

Official Transcript of Proceedings
NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
Design-Centered BWRX-300 Subcommittee
Open Session

Docket Number: (n/a)

Location: teleconference

Date: Wednesday, January 11, 2023

Work Order No.: NRC-2227

Pages 1-89

NEAL R. GROSS AND CO., INC.
Court Reporters and Transcribers
1716 14th Street, N.W.
Washington, D.C. 20009
(202) 234-4433

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

DISCLAIMER

UNITED STATES NUCLEAR REGULATORY COMMISSION'S
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, as reported herein, is a record of the discussions recorded at the meeting.

This transcript has not been reviewed, corrected, and edited, and it may contain inaccuracies.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

+ + + + +

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

DESIGN-CENTERED BWRX-300 SUBCOMMITTEE

+ + + + +

WEDNESDAY

JANUARY 11, 2023

+ + + + +

The Subcommittee met via Teleconference,
at 2:00 p.m. EST, Joy L. Rempe, Chair, presiding.

COMMITTEE MEMBERS:

- JOY L. REMPE, Chair
- RONALD G. BALLINGER, Member
- VICKI M. BIER, Member
- CHARLES H. BROWN, JR., Member
- VESNA B. DIMITRIJEVIC, Member
- WALTER L. KIRCHNER, Member
- GREGORY H. HALNON, Member
- JOSE MARCH-LEUBA, Member
- DAVID A. PETTI, Member
- MATTHEW W. SUNSERI, Member

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

ACRS CONSULTANTS :

DENNIS BLEY

STEPHEN SCHULTZ

DESIGNATED FEDERAL OFFICIAL :

MICHAEL SNODDERLY

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

C-O-N-T-E-N-T-S

Opening Remarks

Joy Rempe 4

Discussion of Memorandum of Understanding,
 Memorandum of Cooperation, and Collaboration on
 BWRX-300 (including major accomplishments, upcoming
 activities, and joint reports)

Robert Taylor 7

Donna Williams 9

Michael Dudek 36

Opportunity for Public Comment 82

Discussion of Upcoming Activities, Including
 Proprietary Schedules (Closed Session)

Member Discussion

Adjourn 89

P-R-O-C-E-E-D-I-N-G-S

2:00 p.m.

CHAIR REMPE: Okay. My computer tells me now it's 2:00 p.m. on the East Coast, so this meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguards' BWRX-300 Design-Centered Subcommittee.

I'm Joy Rempe, the chairman for this meeting. Members in attendance are Ron Ballinger, Vicki Bier, Charles Brown, Vesna Dimitrijevic, Jose March-Leuba, Walt Kirchner, Dave Petti, Greg Halnon, and Matt Sunseri. We're also being joined by our consultants Dennis Bley and Stephen Schultz.

Mike Snodderly is the designated federal official for this meeting.

Today the Subcommittee will discuss the NRC staff's Memorandum of Understanding, Memorandum of Cooperation, and Collaboration on BWRX-300 and other activities with the Canadian Nuclear Safety Commission.

The ACRS was established by statute and is governed by the Federal Advisory Committee Act, or FACA. The NRC implements FACA in accordance with the regulations found in Title 10 of the Code of Federal Regulations, Part 7. The Committee can only speak

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

(202) 234-4433

www.nealrgross.com

1 through its published letter reports. We hold
2 meetings to gather information and perform preparatory
3 work for the support and deliberations at a Full
4 Committee meeting.

5 The rules for participation in all ACRS
6 meetings were announced through the Federal Register
7 on June 13th, 2019. The ACRS section of the U.S.
8 NRC's public website provides our charter, bylaws,
9 agenda, letter reports, and full transcripts of all
10 Full and Subcommittee meetings that are open including
11 the slides presented there.

12 The agenda for this meeting was posted there.

13 Portions of this meeting will be closed to
14 protect proprietary information and information
15 provided in confidence pursuant to 5 USC 552(b)(C)(4).
16 As stated in the Federal Register notice and in the
17 public meeting notes published -- posted to our
18 website members of the public who desire to provide
19 written or oral input to the Subcommittee may do so
20 and should contact the DFO five days prior to the
21 meeting if possible.

22 The communications channel has been opened
23 to allow members of the public to monitor the open
24 portions of this meeting and the ACRS now invites
25 members of the public to use the MS Teams link so that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 it can also view slides and other discussion materials
2 during the open sessions. The MS Teams link
3 information was placed on the agenda on the ACRS
4 public web site and we did receive no written comments
5 or requests to make oral statements from members of
6 the public regarding today's session.

7 There will be an opportunity for public
8 comment during the meeting, however, and we have set
9 aside 10 minutes in the agenda for these comments from
10 members who are listening to the meeting if they
11 decide they would like to make a comment.

12 A transcript of the meeting is being kept
13 and it is requested that the speakers identify
14 themselves and speak with sufficient clarity and
15 volume so they can be readily heard. Additionally we
16 request that participants mute themselves when they
17 aren't speaking.

18 Before we begin with this meeting I want
19 to note that this topic came up during the review of
20 the BWRX-300 Topical Report, and during this meeting
21 we requested this briefing. And I want to thank the
22 staff for accommodating this request today.

23 So we'll now proceed with the meeting, and
24 I'd like to call on Rob Taylor of the Office of
25 Nuclear Reactor Regulations to begin his presentation.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 Rob?

2 MR. TAYLOR: Thank you, Joy. Good
3 afternoon, Chairman Rempe and Subcommittee members.
4 I'm Rob Taylor. I'm the Deputy Office Director for
5 New Reactors and have responsibility for the BWRX-300,
6 as well as other new and advanced reactor licensing
7 activities and our efforts in collaboration with the
8 Canadian Nuclear Safety Commission under the
9 Memorandum of Cooperation that you mentioned.

