UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE SECRETARY

In the Matter of Virginia Electric Power Co. North Anna Power Station, Units 1 and 2	)	Docket Nos. 50-338/339 SLR

CORRECTED PARTIALLY UNOPPOSED MOTION BY BEYOND NUCLEAR, SIERRA CLUB, AND ALLIANCE FOR A PROGRESSIVE VIRGINIA FOR EXTENSION OF DEADLINE FOR FILING HEARING REQUESTS

Pursuant to 10 C.F.R. §§ 2.307 and 2.323, Beyond Nuclear, the Sierra Club, and Alliance for a Progressive Virginia ("Petitioners") hereby request the U.S. Nuclear Regulatory Commission ("NRC") to grant a 32-day extension of the December 14, 2020 deadline for hearing requests and petitions to intervene in the above-captioned proceeding for subsequent license renewal ("SLR") of the operating license for North Anna Units 1 and 2, Dominion's nuclear plant in Mineral, Virginia.[1] Petitioners seek an extension of the deadline until January 15, 2021. The NRC Staff does not oppose this extension request; however, Dominion has stated it will oppose the request.

Petitioners respectfully submit they have "good cause" to request an extension, as required by 10 C.F.R. § 2.307, due to the following circumstances:

- The parts of the North Anna SLR application that have been released publicly amount to over 3,000 pages, including a safety application, an Environmental Report, and several consultants' reports and attachments. Due to the sheer quantity of material that must be

[1] *See* 85 Fed. Reg. 65,438 (Oct. 15, 2020).

reviewed, Petitioners have found that 60 days is inadequate to prepare a hearing request.[2]

- Dominion's SLR application raises significant, complex and unprecedented safety and environmental issues for which Petitioners need additional time to review the application and related documents and consult experts. These issues include the adequacy of proposed measures for assessing and monitoring the condition of safety equipment for as long as 80 years, a time period for which operating experience is completely unavailable in the U.S.; the safety and environmental implications of operating aging reactor equipment with a seismic design whose inadequacy has been demonstrated by the occurrence of a beyond-design-basis earthquake in 2011; and the significance for Dominion's environmental impact analysis of the 2011 Fukushima Daichii nuclear disaster.[3] In order to fully assess these issues, Petitioners must not only review the SLR application, but a large set of NRC and industry documents regarding the history of licensing and safety reviews at North Anna Units 1 and 2; the NRC's research, guidance and decisions regarding the aging, seismic and Fukushima-related issues that have been developed over several decades; and analyses by independent experts. Petitioners are also seeking expert assistance. The 60-day period allotted for a hearing request is not adequate for these tasks.
- Petitioners also seek more time due to the NRC's delay in providing significant information relevant to their concerns. A significant amount of information has been released or is

[2] While Dominion submitted the SLR application to the NRC in late August, the NRC Staff did not make a determination that the application was complete enough to warrant substantive review until the Hearing Notice was issued on October 15, 2020. Consistent with the Staff's schedule, Petitioners reasonably waited until October 15 to begin their own review.

[3] Dominion's Environmental Report makes only one, extremely vague statement regarding the implications of the Fukushima accident, asserting that "changes have been implemented at the site in response to Fukushima Daiichi Near Term Task Force recommendations and other plant-specific programs that are "risk-beneficial." *Id.* at E-4-87.

expected to be released after the notice of hearing. For instance:

- In 2018, in the SLR proceeding for the Peach Bottom nuclear power plant, Petitioner Beyond Nuclear raised concerns about the applicant's need to obtain better information about operating experience for the equipment monitoring program. After the Atomic Safety and Licensing Board denied the admissibility of Beyond Nuclear's contentions, Beyond Nuclear appealed to the Commissioners in July 2019. But the Commission did not rule on Beyond Nuclear's appeal until November 12, 2020.[4] Petitioners seek additional time to review that decision and determine how it will affect the concerns they will raise in this proceeding.
- In addition, the NRC is still in the process of responding to a relevant Freedom of Information Act ("FOIA") request made by Beyond Nuclear more than two years ago, seeking information regarding harvesting of aging reactor components, an issue that is highly relevant to Dominion's SLR application.[5] Documents released by the NRC on October 30, 2020 include slide presentations on that topic by North Anna licensee Dominion and Westinghouse, North Anna's designer and builder.[6] Petitioners reasonably seek additional time to review these documents, which they only recently received through no fault of their own, and which are highly relevant to this proceeding due to their authorship by Dominion and

[4] *See Exelon Generation Co.,* LLC (Peach Bottom Atomic Power Station, Units 2 & 3), CLI-20-11, __ N.R.C. __ (Nov. 12, 2012).

[5] *See* Attachment A, Letter from Diane Curran to NRC FOIA Officer (Sept. 25, 2018).

[6] These slides were presented on March 7-8, 2017, at an NRC workshop attended by international government representatives, reactor licensees, and industry contractors. *See* Attachment B, Dominion, *Kewaunee Station, Insights on Material Harvesting*; Attachment C, Arzu Alpan, *Importance of Harvesting to Evaluate Radiation Effects on Concrete Properties*; Attachment D, Arzu Alpan, *Potential Harvesting of Concrete from Mihama Unit 1*.

Westinghouse. Indeed, an extension should be granted as a matter of fundamental fairness, given the NRC's inexplicable failure to post these documents on ADAMS in 2017 despite the fact that they contained no proprietary information, its failure to provide public notice of the workshop even though it was widely attended by nuclear industry and government officials, and its failure to respond in a timely way to Beyond Nuclear's 2018 FOIA request.[7]

- Based on statements by the NRC's FOIA staff, Beyond Nuclear expects that future disclosures under FOIA NRC-2018-000831 will include a video recording of the March 2017 workshop on harvesting reactor components, including presentations and panel discussions among the participants. According to an NRC Staff e-mail recently disclosed in FOIA NRC-2018-000831, the workshop was structured to devote a significant amount of time (at least 40%) to "a well-balanced discussion of harvesting."[8] Thus, Petitioners reasonably anticipate that in addition to the informative content of the meeting slides, the video recording of group discussions will provide important insights into NRC and industry views on the extent to which harvesting is needed in order to understand the behavior of aging reactor equipment.

- The current timeframe for preparing a hearing request includes the Thanksgiving holiday,

[7] The NRC is slowly and incrementally releasing responsive documents. The agency does not expect to complete its response to Beyond Nuclear's FOIA request until the end of March, 2021 – more than two and a half years after Beyond Nuclear submitted the request. *See* Attachment E, E-mail from Karen Danoff, NRC to Diane Curran, counsel for Beyond Nuclear, re estimated projected completion date for FOIA NRC-2018-000831 (Nov. 19, 2020).

[8] Attachment F, E-mail from Matthew Hiser, NRC, to Sherry Bernhoft, EPRI, et al., re: Harvesting Workshop Sessions 3 & 4 (Jan. 17, 2017).

in which Petitioners and their counsel have made plans to spend time with family. Any extension granted by the NRC should also account for religious and New Year's observances in December.

