA	kazunobu_sakamoto@nsr.go.jp
Gerry van Noordennen	Energy Solutions	gpvannoordennen@energysolutions.com
Chuck Tomes	Dominion	charles.a.tomes@dom.com
Sherry Bernhoft	EPRI	sbernhoft@epri.com
Robin Dyle	EPRI	rdyle@epri.com
Jean Smith	EPRI	jmsmith@epri.com
Al Ahluwalia	EPRI	kahluwal@epri.com
Tom Rosseel	DOE	rosseeltm@ornl.gov
Rich Reister	DOE	Richard.Reister@nuclear.energy.gov
Keith Leonard	DOE	leonardk@ornl.gov
Mikhail A. Sokolov	DOE	sokolovm@ornl.gov
Pat Purtscher	NRC	Patrick.Purtscher@nrc.gov
Rob Tregoning	NRC	Robert.Tregoning@nrc.gov
Matt Hiser	NRC	Matthew.Hiser@nrc.gov
Anders Jenssen	Studsvik	anders.jenssen@studsvik.se

Session	NRC Lead	DOE Lead	EPRI Lead
1	Rob Tregoning	Rich Reister	Sherry Bernhoft/Robin Dyle
2	Pat Purtscher	Keith Leonard (ORNL)	Sherry Bernhoft/Robin Dyle
3	Matt Hiser	Tom Rosseel (ORNL)	Sherry Bernhoft/Robin Dyle
4	Matt Hiser	Tom Rosseel (ORNL)	Sherry Bernhoft/Robin Dyle
5	Rob Tregoning	Rich Reister	Sherry Bernhoft/Robin Dyle

NRC Presentations

Session	Topic	Speaker
1	Why our organization is interested in harvesting	Tregoning
2	Overview of data needs best addressed by harvesting	Pradeep / PNNL
3	Available materials from decommissioning plants and past harvesting programs	Hiser
4	Perspective on Harvesting Lessons Learned / Prior Experience	TBD
5	Technical information needed for informed harvesting decisions	Pradeep / PNNL
5	Perspective on future harvesting planning	Tregoning

Session	Topic	Organization	Speaker	Status
1	Why our organization is interested in harvesting	EPRI		
		DOE		
		NRC	Robert Tregoning	
		MAI or JRC		
		JNRA		
	PANEL DISCUSSION			
2	Overview of data needs best addressed by harvesting	PNNL (for NRC)	Pradeep Ramuhalli	
	Perspective on detailed data needs from harvesting	EPRI		
		DOE		
		MAI or JRC		SCK-CEN?
		JNRA		CRIEPI?
3	Available materials from decommissioning plants and past harvesting programs	NRC	Matt Hiser	
	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?		
4	Perspective on Harvesting Lessons Learned / Prior Experience	EPRI		
		DOE		
		NRC		
	Decommissioning process and harvesting: schedule, site-specific, timing for different components	Energy Solutions	Gerry van Noordennen	
	Utility-Owner perspective on harvesting and decommissioning	Dominion?		
	International decommissioning and harvesting experience	Germany?		
5	Technical information needed for informed harvesting decisions	PNNL (for NRC)	Pradeep Ramuhalli	
	Perspective on future harvesting planning	EPRI		
		DOE		
		NRC	Robert Tregoning	
		MAI or JRC		
		JNRA		
	PANEL DISCUSSION			
	Discussion of Next Steps / Actions			

From: Hiser, Matthew
Sent: Mon, 12 Sep 2016 16:12:48 +0000
To: Tregoning, Robert
Subject: RE: Harvesting Workshop

Sounds good – thanks Rob!

I'll work on something and shoot it out here in the next few days…

From: Tregoning, Robert
Sent: Monday, September 12, 2016 8:39 AM
To: Hiser, Matthew <Matthew.Hiser@nrc.gov>
Subject: Harvesting Workshop

Matt:

I just heard from a German colleague at GRS (Juergen Sievers) and we discussed the workshop. We need to send him the initial workshop announcement. He can help us get the right decommissioning people from Germany to the workshop. So, it would be good if we could develop and circulate this preliminary announcement within the next week or two.