10 We're pleased to be here today to brief
11 you on an important effort related to our licensing of
12 SMRs and advanced reactors. The NRC has a bilateral
13 cooperation agreement with over 45 regulatory
14 counterparts that facilitate technical exchanges and
15 information sharing. We leverage these relationships
16 to enhance our ability to regulate the next generation
17 of reactors in the United States.

18 Today we will be discussing our
19 collaboration with our colleagues at the Canadian
20 Nuclear Safety Commission which provides a prime
21 example of the success of our international
22 cooperation on advanced reactors.

23 The NRC and CNSC have embarked on a first-
24 of-a-kind effort to collaboratively perform safety
25 reviews of advanced reactor and SMR designs that are

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 expected to be constructed in both countries. The
2 goal of this effort is to gain efficiencies by making
3 joint observations on advanced technologies or by
4 identifying where different regulations -- or
5 differing regulations may result in different
6 regulatory decisions.

7 Since signing the Memorandum of
8 Cooperation in 2019 the NRC and CNSC have participated
9 in collaborative reviews of key technical and
10 regulatory topics and produced six joint products
11 related to SMR and advanced reactor designs. This
12 cooperation has enabled us to gain valuable insights
13 into the benefits as well as complexities associated
14 with joint reviews. These lessons learned will be
15 crucial in informing how these reviews could
16 potentially be completed with multiple parties
17 involved while also ensuring that national
18 responsibilities are preserved.

19 Today we'll discuss how the Memorandum of
20 Cooperation is implemented, the successes and
21 challenges we've encountered, and talk about the
22 current projects and future plans for collaboration.
23 In particular we'll discuss recently initiated
24 projects to collaborate on specific technical topics
25 for the BWRX-300 SMR, which is the focus of this

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 Subcommittee.

2 We see tremendous value in the
3 collaboration with CNSC and anticipate that the
4 groundwork that we're laying today in pre-application
5 cooperation will enable more effective license reviews
6 of the BWRX-300 and other designs in the future.

7 I'll now turn the presentation over to
8 Donna Williams who will walk us through the materials.
9 Thank you.

10 MR. SNODDERLY: You're muted, Donna.

11 MS. WILLIAMS: Apologize. I was muted
12 there.

13 I'm Donna Williams, Senior Project Manager
14 in the Office of Nuclear Reactor Regulation, with
15 responsibility for project management in the -- of the
16 CNSC-NRC MOC.

17 So the presentation today, I plan to
18 discuss how and why the cooperation with Canada was
19 initiated and how it's being implemented. We'll
20 discuss the products that have been developed, the
21 current work and how we identify projects for future
22 work.

23 Several advanced reactor and small modular
24 reactor designs are under consideration for licensing
25 in both the U.S. and Canada and the vendors are

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 actively involved in pre-application activities with
2 both regulators, however different regulations,
3 guidance and practices for licensing in Canada and the
4 U.S. can negatively impact the standardization of
5 these designs. It was anticipated that if the
6 regulators were able to jointly review aspects of the
7 design, it would maximize design standardization and
8 provide review efficiencies.

9 In 2019 the NRC and CNSC signed an
10 historic Memorandum of Cooperation to provide a
11 mechanism for joint reviews of these reactors. The
12 MOC represents an important step in both countries'
13 strong commitment to be more effective, efficient, and
14 timely in the reviews of next generation technologies
15 while continuing to achieve their individual safety
16 missions.

17 The benefits of this collaboration to the
18 NRC and CNSC are effective and efficient regulation
19 and enhanced risk-informed agile decision making. The
20 MOC allows for both regulators to retain sovereignty
21 in their licensing decisions while benefiting from the
22 other's expertise and experience.

23 CHAIR REMPE: Donna, this is Joy.

24 MS. WILLIAMS: Yes?

25 CHAIR REMPE: Before you go to the next

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 slide --

2 MS. WILLIAMS: Yes.

3 CHAIR REMPE: -- I have a couple of
4 questions. I think this is a great thing to be doing,
5 but I'm curious about how you will respond to
6 stakeholders if they give you a lot of questions about
7 how do you know that you've benefitted from this
8 collaboration? Do you have metrics that you're using
9 to try and demonstrate this was a good thing to do?
10 And if so, could you elaborate on what those metrics
11 are?

12 MS. WILLIAMS: We do have specific
13 metrics, but I see Mo is on here, so he may have some
14 thoughts on --

15 MR. SHAMS: Yes, I was going to assist
16 Donna. So this is Mo Shams. Chairman Rempe, thank
17 you. If I may I can support the response to that.

18 So 100 we're aligned with your thinking
19 and the stakeholders on that, to what degree this is
20 going to benefit what we're doing. And I think it's
21 not the easiest thing to particularly measure, but
22 it's not -- also it's not the hardest for us.

23 So we have particular attributes that we
24 can point to. I think the biggest one that we can
25 point to is the ability for one regulator to leverage

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 what the other has done in the past and actually being
2 able to build on that and not particularly repeat and
3 produce duplication. And we're seeing that already as
4 we're going to tell you a little bit further down the
5 presentation on BWRX-300, particularly around the
6 fuel. So that's an area where we can point to an
7 efficiency right there.

8 Another element to it is it would probably
9 a little bit more tangible to the vendor than the
10 regulator, which is reaching more of a standardized
11 design that would work in both countries having
12 arrived to a common technical position on a certain
13 area and making the right adjustments to make that
14 design palatable for both sides. So that's an
15 intangible activity as well.