- Petitioners' counsel is balancing the North Anna intervention with professional obligations in other cases, including briefing in a D.C. Circuit appeal, *Beyond Nuclear v. NRC,* No. 20-1187 (consolidated with No. 1225).
- As the NRC has recognized, the ongoing Covid-19 pandemic adds additional time burdens and restrictions on Petitioners and their counsel, including limitations imposed by having to work from home or restrict office hours. Consistent with the NRC's own practices, 32 days constitutes a fair and reasonable amount of additional time to prepare.
- Finally, an extension of 32 days at the outset of this proceeding will assist the NRC in conducting an efficient and effective proceeding by allowing Petitioners a more meaningful opportunity to prepare and present their case. And the requested extension will not cause significant harm to Dominion, which has submitted its SLR application well in advance of the expiration dates of the operating licenses for North Anna Unit 1 (18 years before expiration date of 2038) and North Anna Unit 2 (20 years before expiration date of 2040). In fact, 20 years in advance is the earliest time permitted by NRC regulations for a license renewal application. 10 C.F.R. § 54.17(c).

Under these circumstances, Petitioners respectfully submit that they have good cause to request a 32-day extension until January 15, 2021, to prepare and submit their hearing request.

Respectfully submitted,

___/signed electronically by/__
Diane Curran
Harmon, Curran, Spielberg & Eisenberg, LLP
1725 DeSales St. N.W., Suite 500
Washington, D.C. 20036

November 23, 2020
Re-filed December 9, 2020

CERTIFICATE OF COUNSEL PURSUANT TO 10 C.F.R. § 2.323(b)

I certify that on November 20, 2020, I contacted counsel for the NRC Staff and Dominion in an attempt to resolve the issue raised by this motion. Counsel for the NRC Staff stated that the Staff would not oppose an extension until January 15, 2021. Counsel for Dominion stated that Dominion would oppose the motion.

___/signed electronically by/__
Diane Curran

ATTACHMENT A

Harmon, Curran, Spielberg + Eisenberg LLP
1725 DeSales Street NW, Suite 500
Washington, DC 20036
202.328.3500 | office
202.328.6918 | fax
HarmonCurran.com

September 25, 2018

FOIA Officer
Mail Stop T-2 F43
U.S. Nuclear Regulatory Commission
Washington, DC 20555
BY EMAIL: foia.resources@nrc.gov and
BY FOIAOnline

SUBJECT: *Freedom of Information Act Request*

Dear FOIA Officer:

On behalf of the Beyond Nuclear, and pursuant to the Freedom of Information Act ("FOIA") (5 U.S.C. § 552 et seq.) and U.S. Nuclear Regulatory Commission ("NRC") FOIA regulations, I am writing to request you for access to and copies of records generated or received by NRC relating to past, existing or proposed harvesting of aged materials from operating nuclear reactors and decommissioning or decommissioned nuclear reactors. The harvesting of reactor parts is described in the attached presentation by Hiser, et al., *Harvesting of Aged Material from Nuclear Power Plants* (RIC: 2018). The date range of the requested documents is January 1, 2015 to the present.

This request includes but is not limited to:

1) Internal records generated within the NRC (including but not limited to the NRC Office of Nuclear Reactor Research / Division of Engineering / Corrosion Metallurgy Branch ("RES/DE/CMB"), NRC Headquarters, and the Office of the Commission;

2) Records of external communications between the NRC and other parties, including but not limited to the Nuclear Energy Institute and the Electric Power Research Institute; and

3) Records of communications between the NRC and the national laboratories, including but not limited to Pacific Northwest National Laboratory and Oak Ridge National Laboratory.

If it is your position that records exist that are responsive to this request, but that those records (or portions of those records) are exempt from disclosure pursuant to the FOIA and NRC implementing regulations, please identify the records the records that are being withheld and state the basis for the denial for each record being withheld. In addition, please provide the non-exempt portions of the records.

Definition of "Records"

The term "record" should be construed to mean any written, recorded, or graphic matter of any nature whatsoever, regardless of how recorded, and whether original or copy, including, but not

limited to, the following: memoranda, reports, expense reports, books, manuals, instructions, financial reports, working papers, records, notes, letters, notices, confirmations, telegrams, receipts, appraisals, pamphlets, magazines, newspapers, prospectuses, interoffice and intra-office communications, electronic mail (e-mail), contracts, cables, notations of any type of conversation, telephone calls, meetings or other communications, bulletins, printed matter, computer printouts, teletypes, invoices, transcripts, diaries, analyses, returns, summaries, minutes, bills, accounts, estimates, projections, comparisons, messages, correspondence, press releases, circulars, financial statements, reviews, opinions, offers, studies and investigations, questionnaires and surveys, and work sheets (and all drafts, preliminary versions, alterations, modifications, revisions, changes, and amendments of any of the foregoing, as well as any attachments or appendices thereto), and graphic or oral records or representations of any kind (including without limitation, photographs, charts, graphs, voicemails, microfiche, microfilm, videotape, recordings and motion pictures), electronic and mechanical records or representations of any kind (including, without limitation, tapes, cassettes, disks, computer server files, computer hard drive files, CDs, DVDs, memory sticks, and recordings) and other written, printed, typed, or other graphic or recorded matter of any kind of nature. A record bearing any notation not a part of the original text is to be considered a separate record. A draft of a non-identical copy is to be construed as a separate record.

The terms "relating" and "regarding" with respect to any given subject, should be construed to mean anything that constitutes, contains, embodies, reflects, identifies, states, refers to, deals with or is in any manner whatsoever pertinent to that subject. The inclusion and description of particular records in this request should not be construed to eliminate other records that are not described in particular detail if they should exist in another format.

Request for Documents in Electronic Format

If possible, please provide the requested documents in electronic (pdf) format.

Request for Waiver of Fees

Pursuant to federal regulations at 10 CFR 9.41, Beyond Nuclear requests that any searching and copying fees incurred as a result of this search be waived. Beyond Nuclear satisfies all of the NRC's criteria in 10 C.F.R. § 9.41(b) for this FOIA request:

1) *Purpose of request:* The purpose of the request is to gather information on the NRC oversight and regulation of the operational safety and reliability of nuclear power generating stations seeking Subsequent License Renewal, particularly with respect to the value of considering information gained from evaluating the condition of components from decommissioned reactors. The requested information is currently not publicly available through the agency's public document room.

2) *Extent to which Beyond Nuclear will extract and analyze the substantive content of the records:* Beyond Nuclear is qualified to make use of the requested information. Its staff has demonstrated the ability to interpret information and communicate that information in a form comprehensible to the general public. Beyond Nuclear is quoted in national and international

media and has been cited as a reliable source of information on NRC oversight and enforcement of regulation regarding the operation of nuclear power generating stations and public safety in electronic and print media including newspapers such as the New York Times and the Washington Post. Beyond Nuclear is recognized and utilized as a reliable source of information in the broadcast media of television, radio and the worldwide web. Beyond Nuclear has a working relationship with physicists, structural and nuclear engineers, federal policy analysts and other respected professionals who contribute to the full understanding of the NRC oversight and regulation of operational safety and reliability of nuclear power generating stations seeking Subsequent License Renewal.