Cheers,

Rob

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

Note to requester:
Attachment is
immediately following.

From: Hiser, Matthew
Sent: Wed, 24 Aug 2016 12:51:02 +0000
To: Frankl, Istvan;Tregoning, Robert;Hull, Amy;Purtscher, Patrick
Subject: RE: Harvesting Workshop
Attachments: Harvesting Workshop Plan 8-24-16.docx

Hi everyone,

I have revised this plan based on a few comments from Steve. Please take a look and provide any comments by the end of the week if possible.

Thanks!
Matt

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

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

Hi everyone,

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

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

Thanks!
Matt

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

Ex-Plant Materials Harvesting Workshop

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, leveraging limited NRC resources to produce highly representative technical data of materials degradation for extended plant operation.

Approach:

- NRC staff host a 2-day workshop with interested stakeholders, including domestic and international utilities and research organizations, to discuss benefits and challenges associated with ex-plant harvesting.
- Format will include sessions with time for presentations and open discussion of different aspects of ex-plant materials harvesting.
- Views and insights from domestic and international regulators, researchers, industry, and decommissioning companies' experience will be encouraged.

Intended Outcome:

- NRC staff and stakeholders are better informed of the benefits and challenges associated with ex-plant harvesting.
- Contacts are made with domestic and international utilities and researchers to allow for further discussion of specific cooperative research projects that may address technical data gaps associated with materials degradation that can be best addressed through ex-plant harvesting.

Potential Dates:

- March 9-10, 2017 – Thursday/Friday before RIC
- March 16-17, 2017 – Thursday/Friday of RIC week
- March 20-21, 2017 – Monday/Tuesday after RIC

Discussion Topics:

- Harvesting decision-making / prioritization
    - Technical data needs best addressed by harvesting
    - Technical information needed in advance of harvesting
- Sources of materials:
    - Decommissioning reactors
    - Operating reactors – replaced or failed 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

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

From: Hiser, Matthew
Sent: Wed, 7 Dec 2016 20:37:36 +0000
To: Tregoning, Robert
Subject: RE: Harvesting Workshop Agenda Brainstorming
Attachments: NRC Harvesting Workshop Announcement 12-7-16.docx

Hi Rob,

Added some language to the announcement per suggestion from Allen. He suggested addressing whether presentations were open or solicited, as well as when more information on the workshop would be available:

"Workshop will consist of solicited presentations followed by discussion periods. Open attendance and participation in discussion is encouraged. Additional information to be provided by January 13, 2016."

Any thoughts? Look good to you?

Thanks!
Matt

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

From: Hiser, Matthew
Sent: Wednesday, December 07, 2016 2:08 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>
Subject: RE: Harvesting Workshop Agenda Brainstorming

Updated workshop announcement as requested with figures.

<< File: NRC Harvesting Workshop Announcement 12-7-16.docx >>
Matthew Hiser

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

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

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

Thanks!
Matt

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

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

Hi Rob, Pat, and Jeff,

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

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

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

Thanks!

Matt

Original Appointment-----
From: Hiser, Matthew
Sent: Wednesday, November 02, 2016 2:34 PM
To: Hiser, Matthew; Purtscher, Patrick; Tregoning, Robert; Poehler, Jeffrey
Subject: Harvesting Workshop Agenda Brainstorming
When: Thursday, November 03, 2016 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-08C01-10p