16 We try to hold ourselves very much to the
17 resources that we identify in a particular activity,
18 so we measure ourselves against that. Certainly we'll
19 try to make them as efficient as possible, but there's
20 certainly a degree of a learning curve and being able
21 to communicate on both sides the technical aspects or
22 share information.

23 So I would say it's a mixed bag of
24 specific numbers that we look at, which is resources
25 and whether or not we're meeting them and meeting our

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 schedules, as well as other intangibles that we see
2 that turn value, whether it's the standardization or
3 leveraging the other regulators' prior work.

4 MEMBER MARCH-LEUBA: Hey, Mohamed, this is
5 Jose March-Leuba. This is very interesting what you
6 said. Just so I can focus on the designs, can you
7 give me an example of a design that is not the
8 standard? I mean, what do you mean by a standardized
9 design in this particular case in U.S. and Canada?

10 MR. SHAMS: Sure. Sure. I would say
11 we're interacting now with the VA BWRX-300 design.
12 We're looking to interact with other designs as well.

13 I think the benefit that goes back to the
14 vendor is if they can get both regulators to say
15 perhaps the state of safety-related equipment are the
16 same for both sides, or the number of redundancies
17 that are needed for reactivity controls, or what have
18 you, satisfy both sets of requirements on both sides
19 of the border, that's what I meant by standardizing
20 the design, or at least keeping it consistent for that
21 vendor and for both countries. That's going to
22 facilitate construction, it's going to facilitate
23 manufacturing of equipment perhaps in one country
24 versus the other. And for them in my view it
25 facilitates deployment worldwide. So that was what I

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 was pointing to when I said standardizing design.

2 MEMBER MARCH-LEUBA: Yes, but say for
3 example the U.S. requires three diesel generators and
4 Canada requires only two. If I was here this time I
5 would apply for three satisfies both regulators. But
6 are you thinking that through this collaboration we
7 can agree on a two-and-a-half solution at the
8 regulatory level? And obviously there are not two-
9 and-a-half diesel generators, but see what I mean?

10 MR. SHAMS: I know. Something in between.
11 Yes. I want to say you could because there may be a
12 justification that the regulator that has three can be
13 satisfied with two-and-a-half with the right
14 justification because there are other attributes in
15 the design that compensate for the difference. But to
16 your point, clearly the obvious answer would be
17 provide the three and now we've covered both. But you
18 could ultimately get in a place where you can find
19 that two-and-a-half would satisfy, even two, but you
20 still would need potentially whatever legal instrument
21 that we would need to make the two work, which is an
22 exemption or some other sort of a legal instrument.

23 MEMBER MARCH-LEUBA: Yes, the point I was
24 -- that's not the point I was trying to make --

25 MR. SHAMS: Okay.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 MEMBER MARCH-LEUBA: -- but the point I'm
2 thinking of now is that if the solutions have been
3 design the plant with three so that you satisfy both
4 regulations, this particular MOU 21317/162122BU is
5 wasting our time, because GE can do that on their own.
6 So I do encourage that you guys try to find a two-and-
7 a-half solution whenever possible. That should be a
8 goal of the MOU, right? Otherwise, if you want to
9 pick the three, they can do it without us.

10 MR. SHAMS: And it's a great point, and I
11 agree with you. And a good bit of the guidance that
12 we hold ourselves to as a group on both sides is look
13 at the differences between the two countries and the
14 regulations and guidance and determine if they're
15 particularly -- meaningful is -- may not be the right
16 word I'd like to use, but they're that critical or
17 that important or are they being addressed in a
18 different manner perhaps? On the surface like there
19 are differences, but there are other attributes within
20 the regulatory framework that captures the same ideas.
21 So to your point, searching for that two-and-a-half
22 solution. I agree with you.

23 CHAIR REMPE: So this is Joy and I
24 appreciate this discussion. And actually the last
25 comments were, Mo, where I was thinking this might be

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 a very useful exercise is understanding not only the
2 differences in the criteria and the methods to get to
3 those criteria, but the impact.

4 MR. SHAMS: Yes.

5 CHAIR REMPE: When I learned a different
6 language, I've actually learned more about my own
7 language. And I think the same thing would come from
8 this type of endeavor and it could be extrapolated to
9 other regulators in other countries. So it's not an
10 easy-to-quantify metric, but I think there's some
11 knowledge gained that should be emphasized. And
12 actually later in this -- your set of slides I wanted
13 to harp on that a bit -- point a bit more by one of
14 the other activities you've done where you looked at
15 the LMP versus the regulatory approach. Because I
16 think that that exercise could yield some more
17 benefits, and so I'm curious about that. But I think
18 knowledge gained is another important metric that
19 would help, you know, licensing future reactor sites.

20 MR. SHAMS: A hundred percent. And I
21 don't want to belabor this and take much more of your
22 time, but I couldn't express how much we're aligned in
23 the thinking on -- before we go into any comparison we
24 know it's going to be different. That's just probably
25 the more default answer than anything. It's probably

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 get out of it recognizing how the differences there
2 that are particularly critical, meaningful, and
3 practical? I like the word about that. And to what
4 degree that that impact can be mitigated to get to a
5 common solution. So we're in that -- and it's not the
6 easiest thing to get to, but certainly that's the line
7 of thinking that we're adopting here.

8 CHAIR REMPE: Thank you.

9 MR. SHAMS: Sure. Thank you.

10 Donna, back to you.

11 MS. WILLIAMS: All right. Thanks, Mo.

12 And thanks for the questions.

13 So this slide shows the structure and
14 responsibilities under the MOC. Prior to the MOC we
15 had an existing Memorandum of Understanding between
16 the NRC and CNSC that established a framework for the
17 exchange of many types of regulatory information.
18 Activities of the MOU are managed by a steering
19 committee composed of senior managers in both
20 agencies. The MOC specifically addresses advanced
21 technologies including small modular reactors.