3) *Nature of the specific activity or research in which the records will be used and Beyond Nuclear qualifications to utilize the information for the intended use in such a way that it will contribute to public understanding:* Beyond Nuclear seeks the requested information solely to contribute to and help shape the public policy debate on NRC oversight, regulation and licensing of nuclear power stations seeking Subsequent License Renewal. Beyond Nuclear intends to use the information in order to advance the concerns for public understanding of NRC oversight and enforcement of regulation regarding the operational safety of nuclear power generating stations seeking Subsequent License Renewal.

4) *Likely impact on the public understanding of the subject as compared to the level of understanding of the subject prior to disclosure:* The public understanding of the issues regarding NRC oversight and enforcement of requirements for the protection of public safety will be enhanced by the contribution of this information.

5) *Size and nature of the public to who's understanding a contribution will be made:* Beyond Nuclear has a membership of 23,000 who periodically receive communications from Beyond Nuclear. Beyond Nuclear provides resource material to electronic and print media outlets with very broad outreach to a constituency and the interested public. Additionally, Beyond Nuclear maintains a web site at www.BeyondNuclear.org, where postings on this issue will be made available.

6) *Means of distribution of the requested information:* Beyond Nuclear will use its publications and media contacts in both electronic and print media outlets to provide very broad outreach to the public on this issue. Beyond Nuclear will also share information with other interested parties concerned about NRC oversight and enforcement of public safety requirements. Additionally, Beyond Nuclear will post information on its web site.

7) *Whether free access to information will be provided:* Beyond Nuclear will provide the information without charge to all members of the public. Information from the FOIA requested will be prepared for printed material and electronically posted on the web site for downloading free of charge. Beyond Nuclear will provide a copy of information to all interested public without charge.

8) *No commercial interest by Beyond Nuclear or any other party:* Beyond Nuclear is a nonprofit charitable organization and therefore has no commercial interest in obtaining the requested information. This information is provided to all public requests without charge.

The sole interest of Beyond Nuclear is to promote an open policy debate on the quality of NRC oversight, operational licensing and enforcement of requirements for the protection of public safety.

Thank you very much for your prompt attention to this request. We look forward to receiving your response within 20 working days, as required by 10 C.F.R. § 9.25(a). In the meantime, please call me at 240-393-9285 if you have any questions regarding this request.

Sincerely,

Diane Curran

Counsel to Beyond Nuclear

Cc: Paul Gunter, Beyond Nuclear

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

RIC 2018

Harvesting of Aged Materials from Nuclear Power Plants

M. Hiser[a], P. Purtscher[a], P. Ramuhalli[b], A.B. Hull[a], and R. Tregoning[a]; [a]U.S. Nuclear Regulatory Commission (NRC), [b]Pacific Northwest National Laboratory

Background and Motivation

Recent developments in the nuclear industry include stronger interest in extended plant operation and plans to shut down a number of nuclear power plants (NPPs). In the United States, there is strong interest in extending NPP lifespans through subsequent license renewal (SLR) from 60 to 80 years.

Extended plant operation and SLR raise a number of technical issues that may require further research to understand and quantify aging mechanisms. U.S. utilities and the U.S. Nuclear Regulatory Commission (NRC) have focused on the aging of systems, structures, and components and in particular four key SLR issues: reactor pressure vessel embrittlement, irradiation-assisted stress-corrosion cracking of reactor internals, concrete structures and containment degradation, and electrical cable qualification and condition assessment.

Meanwhile, in recent years, a number of NPPs, both in the United States and internationally, have shut down or announced plans to shut down for various reasons, including economic, political, and technical challenges. Unlike in the past when there were very few plants shutting down, these new developments provide opportunities for harvesting components that were aged in representative light-water reactor environments.

In a third related development, economic challenges and limited budgets have restricted the resources available to support new research, including harvesting programs. Given this constrained budget environment, aligning interests and leveraging with other organizations is important to allow maximum benefit and value for future research programs.

Current Activities

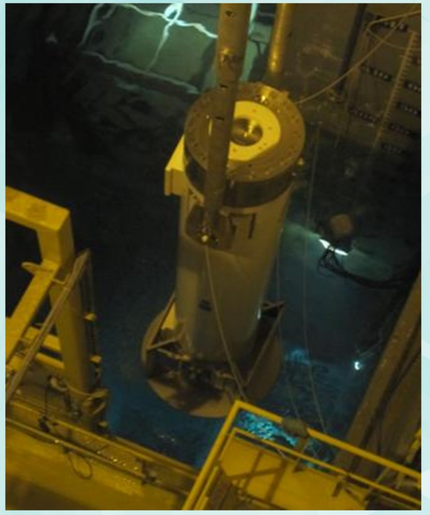
The NRC has recently undertaken an effort, with the assistance of Pacific Northwest National Laboratory, to develop a strategic approach to harvesting aged materials from NPPs. Because of limited opportunities, past harvesting efforts have been reactive to individual plants shutting down and beginning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

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

Potential Criteria for Harvesting Prioritization

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

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



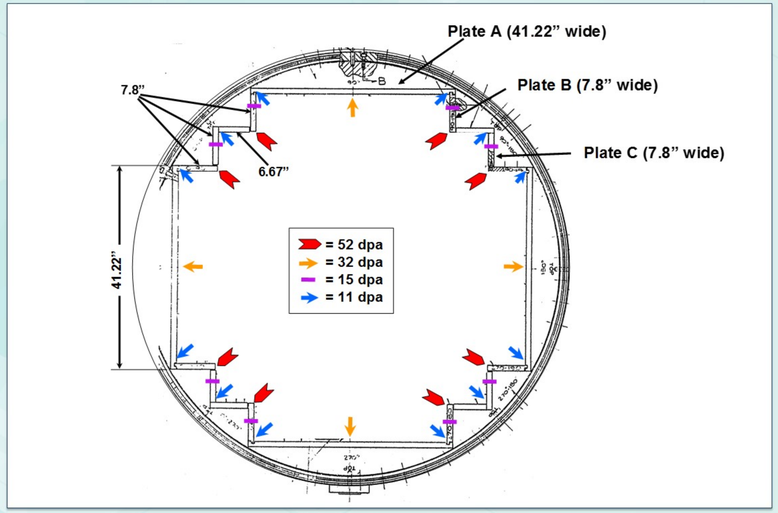
Lifting operation for irradiated materials transport cask