Hi Rob, Jeff, Pat,

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

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

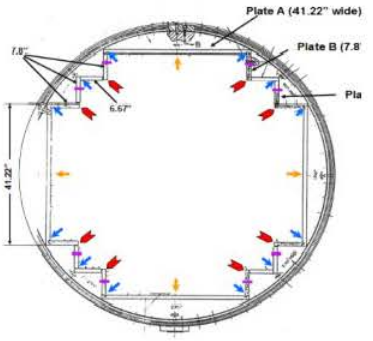
Thanks!
Matt

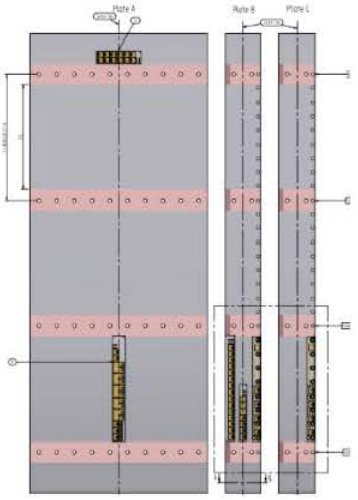
<< File: Agenda Outline.docx >>

Ex-Plant Materials Harvesting Workshop

Location: NRC 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. Open attendance and participation in discussion is encouraged. Additional information to be provided by January 13, 2016.

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

From: Purtscher, Patrick
Sent: Wed, 9 Nov 2016 10:59:23 -0500
To: Hiser, Matthew;Poehler, Jeffrey;Tregoning, Robert;Hiser, Allen
Subject: RE: Harvesting Workshop Agenda Brainstorming

The potential speakers for the data needs is probably the biggest unknown. The Swiss were looking to us for direction on what was needed.

Pat

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

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

Thanks!
Matt

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

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

Hi Rob, Pat, and Jeff,

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

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

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

Thanks!
Matt

Original Appointment-----
From: Hiser, Matthew
Sent: Wednesday, November 02, 2016 2:34 PM
To: Hiser, Matthew; Purtscher, Patrick; Tregoning, Robert; Poehler, Jeffrey
Subject: Harvesting Workshop Agenda Brainstorming
When: Thursday, November 03, 2016 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-08C01-10p

Hi Rob, Jeff, Pat,

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

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

Thanks!
Matt

<< File: Agenda Outline.docx >>

From: Tregoning, Robert
Sent: Wed, 7 Dec 2016 16:07:10 -0500
To: Hiser, Matthew
Subject: RE: Harvesting Workshop Agenda Brainstorming

Matt:

Just got off the phone with Sherry and Rich. Let's talk about the agenda as soon as possible, either today or tomorrow morning.

Cheers,

Rob

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

From: Hiser, Matthew
Sent: Wednesday, December 07, 2016 3:38 PM
To: Tregoning, Robert <Robert.Tregoning@nrc.gov>
Subject: RE: Harvesting Workshop Agenda Brainstorming

<< File: NRC Harvesting Workshop Announcement 12-7-16.docx >>

Hi Rob,

Added some language to the announcement per suggestion from Allen. He suggested addressing whether presentations were open or solicited, as well as when more information on the workshop would be available:

"Workshop will consist of solicited presentations followed by discussion periods. Open attendance and participation in discussion is encouraged. Additional information to be provided by January 13, 2016."

Any thoughts? Look good to you?

Thanks!
Matt

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

From: Hiser, Matthew
Sent: Wednesday, December 07, 2016 2:08 PM
To: Purtscher, Patrick <Patrick.Purtscher@nrc.gov>; Poehler, Jeffrey <Jeffrey.Poehler@nrc.gov>; Tregoning, Robert <Robert.Tregoning@nrc.gov>; Hiser, Allen <Allen.Hiser@nrc.gov>
Subject: RE: Harvesting Workshop Agenda Brainstorming

Updated workshop announcement as requested with figures.

<< File: NRC Harvesting Workshop Announcement 12-7-16.docx >>

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

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

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

Thanks!
Matt

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

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

Hi Rob, Pat, and Jeff,

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

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

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

Thanks!
Matt

Original Appointment-----
From: Hiser, Matthew
Sent: Wednesday, November 02, 2016 2:34 PM
To: Hiser, Matthew; Purtscher, Patrick; Tregoning, Robert; Poehler, Jeffrey
Subject: Harvesting Workshop Agenda Brainstorming
When: Thursday, November 03, 2016 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-08C01-10p

Hi Rob, Jeff, Pat,

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

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

Thanks!
Matt

<< File: Agenda Outline.docx >>