22 A subcommittee was established consisting
23 of staff and management that are responsible for the
24 review of SMR and advanced reactor license
25 applications. Working groups of subject matter

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 experts in each country are established to cooperate
2 on the specific aspects of a design or generic topic
3 and work plans are created to guide each of the
4 projects.

5 The MOC covers several types of projects
6 including pre-licensing engagement, licensing reviews,
7 and the sharing of science and research results.
8 Projects are established to cooperate on specific
9 aspects of the design or generic topic and work plans
10 are created to guide each project by identifying the
11 objective and scope of the project, the expected
12 outputs, the work process and schedule, points of
13 contact in each agency and external organizations that
14 would be involved. The work plans ensure that both
15 agencies are aligned in the expectations up front and
16 have committed the necessary resources to perform the
17 joint review.

18 In carrying out the collaborative reviews
19 NRC and CNSC staff can hold joint meetings with
20 vendors, participate certainly in audits, issue a
21 joint set of questions to the vendor applicant, and
22 provide training on licensing processes and technical
23 issues to each other. A working group of subject
24 matter experts carries out the plan and develops joint
25 products.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 We developed processes for collaboration
2 to administer this first-of-a-kind cooperation such as
3 protocols, checklists, templates, and desk guides.
4 For example, a communication protocol was developed to
5 ensure that communication activities are effectively
6 coordinated and managed. The protocol also provides
7 guidance on managing sensitive information including
8 appropriate security markings.

9 To date we've successfully testing the
10 process of collaborative reviews by issuing joint
11 products that meet all of the goals of the MOC. One
12 of the goals is to collaborate on pre-application
13 activities for designs under consideration in both
14 countries. Because NRC and CNSC are both in pre-
15 application engagement with X-energy, GEH, and
16 Terrestrial, we focused on specific technical topics
17 for these designs for our first projects.

18 The first report that was issued concerns
19 the reactor vessel for X-energy's advanced reactor.
20 This report documents the collaborative review of X-
21 energy's approach to code identification, assessment
22 selection, and the adequacy of the regulatory analysis
23 conclusions made in the code selection.

24 We also issued a report that documents the
25 results of the collaborative assessment of the method

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 for predicting the conditions inside the containment
2 vessel following a LOCA for the GEH BWRX-300 reactor.

3 Another product is the joint report
4 concerning Terrestrial Energy USA's white paper on
5 postulated initiated events for its integral molten
6 salt reactor.

7 The second goal of the MOC is the
8 development of shared review approaches to facilitate
9 regulatory reviews. In this area we issued a joint
10 report that documents the results of a broad overview
11 of NRC and CNSC regulatory frameworks and for the a
12 specific comparison of LMP-endorsed NRC Reg Guide
13 1.233 with the CNSC approach.

14 The findings in this report will support future
15 collaborative reviews by understanding the differences
16 in our approaches for licensing new reactors.

17 A third goal of the MOC is to collaborate
18 on research and development of regulatory positions to
19 address unique or novel technical considerations for
20 advanced reactors. In this area we've issued two
21 interim reports on TRISO fuel qualification. These
22 reports address the regulatory basis for advanced
23 reactor fuel qualification in Canada and the U.S., the
24 known degradation mechanisms and failure modes for
25 TRISO fuel, and transient behavior of TRISO fuel.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 The issuance of these products
2 demonstrates that we can successfully perform
3 collaborative reviews and positions the NRC and CNSC
4 for future success in licensing review cooperation.

5 CHAIR REMPE: Donna. Please go back to
6 the prior slide.

7 MS. WILLIAMS: Yes.

8 CHAIR REMPE: Okay. So in one or two
9 sentences can you tell us what the biggest benefit
10 was?

11 MS. WILLIAMS: In a specific product?

12 CHAIR REMPE: And in particular I'm
13 interested in the Terrestrial postulated initiating
14 events because this is something that's always been a
15 focus of ACRS, about starting with a clean sheet of
16 paper. What did you guys learn from this interaction
17 and why was it beneficial?

18 And then on the LMP comparison report with
19 the Canadian approach, I'm interested in, bottom line,
20 why was this a good thing do? And I actually had a
21 copy of this report and I saw a lot of good ideas for
22 future activities. And what's going on about that?
23 Are you guys going to do some of those activities,
24 because I hope the answer is yes.

25 MS. WILLIAMS: Yes, and I was going to say

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 I think one of the biggest benefits of that report is
2 identifying where there are areas that we need to look
3 at more closely. And one of them was the SSC
4 classification project that we're doing now, but there
5 are several others. And we're maintaining a list of
6 possible topics for future projects using some of the
7 outputs of that report.

8 But, Mo, did you have something to add,
9 too?

10 MR. SHAMS: Sure. I think I'll build on
11 what you said. So we'll start with the LMP project.
12 Donna is spot on. We did take a good bit of insights
13 from that comparison and it did suggest that looking
14 into structure system component classification would
15 be a valuable effort, and we actually are underway on
16 that. And I believe we're aiming for earlier -- early
17 this year to put together a report that looks at our
18 process for classifying structures and components as
19 well as the Canadian. So this is a great, great
20 project and insight for us.