Harvesting Database

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

Path Forward

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



Example of reactor internals harvesting plan

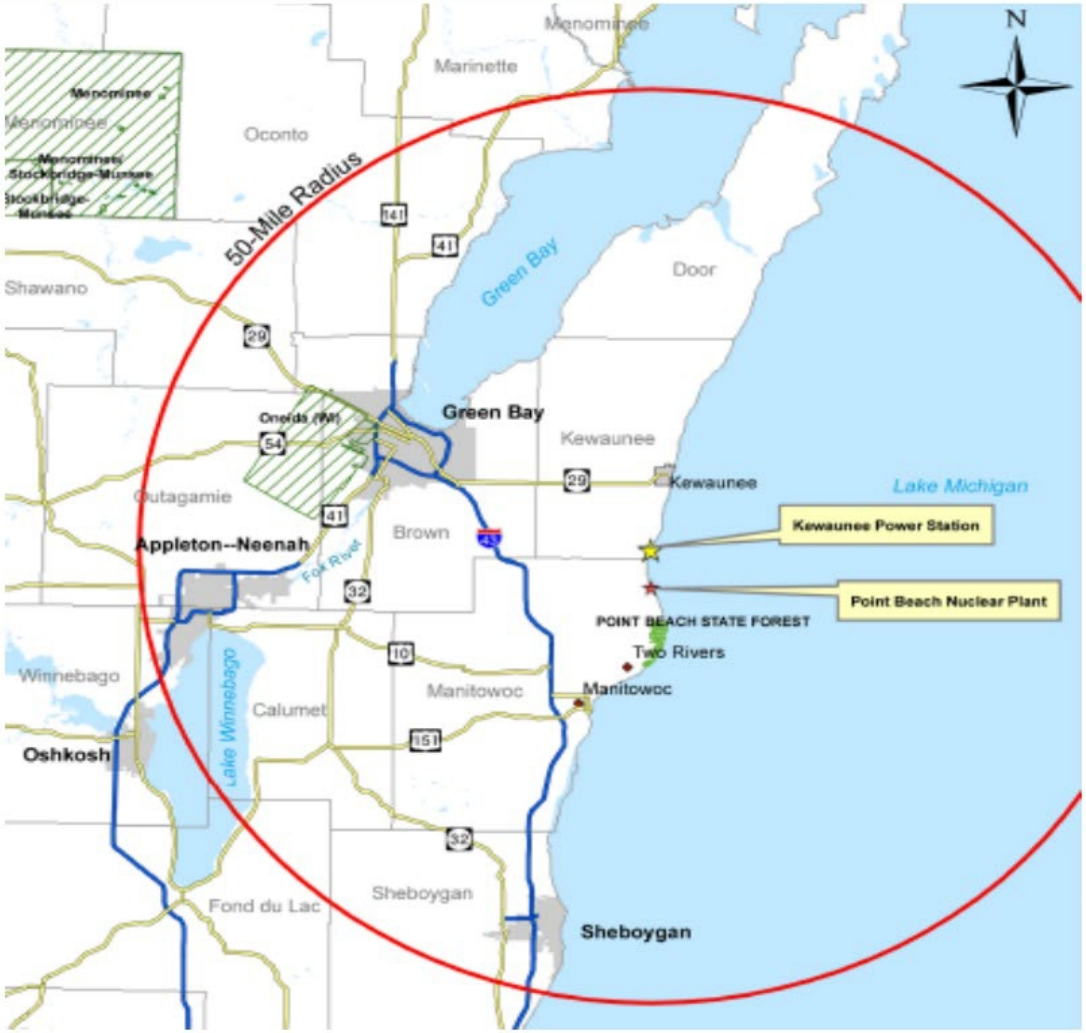
ATTACHMENT B

Dominion

Kewaunee Power Station

Insights on Material Harvesting

Kewaunee Power Station



Kewaunee Power Station

Kewaunee Power Station

2-Loop Westinghouse PWR (590MWe)

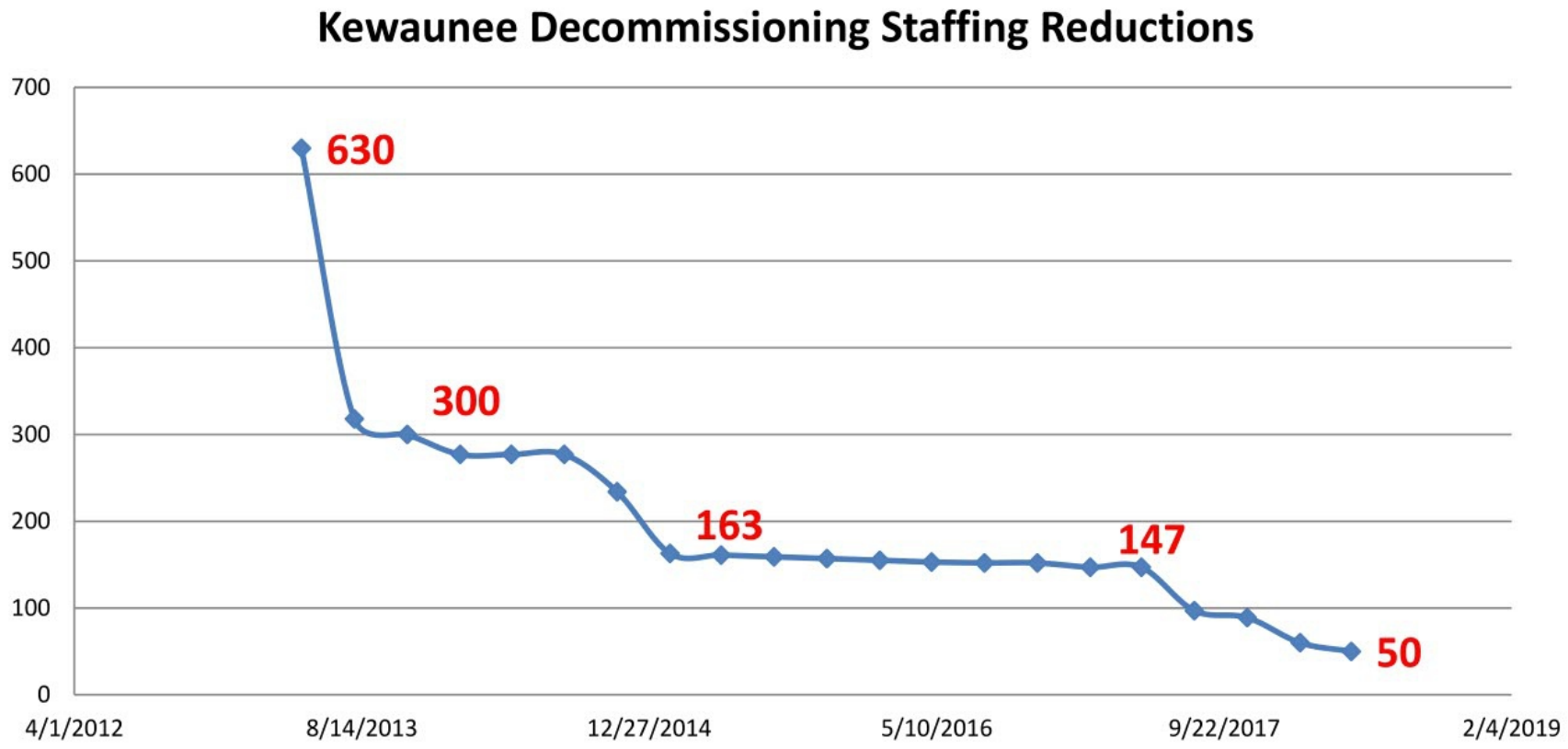
• Construction permit	August 1968
• Operating license	December 1973
• Initial operating license expiration	December 2013
• Renewed Operating License Issued	February 2011
• Shutdown decision (unexpected)	October 2012
• Permanently Shutdown	May 2013
• ERO offsite response eliminated	November 2014
• All nuclear fuel in dry storage	July 2017

Dominion

Kewaunee Perspective

- Top priority for decommissioning plants is **preserving and good stewardship of the decommissioning trust fund**
- Highest fund drain is staffing
- Station electrical use also expensive
- Initial decommissioning actions focus on safety and cost reduction.
  - ◇ Use initial required large staff to prepare plant for long term dormancy and decommissioning
  - ◇ Abandon or downsize equipment to reduce ongoing costs.
  - ◇ Then reduce staff commensurate with reduction in risk

Kewaunee Power Station



Dominion

Kewaunee Perspective

- Timing is everything!
- Perhaps best discussed via an example:
  - ◇ Reactor vessel surveillance capsules
  - ◇ Two remain in the vessel
  - ◇ Logistical considerations:

Dominion

Kewaunee Perspective

- Circulating Water pumps were high energy consumers
- Therefore we wanted to retire them as soon as possible
- Circulating Water pumps were high capacity, low head, very good at dilution for meeting ODCM requirement for radiological discharges
- Without CW pumps, much smaller capacity service water pumps will be used in the future for dilution..

Dominion

Kewaunee Perspective

- Therefore – prior to retiring CW pumps, we processed as much radioactive water as possible
- This included draining the RCS
- RCS at Kewaunee has no loop isolation valves
- RCS today is drained to the bottom of the cold legs, about 7 feet below the RV flange
- RV internals are installed, RV head is on the vessel, flux thimbles are installed in the vessel

Dominion

Kewaunee Perspective

- So if we wanted to remove surveillance capsules today we would face unique challenges that would not have been present at initial plant shutdown:
  - ◇ Shielding – need to refill the RV (and cavity?)
  - ◇ Lifting the RV head and internals – polar crane is in place, but maintenance has been discontinued
  - ◇ Qualified staff – Crane operators, RP technicians, maintenance, operators
  - ◇ Rad monitors (many have been abandoned)
  - ◇ Ventilation and atmosphere control, lighting

Dominion

Kewaunee Perspective

- What generic issues could be resolved or simplified by harvesting and additional testing?
- GALL aging management program examples
  - ◇ Electrical cables and connections – test power cables taken from adverse localized environments
  - ◇ SG divider plates; autogenous welds
  - ◇ Buried piping;
  - ◇ Inaccessible power cables (buried; underground)

Dominion

Additional Considerations

- Who will pay?
- Why is the material needed?
  - ◇ “What’s in it for me?”
  - ◇ Are we solving an industry problem? (example – SFP neutron absorbing material GL 2016-01)
  - ◇ Objectively needing more information to determine if we have a new problem?
  - ◇ What’s the plan? What is done with the information gathered? Is there a driver to review impact on existing programs?

Dominion

Additional Considerations

- Need to think ahead, plan ahead
- Some harvesting is very plant condition specific, others maybe not
- What plants will be entering decommissioning in the future?
- Have you reached out to them?
- Scope, Schedule, Budget

Kewaunee Perspective

ATTACHMENT C

Importance of Harvesting to Evaluate Radiation Effects on Concrete Properties

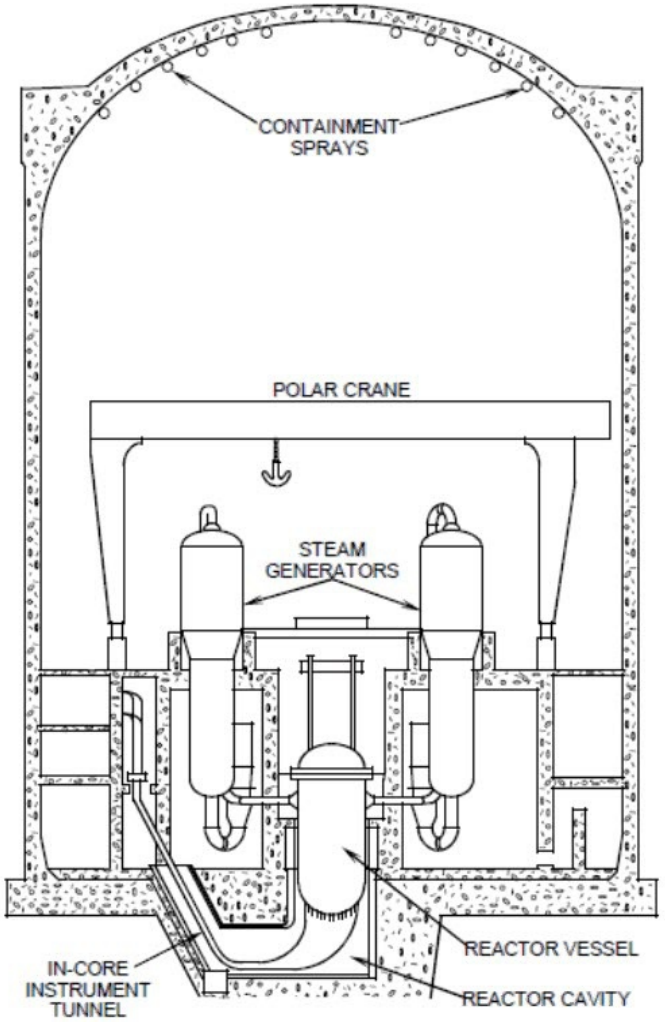
Arzu Alpan, Principal Engineer

Westinghouse

Nuclear Power Plant Concrete Structures

- There are various safety-related concrete structures in nuclear power plants (primary containment, containment internal structures, secondary containment/reactor buildings, other structures)

- Near the pressure vessel:
  - Biological shield concrete is placed around the pressure vessel to reduce radiation to allowable levels for humans
  - Some plants use concrete as the pressure vessel support structure



Westinghouse

Radiation Effects on Concrete

- The radiation types important for the concrete biological shield and reactor vessel support structure are gamma rays and neutrons
- Effects of radiation on concrete for long-term nuclear power plant operation has been of interest to various organizations
- Radiation effects on the properties of concrete depend on the intensity of the radiation field, period of exposure, and concrete composition
- Radiation affects concrete properties such as compressive and tensile strength, modulus of elasticity, creep, volumetric variation