21 Also imbedded in that report itself there
22 was the comparisons about -- that the LMP and the --
23 sort of the dose limits that we have imbedded in our
24 regulations and how they compare to those in the
25 Canadian framework. And we also can say arrived --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 that there were differences, getting back to that
2 discussion we just had a couple minutes ago. We
3 ultimately arrived that there are differences between
4 these limits, but ultimately both are leading to a
5 safe licensing of these facilities. So different
6 numerics that in particular lend themselves to a
7 difference in the level of safety that the regulations
8 assure at the end of the day. So those were good
9 insights for us from LMP.

10 We had actually follow-on discussions with
11 our Canadian counterparts on safety goals and how they
12 were developed and constructed. So there was a number
13 of great benefits that came to us from this particular
14 project.

15 For the Terrestrial one, the postulated
16 initiating event, you're 100 percent right. This was
17 an opportunity for us to exercise or at least -- not
18 just us, for the vendor to exercise and us to be able
19 to review, if you will, a clean-sheet-of-paper
20 approach looking at a technology that certainly hasn't
21 been licensed before and be able to develop initiating
22 events.

23 They did do a -- we responded that it was
24 a viable job, great job. The approach wasn't
25 particularly complete and we left that note in there

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 that more would be developed as the design has matured
2 enough, but for the level of maturity that was offered
3 to us we felt that what was offered was -- represented
4 a viable approach for identifying initiating events.

5 CHAIR REMPE: Let me focus in a little bit
6 more. Did either the U.S. or the Canadians identify
7 a type of event that -- in one country that was not
8 detected in another, or did you come up with the
9 conclusion that we both captured the same type of
10 events?

11 MR. SHAMS: We were more the latter than
12 the former. We were more near -- our finding was more
13 towards -- the approach they're using to identify
14 initiating events was viable and the ones they
15 identify are a reasonable set of events that identify
16 -- given the maturity. We didn't close the door that
17 other events would be identified as the design matures
18 further.

19 CHAIR REMPE: Okay. So far it gives you
20 a warm fuzzy, but it's not a guarantee to a vendor or
21 either regulator that if you send to one country, it's
22 going to give you the same events in the other
23 country. Just so far you've not detected anything
24 different, I guess.

25 MR. SHAMS: Yes.

1 CHAIR REMPE: Did I summarize what I'm
2 hearing?

3 MR. SHAMS: Yes, exactly. And also
4 perhaps you can say it this way: On one hand the
5 entire approach is intended to support de-risking the
6 reviews. So at this point Terrestrial has a great
7 insight into a -- how did we envision or how do we
8 envision created postulated events and what areas
9 we'll be looking at? So they have a good sense for
10 that.

11 On the flip side of that for us, we're
12 also looking at a new technology and we're not seeing
13 major gaps, which is the point you just made. We're
14 not seeing major gaps. Perhaps there are events in
15 there that needs to be further materialized or
16 crystallized. And reliability of equipment would come
17 in there and perhaps drive events one way or the
18 other, but we didn't see major gaps that sort of
19 concern us on both sides. So those sort of two high-
20 level goals in my view were reasonably accomplished in
21 that exercise.

22 CHAIR REMPE: Okay. Again this was just
23 my reading and maybe I've missed something, but when
24 I looked at the LMP document the way that the LMP will
25 do a defense-in-depth assessment after they finish

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 their analyses was described like it was a well-
2 established process. And I'm not sure that that's
3 quite the situation. And you can correct me if I'm
4 confused here, Mo, but I'm just kind of wondering if
5 maybe that some insights could be gained if there was
6 a little more -- well, at least if some of the --
7 we've not exercised this approach yet really with a
8 real design. And can we explore getting some insights
9 from the Canadians and how they do it, or you think
10 that both countries are in the same situation? I'm
11 kind of getting down into the weeds to see if there
12 are some things where we know --

13 (Simultaneous speaking.)

14 MR. SHAMS: You are. You're stressing --
15 you're definitely stressing my knowledge of that.

16 (Laughter.)

17 MR. SHAMS: I would say I believe there's
18 definitely learning on both sides, that the Canadian
19 approach in this -- certainly in this area is valuable
20 for us to understand how they consider defense-in-
21 depth, but as -- our approach to the LMP has been in
22 a number of ways: And number one is the frequencies
23 of events that we look at, whether it's a likely
24 event, highly unlikely events, the bands -- as you
25 would recognize when we presented this approach to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 you, the bands of events we're looking at. And then
2 also the sets of equipment and the sets of accidents
3 that we're looking at, what would be a design-basis
4 accident versus just a licensing event.

5 And then on top of that you probably have
6 seen it in the Part 53 proposed requirements is
7 specific requirements into defense-in-depth being
8 provided and describing what would that look like? So
9 no single -- particularly single system or action or
10 -- is the single sole item to be relied on.

11 So we're building through the events and
12 we're building it through the requirements for relying
13 on more than just one set of equipment or actions and
14 the like. And certainly there's room for us to learn
15 what the Canadians are doing to see how best we
16 approach that.

17 We are certainly aware that in your letter
18 to us in the past month or so there was discussion
19 about augmenting defense-in-depth. And we're looking
20 to respond in that -- in an appropriate way to
21 basically mention that what efforts we have to do
22 going forward in terms of guidance in that regard.

23 CHAIR REMPE: Yes, again I just am kind of
24 pulling the string. And I just think there's a lot of
25 good opportunities that we could learn from and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 jointly solve this all together. But anyway, I think
2 I've made my point. Thank you.

3 MR. SHAMS: Thank you.

4 MS. WILLIAMS: Okay. Yes, in addition to
5 the specific technical benefits that we've learned in
6 each of these reports, I think these first products we
7 were really testing the system. We were figuring out
8 how to work together, how to jointly perform a review
9 and issue a joint product that will pay off with these
10 benefits when we get into the actual licensing
11 reviews. This is all in pre-app and very specific
12 topics. But there were a lot of lessons learned that
13 came out of this that really made us more efficient in
14 how we can do this.