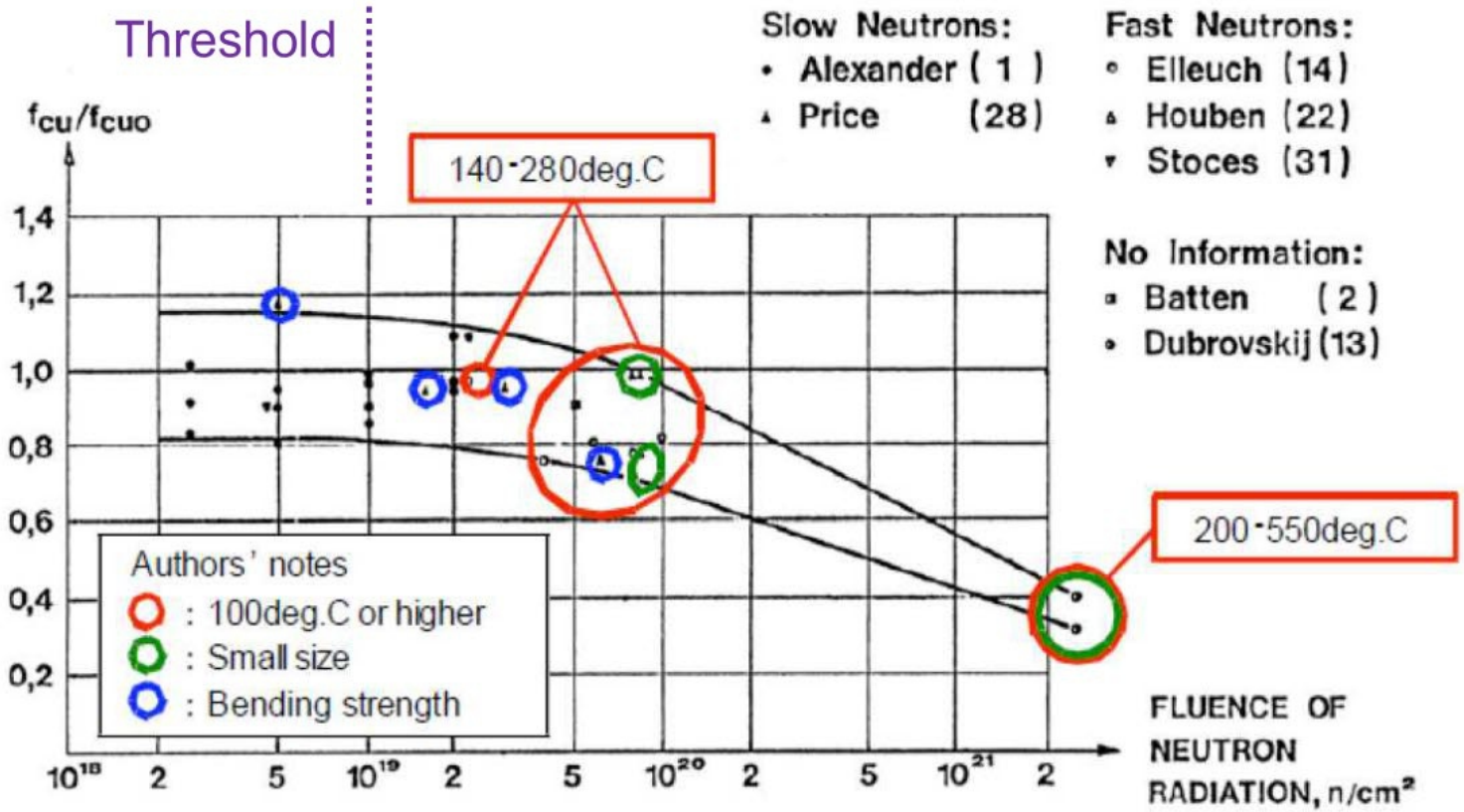
Westinghouse

Radiation Effects on Concrete

- Effects of radiation on concrete has been addressed in various reports; the work by Hilsdorf et al. (1978) is cited frequently:
  - H.K. Hilsdorf, J. Kropp, and H.J. Koch, "The Effects of Nuclear Radiation on the Mechanical Properties of Concrete," American Concrete Institute Special Publication SP-55, 223-251 (1978)
- The change in compressive strength under neutron radiation exposure was selected for evaluation for this presentation, from the work by Hilsdorf et al. (1978)
- Purpose is to find a threshold radiation level where significant strength reduction will occur

Westinghouse

Compressive Strength of Concrete Exposed to Neutron Radiation - Hilsdorf et al (1978)



NUREG/CR-7171, ORNL/TM-2013/263, "A Review of the Effects of Radiation on Microstructure and Properties of Concretes Used in Nuclear Power Plants," November 2013

Westinghouse

Need for New Data for Irradiated Concrete

- Data providing information on the effect of radiation on concrete properties are limited and an expansion of the irradiated concrete database is needed
- New data should be representative of conditions associated with nuclear power plants, indicating the need to obtain and test concrete samples from shutdown nuclear power plants
- Furthermore, reliable fluence data from radiation transport calculations is also needed
- Reliable fluence data is achieved by dosimetry measurements
  - Measurement data validates the radiation transport calculational methodology and determines the uncertainty in fluence calculations