15 So that brings us to the next slide on
16 lessons learned. So this first-of-a-kind
17 collaboration had a learning curve. In response to
18 lessons learned from early implementation of the MOC
19 we established processes and protocols to ensure that
20 the collaborative products benefit both agencies and
21 don't result in longer review times and increased
22 resources expended.

23 A challenge that we encountered was that
24 there are differences in the priority of licensing
25 projects and resources available for each regulator.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 To address this we identified criteria to
2 strategically select projects that will better
3 position us for success. That includes choosing
4 designs that are similar phases of submittal in each
5 agency. We also actively engaged with vendors to
6 ensure that the requests of both regulators are
7 similar enough to allow for joint review.

8 Another change to the process was to
9 expand the collaboration to include the U.K.'s Office
10 of Nuclear Regulation, who also have an interest in
11 specific projects. In September of 2021 the NRC and
12 CNSC mutually agreed to invite LNR to observe the
13 collaborative activities for TRISO fuel. We're
14 leveraging the existing bilateral arrangement that we
15 have with LNR to enable this initiative. And we plan
16 to expand on this and have LNR observe the
17 collaborative activities on BWRX-300.

18 When we began collaborative reviews we
19 anticipated that differences in licensing frameworks
20 and processes would be a challenge to developing joint
21 regulatory positions. To address this we held
22 training sessions on each other's regulatory processes
23 and we also compared the regulatory frameworks so we
24 can understand how a regulatory decision made in one
25 country can be applied in the other.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 One action taken to improve the
2 understanding of each other's processes was a staff
3 exchange. This formal staff exchange was included as
4 part of the collaborative review of the first GEH
5 Topical Report. This exchange was successful in
6 increasing communication and allowed CNSC and NRC to
7 better understand the different review approaches in
8 each country.

9 Because much of the work performed under
10 the MOC was withheld as proprietary or as foreign
11 government-controlled information, very little
12 information in the MOC project was made publicly
13 available initially. Recognizing that several
14 external stakeholders including other regulators are
15 interested in the collaborative activities, we made a
16 conscious effort to make reports publicly available if
17 possible. When we issue press releases, we issue
18 press releases when joint reports are issued and we've
19 create external web pages and made presentations in
20 public conferences on the activities under the MOC.
21 We also ensure that we coordinate any public
22 announcements and presentations with CNSC, and they do
23 the same with the NRC.

24 We also faced some logistical challenges
25 in sharing sensitive information, holding joint public

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 meetings, and efficiently working together to develop
2 products. These challenges were addressed to the use
3 of IT tools and alignment on new processes and
4 protocols that we use during the reviews.

5 We have discussed how the designs are
6 chosen for collaborative review and improvising
7 details on the current projects. The decision to
8 propose collaborative licensing projects is that of
9 the vendors. It's made with consideration of their
10 commercial plans in each country.

11 This slide shows the four designs that
12 have been the subject of collaboration under the MOC
13 including NuScale's SMR, X-energy's Xe-100, GE
14 Hitachi's BWRX-300, and Terrestrial Energy's integral
15 molten salt reactor. When proposing projects vendors
16 consider the timelines for submittal in each country
17 as well as the scope and depth of interactions with
18 the regulators. In agreeing to cooperation the
19 regulators consider the outcomes of products desired
20 by the vendor in each country. For example, the
21 objectives of the CNSC's vendor design review process
22 are different than those of the NRC's certification
23 and pre-licensing engagement process. The
24 opportunities exist for leveraging information between
25 these two regulators.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 Even in areas where the licensing process
2 or outputs differ, cooperation can align on
3 fundamental scientific and engineering findings. In
4 general, a request by vendors to participate in this
5 bilateral cooperation is made because they've already
6 substantially engaged with at least one of the
7 regulators and have no plans to engage with the other
8 regulator on the same design.

9 We've established criteria to
10 strategically select licensing projects that are at
11 similar phases of submittal in each country and the
12 requests to both regulators are similar enough to
13 allow for a joint review. The decision to cooperate
14 on a licensing project is based on the following
15 factors: The extent to which the vendor is engaging
16 in meaningful pre-licensing activity with each
17 regulator, the similarity between a vendor's
18 engagement activities in each country, the timelines
19 for engaging with each regulator, and the ability of
20 the vendor to share information about their design
21 with both regulators. These factors will determine
22 whether cooperation can occur and the usefulness of
23 that cooperation.

24 The most benefit will be gained through
25 projects in which the similarities in each country are

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 well-aligned. Communication between the vendor
2 representatives in each country is also important.
3 The vendors in each country should be able to
4 collaborate effectively with each other and speak with
5 one voice.

6 Once a design is chosen for collaboration
7 the NRC and CNSC, in cooperation with the vendor,
8 identify specific technical topics for review.
9 Generally these areas are the subject of topical
10 reports or white papers that have been submitted.
11 Recognizing that the regulatory requirements will not
12 always align, collaboration will focus on the
13 technical content that ultimately satisfies both
14 countries' unique requirements.

15 The NRC and CNSC work with the vendors as
16 active participants in the collaborative process.
17 Vendors are strongly encouraged to have a point of
18 contact participating from both sides of the border to
19 represent the vendor in collaborative activities.
20 Communication protocols are established and
21 standardized at the beginning of the project. Vendors
22 must be enabled with a working understanding of how
23 both regulators conduct their pre-licensing activities
24 and what the outcomes of those processes are.

25 The NRC and CNSC work together to reach

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 alignment with the vendor on the scope of
2 collaboration and establish an understanding on how
3 this collaboration can result in both near-term and
4 long-term useful products. The regulators clearly
5 communicate the expectations with vendors that are
6 considered necessary to facilitate an efficient and
7 p r o d u c t i v e c o l l a b o r a t i o n .

8 The regulators also work to influence the
9 utilities to collaborate in the preparation of
10 licensing application. They get early alignment on
11 the scope and expected outcomes.

12 There are currently three active projects
13 under the MOC. Our collaborative work continues with
14 the TRISO fuel qualification project as the science
15 and regulatory experience evolves. As I mentioned
16 earlier we've already issued two interim reports and
17 plan to issue a final report early this year. The
18 goal of this collaboration was to establish a common
19 regulatory position on TRISO fuel qualification based
20 on existing public knowledge and to identify any
21 potential analytic or testing gaps that would need to
22 be addressed to enable TRISO use in advanced reactor
23 licensing applications.

24 It's expected that the final report will
25 enable efficiencies in the licensing process by

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 providing reactor vendors and regulators with a
2 reference-able report that documents the basis for
3 items related to fuel qualification and highlights the
4 areas where additional analysis or testing is needed
5 to support licensing.

6 We also engaged the U.K. regulator to
7 observe our activities, but there are developers in
8 all three countries proposing to use variations of
9 TRISO fuel. The benefit of a shared knowledge base on
10 TRISO goes beyond Canada, the U.S., and the U.K.

11 We're also collaborating on a project on
12 safety classification processes. The goal of this
13 project is to identify key similarities and
14 differences in a safety-significance determination
15 process, the scope of SSCs subject to the process, and
16 the outcomes, as well as the engineering design rules
17 applied to each safety class.

18 The joint report on technology inclusive
19 and risk-informed reviews for advanced reactors that
20 was developed under the MOC include a brief comparison
21 on safety classification SSCs and recommended more
22 detailed future work be done on both the safety
23 classification and application of safety
24 classification.

25 We expect that there are many similarities

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 between the regulators in these areas and confirming
2 this and identifying the differences will benefit
3 future cooperation in advanced reactor regulatory
4 activities, particularly for vendors seeking licenses
5 in other countries.

6 The working group performed reviews of two
7 pilot areas: pressure retaining components and
8 supports and reliability assurance programs. The
9 working group plans to issue an interim report and
10 results of the pilot reviews by the end of this month
11 and a final report in June.

12 Earlier this year we began collaborative
13 reviews of specific aspects of the GEH BWRX-300 small
14 modular reactor. Mike Dudek, the Branch Chief in the
15 Division of New Reactor Licensing, will present more
16 details on these projects. I'll turn it over to Mike
17 unless you have any questions.

18 MR. DUDEK: Any questions before I begin?

19 CHAIR REMPE: I'm not seeing any. Go
20 ahead.

21 MR. DUDEK: Okay. Hearing none, again my
22 name is Michael Dudek. I'm the Chief of New Reactor
23 Licensing in the Division of New and Renewed Licenses.
24 And this really where the rubber meets the road today,
25 so thanks, Donna, and thanks, Chairman Rempe and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 esteemed members of the Committee for your opportunity
2 -- the opportunity to brief this today.

3 And this really goes to the rubber meeting
4 the road on what we're doing for the current work and
5 the next steps for what we're doing on these
6 collaborative efforts with GEH and CNSC.

7 Under the Memorandum of Cooperation
8 advanced reactors and small modular reactor
9 technologies are conducting collaborative reviews.
10 The process and guidelines for collaborating on the
11 BWRX-300 have been documented in a charter that was
12 signed by the EDO in late September 2022.
13 Additionally, the staff is providing knowledge
14 transfer training to CNSC staff and they're providing
15 knowledge transfer to us. This whole initiative
16 started off with a two-week training class between the
17 two entities to understand how each other operates.

18 We have some common guidelines on the
19 ESBWR and some of the other designs from the other
20 work that we've done, but this two-work -- two-week
21 training class really got down to the nitty-gritty on
22 how each other's regulators make their regulatory
23 findings, what their regulations entail, how they make
24 their technical judgments, and just how far they go in
25 some of their reviewing. So it was very enlightening

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 to our technical staff for how they analyze, and it
2 was quite eye-opening at the end of the day.

3 So with that training class and these
4 efforts underway what is the goal? Well, the goal is
5 to conduct efficient and coordinated technical reviews
6 resulting in a common technical position. So
7 regardless of regulatory outcomes or regardless of
8 processes and procedures we have been finding common
9 ground on technical positions. Technical to technical
10 discussions on pump valves, safety structures, safety
11 systems, fuel, design have been very fruitful and very
12 -- and there's been an understanding gained across
13 borders.

14 And that's really the golden goose at the
15 end of the day, harmonization on technical items,
16 technical positions where we can agree and can find
17 those efficiencies in the BWRX-300 design, to enhance
18 the standardization. Because that's the goal at the
19 end of the day, right? I mean, I've heard it -- we've
20 heard it over and over from GEH, what if at the end of
21 the day we could submit one application for both
22 countries? Well, we're making strides in that
23 direction. We are definitely making strides in that
24 direction. It's those technical reviews and those
25 technical items where we're making the best efforts.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 And as always we presented some additional
2 information. Every topical report, every item that we
3 review comes before the ACRS and we have the
4 opportunity to review it. And this isn't the last
5 time that we will be in front of you talking about
6 this item, but I hope this presentation today helps
7 enhance your knowledge about where we're at where
8 we're going. And the next --

9 DR. BLEY: Can I --

10 MR. DUDEK: -- slide is going to help me
11 do that even further. Yes?

12 DR. BLEY: This is Dennis Bley.

13 MR. DUDEK: Sure.

14 DR. BLEY: I kind of followed everything
15 up until now, but I've been worrying about one -- a
16 couple of areas. When you compared what they do at
17 NRC to -- it's more a philosophy of regulation I guess
18 -- to Canada -- we'll leave the U.K. out because
19 they're pretty different I think -- are you kind of
20 similar in when you think you need independent
21 confirmatory analysis by the regulator and in areas
22 where you need experiments to back up computer
23 modeling or is there more reliance by one party of the
24 other on some of these things?