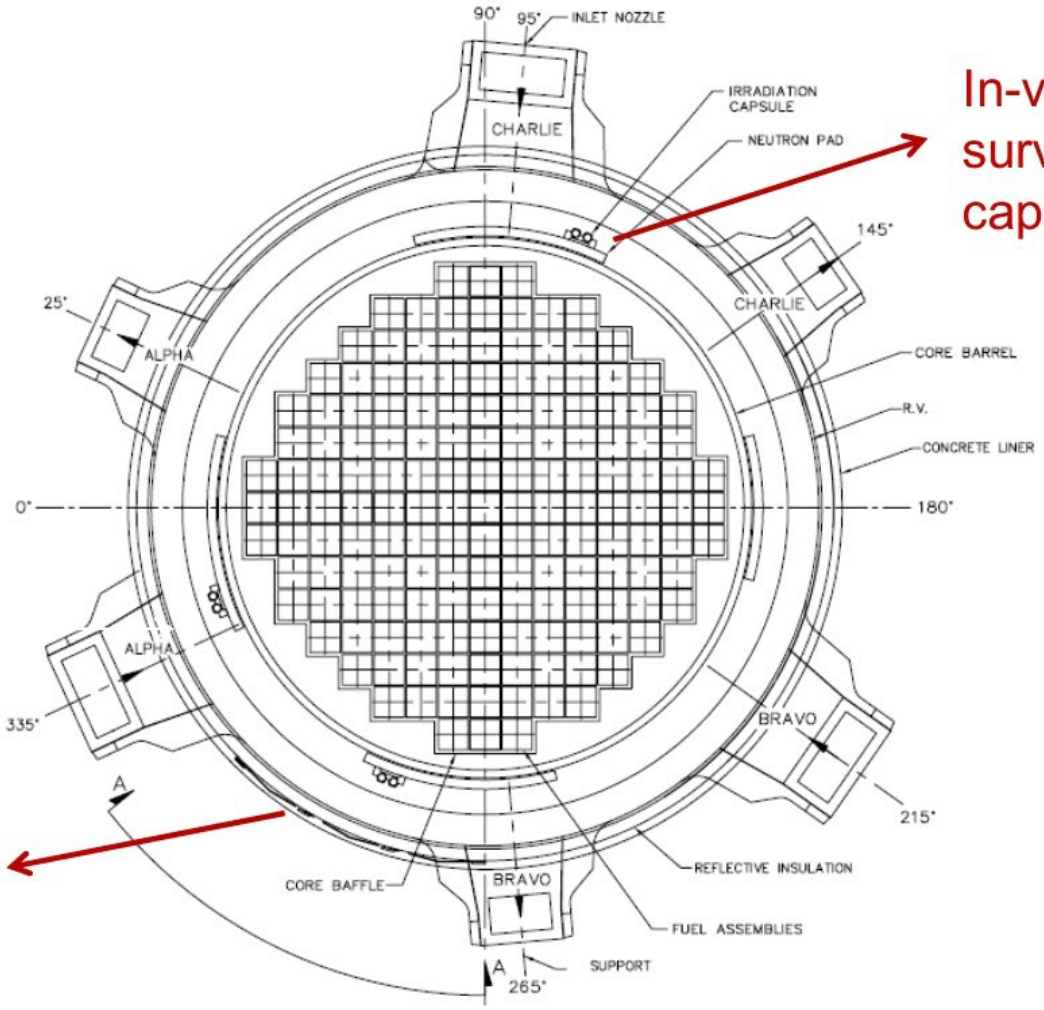
Westinghouse

Neutron Dosimetry for Reactor Pressure Vessel Fluence Calculations

- Reactor pressure vessel fluence calculational methodology validation and uncertainty determination is obtained from:
  - Surveillance capsules
  - Pressure vessel clad sampling
  - Ex-vessel neutron dosimetry (EVND)

Westinghouse

In-Vessel and Ex-Vessel Neutron Dosimetry Plan View

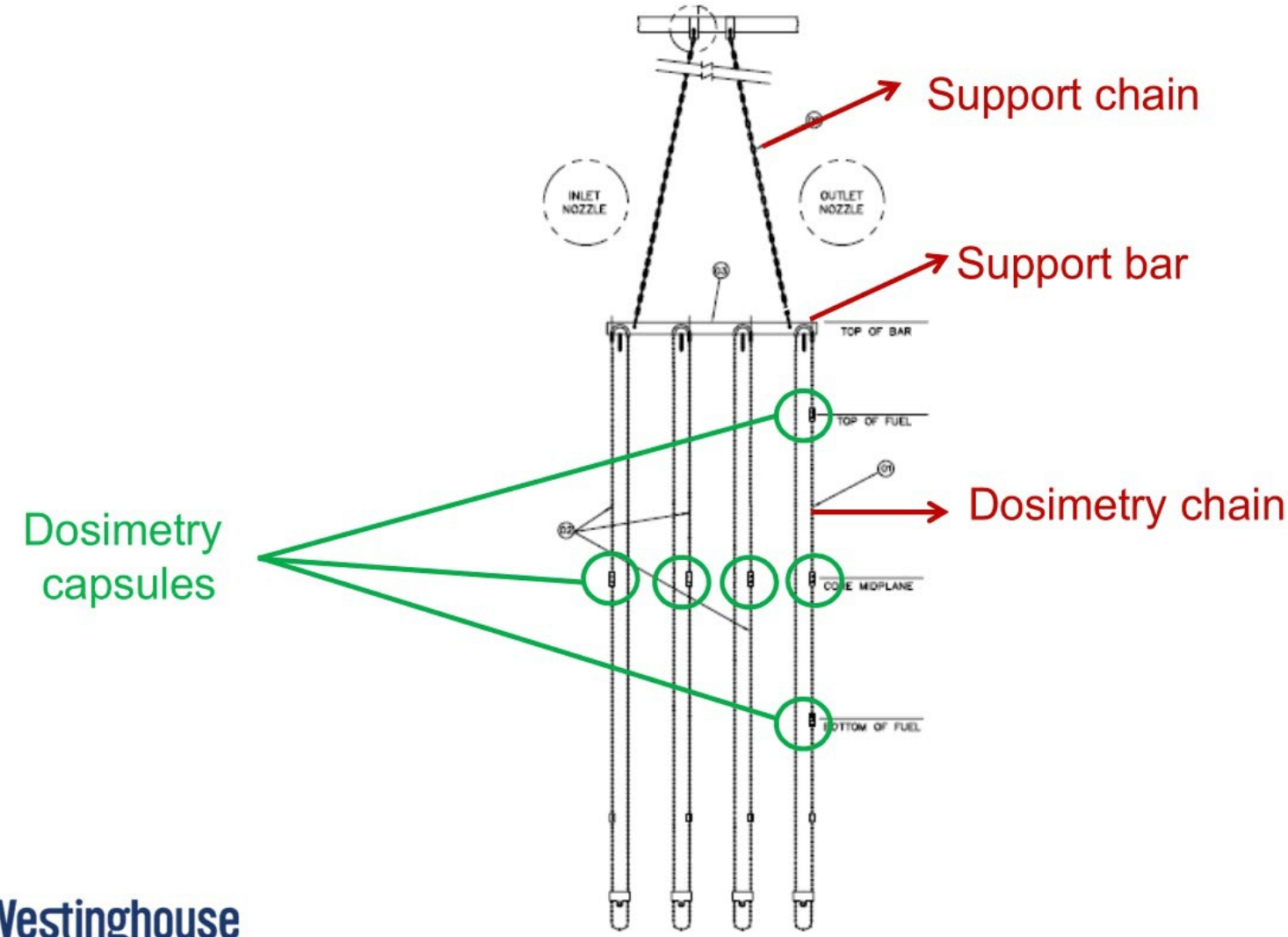


In-vessel surveillance capsule

Ex-vessel neutron dosimetry

Westinghouse

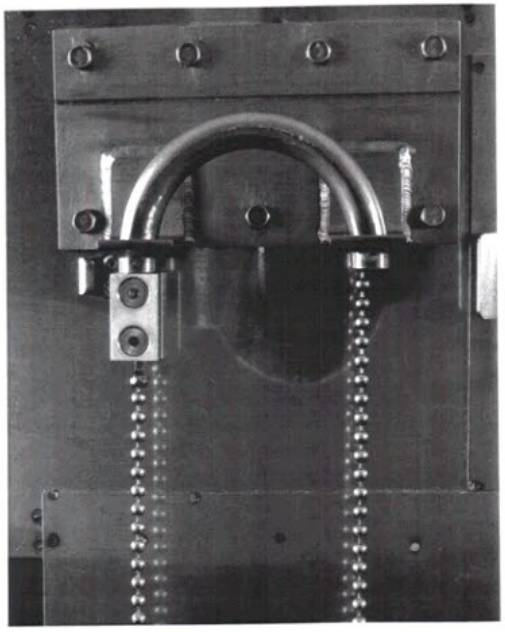
Ex-Vessel Neutron Dosimetry Section View



Westinghouse

Ex-Vessel Neutron Dosimetry

Support Bar



U Tube on Support Bar

EVND Capsule

Westinghouse

Ex-Vessel Neutron Dosimetry

Westinghouse has successfully provided ex-vessel neutron dosimetry programs to nuclear plants since 1974, including:

- Almaraz • Asco
- Beaver Valley • Braidwood • Brunswick • Byron
- Callaway • Catawba • Comanche Peak • Connecticut Yankee
- Diablo Canyon
- Farley
- H. B. Robinson
- Kori • Krsko
- McGuire • Mihama
- Palisades • Point Beach
- Ringhals
- South Texas • St. Lucie
- Turkey Point
- Ulchin
- Vogtle • V. C. Summer • Vandellos
- Wolf Creek
- Yonggwang (Hanbit)
- Zion

Westinghouse

Neutron Dosimetry Measurements for Concrete

- Similar to the pressure vessel fluence analysis, fluence calculations for concrete should utilize measurements for calculational methodology validation and fluence uncertainty determination

- Since EVND is installed at the cavity in front of concrete, it provides dosimetry measurement data useful for concrete fluence calculations

Westinghouse

Conclusions

- Data on irradiation effects on concrete properties are limited; existing data has deficiencies and may be non-representative of the conditions associated with nuclear power plants
- New data is needed to evaluate irradiated concrete degradation; this is best achieved through testing concrete samples obtained from nuclear power plants
- Materials testing data are coupled with fluence data in the evaluation of irradiated concrete degradation

Westinghouse

Conclusions

- Neutron dosimetry measurements should be used in qualifying the fluence calculational methodology and determining the uncertainty in fluence calculations for concrete
  - EVND is appropriate to use for concrete fluence calculations
  - A potential nuclear power plant to harvest concrete that also has neutron dosimetry measurement data will be discussed in Session 3

ATTACHMENT D

Potential Harvesting of Concrete from Mihama Unit 1

Arzu Alpan, Principal Engineer

Westinghouse

Concrete Harvesting / Testing / Fluence Analysis

- Harvesting of concrete from nuclear power plants is needed to understand the mechanisms that cause radiation damage
- Materials testing data is used with exposure data to evaluate irradiated concrete degradation
- It is important to validate the fluence calculations using measurement data

Westinghouse

Mihama Unit 1 Neutron Dosimetry for Concrete

- Westinghouse installed and analyzed neutron dosimetry for one fuel cycle at Mihama Unit 1 at the reactor cavity in front of concrete and away-from-reactor side (back of) concrete
- The dosimetry measurements were used to validate the radiation transport calculations and estimate the water content of concrete at Mihama Unit 1
- Other dosimetry measurement data (e.g. from surveillance capsules) could be used as supplemental data to validate the radiation transport calculations

Westinghouse

Opportunity to Harvest Concrete from Mihama Unit 1

- Mihama Unit 1 was shutdown in 2015
  - Kansai submitted its decommissioning plan to the Nuclear Regulation Authority (NRA)
- Westinghouse is in communication with Kansai to investigate the possibility of extracting cores from the concrete biological shield of Mihama Unit 1

Westinghouse

Collaboration Possibilities

- Westinghouse allocated internal funding to investigate the possibility of harvesting concrete from Mihama Unit 1 and explore feedback from the industry, with the expectation of external funding to complete the project

- We would like your feedback on this possible opportunity and determine if there is an industry interest for this work

Westinghouse

ATTACHMENT E

Diane Curran

From: Danoff, Karen <Karen.Danoff@nrc.gov>
Sent: Thursday, November 19, 2020 10:17 AM
To: Diane Curran
Cc: Blaney, Stephanie
Subject: estimated projected completion date for FOIA NRC-2018-000831

Hi Diane,

The estimated projected completion date for FOIA NRC-2018-000831 is the end of FY21, Q2: March 31, 2021.

This date could shift, it depends on when we receive all the responses from the consultations to external parties (other agencies, laboratories within the U.S., and outside the U.S.), but this is our best estimated projection date at this time.

Sincerely,
Karen

From: Diane Curran <dcurran@harmoncurran.com>
Sent: Thursday, November 19, 2020 10:03 AM
To: Danoff, Karen <Karen.Danoff@nrc.gov>
Cc: Blaney, Stephanie <Stephanie.Blaney@nrc.gov>
Subject: [External_Sender] RE: Received your voice mail this morning re: FOIA NRC-2018-000831

Thanks Karen,
That is very helpful and encouraging news.
Diane

From: Danoff, Karen <Karen.Danoff@nrc.gov>
Sent: Thursday, November 19, 2020 10:01 AM
To: Diane Curran <dcurran@harmoncurran.com>
Cc: Blaney, Stephanie <Stephanie.Blaney@nrc.gov>
Subject: Received your voice mail this morning re: FOIA NRC-2018-000831

Hi Diane,

I was in a meeting when you called this morning. My work number is now automatically transferred to my personal cell phone, so I was able to retrieve and listen to your voice mail after our meeting.

I am confirming the estimated projected date of the completion of FOIA NRC-2018-000831 with our FOIA Officer right now to provide you a response today.

On a related matter, late yesterday afternoon I submitted the 7th interim response of 446 pages to our FOIA Officer for her review. Once she concurs, I can prepare that response for you to retrieve in BOX.

Sincerely,
Karen

Karen Danoff
Government Information Specialist, FOIA Team
Governance & Enterprise Management Services Division
Office of the Chief Information Officer
US Nuclear Regulatory Commission
Rockville, MD 20852
301-415-5072
Karen.Danoff@nrc.gov

ATTACHMENT F

4500S MS 6132

PO Box 2008
Oak Ridge, TN 37831

TEL: 1-865-574-5380
rosseeltm@ornl.gov

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

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

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

Notes from today's call:

- Matt H. described general plans for workshop:
- Non-public, keep participation to around 30 individuals for more focused interactive discussion
- Goal is to have well-balanced discussion of harvesting, not sales pitches for specific projects or programs
- Sherry B. suggested fewer presentations with more panel discussion time
- Plan is for roughly 50-60% presentations and remaining time for discussion
- Sessions 1 and 5 should be primarily panel discussion
- Session 2:
- Question raised about covering metals, cables, and concrete
- Agreed that all presenters can cover all three types materials, hopefully just a few slides
- Suggest presenters focus on high-priority data needs from their organization's perspective
- Perhaps some background on what informs their priorities
- Session 3:
- Suggestions to include EnergySolutions, PWROG, Korea, Japan, and French presentation slots
- Emphasize to presenters to avoid "sales pitch," but please provide information on sources of materials
- Short ~10 min presentations on sources of materials with remaining time for discussion
- Hopefully use presented information as starting point for previously harvested materials database
- Session 4:
- Longer (20-30 min) presentations focused on forward-looking lessons learned
- Suggestion to reach out to Exelon (Zion experience plus many operating facilities) if Dominion can't support
- Also consider Japan and France for international presentations

Actions:

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

Thanks!
Matt

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

-----Original Appointment-----
From: Hiser, Matthew
Sent: Monday, January 16, 2017 9:48 AM
To: Hiser, Matthew; Bernhoft, Sherry; Rosseel, Thomas M.; Dyle, Robin; Demma, Anne
Subject: Harvesting Workshop Sessions 3 & 4
When: Tuesday, January 17, 2017 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Telecon: 888-677-8615 passcode: (b)(6)

888-677-8615passcode: (b)(6)

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

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

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