25 MR. DUDEK: So I'm going to go out on a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 limb and start the answer. Then I can turn it over to
2 Mo and Brian for perhaps additional insights.

3 But I think on the first topical report
4 that we reviewed between GEH -- it was very
5 enlightening that CNSC didn't appear to go as far with
6 the codes or utilize the codes in a similar manner as
7 the U.S. And what I mean by that is that they still
8 use the codes, they still did the calculations, but
9 they didn't -- I don't think that they went quite as
10 far as the in-depth analysis and the independence that
11 the NRC goes through with those codes and those
12 independent analysis.

13 Brian? Mo, you have any additional
14 insights on that?

15 MR. SHAMS: Yes, thank you, Mike.

16 So as we have discussed a little bit
17 earlier and we continue to point out, there is
18 differences. It's not a carbon copy approach at all,
19 but I think if we step back a little bit, we can see
20 the commonality. I think both regulators are
21 incredibly independent. They do have a commission
22 just like we do, reporting up to the commission in
23 their own way as far as their analyses and the like.

24 I probably would like to take it a little
25 bit higher than whether -- what they do specifically

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 on software validation versus not, even though it's a
2 convenient answer, but I'm seeing it across the board.
3 As we're interacting on things the independence comes
4 through, they're looking at our activities and then
5 taking that and assessing the -- in a risk-informed
6 approach what areas they wanted to look into further,
7 what areas they wanted to confirm, what reviews do
8 they want to do.

9 So I'm not particularly seeing a reduced
10 degree of independence per se or reliance on -- Dr.
11 Bley, you asked about safety features, testing for
12 safety features. I'm seeing a common theme between
13 both regulators about requiring the right data to
14 support the finding, relying on the industry and the
15 applicant to provide such information. So they have
16 a lot of language that one can map through our
17 regulations and our guidance.

18 DR. BLEY: Thanks. That's a pretty rosy
19 picture.

20 (Laughter.)

21 DR. BLEY: You're just painting a really
22 nice picture for us.

23 MR. SHAMS: Well, I think I was -- no, I'm
24 serious. No, I'm serious. I would say look at the
25 AP1000. I think that's a good example, perhaps a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 complete -- more complete example than the activities
2 that we're working on now. And that offers a glaring
3 example of taking what we have done and just
4 particularly looking at certain areas and ultimately
5 arriving to the conclusion very similar to ours they
6 need particularly any massive changes per se or even
7 small changes to the design. So I feel reasonably
8 comfortable that their approach and ultimately where
9 they find themselves is relatively close to where the
10 U.S. is.

11 CHAIR REMPE: So since you brought up the
12 AP1000 --

13 (Simultaneous speaking.)

14 MR. SHAMS: So, I know, yes.

15 CHAIR REMPE: -- in the U.K. regulator did
16 identify an area where the U.S. missed with respect to
17 getting data to support the assumption. I'm looking
18 for some specific examples. Did the U.S. NRC see
19 something good that the regulator in Canada is doing
20 that said -- that made you think hey, maybe we should
21 change how we do something or other, or vice versa has
22 that happened with the Canadian regulator? I guess
23 I'm kind of getting back to what metrics -- give me
24 some examples.

25 MR. SHAMS: Sure. Sure. So I'll try to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 give you examples now that we're talking AP1000, so we
2 might as well just get into that. So I think what --
3 back in the day when we were discussing it I think
4 that at the time we were having a lively debate around
5 a steel concrete composite and shield building, if
6 some of the members may recall, and the like. And
7 that was an area for them that they honed in on. They
8 looked into how that was approved by us. That was
9 another area -- a bit of a novel construction
10 approach.

11 And we went further in our own assessments
12 and they relied on that.

13 So an area where they found us have done
14 something and they leveraged, I would point to that
15 and say that was an area they definitely had some
16 concerns with early on and we helped move them through
17 that.

18 As far as where we've benefitted, I would
19 point to something perhaps not as technical as what I
20 just provided and I would point more to how we're
21 approaching advanced reactor reviews and the pre-
22 application activities that we're taking on. I think
23 a good bit of that also came from seeing the VDR
24 process for Canada and their ability to provide
25 feedback on whether a design is on the right track or

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 meeting the regulations and what not.

2 So we've modeled something that ultimately
3 fits within our regulatory frames and our regulatory
4 boundaries, but it does achieve a similar goal of
5 providing input on whether a design or an idea that a
6 vendor is embracing is ultimately going to meet with
7 the regulations, with our regulations. So I'd point
8 to those activities and say there's definitely benefit
9 in our interactions over the past however many -- as
10 long as I can over the past decade-and-a-half or so.

11 CHAIR REMPE: Yeah, I know the VDR, the
12 vendor design -- whatever the R stands for -- I'm
13 drawing a blank here now.

14 MR. SHAMS: Review or something, I think
15 so.

16 CHAIR REMPE: Review. Yes.

17 MR. SHAMS: Yes.

18 CHAIR REMPE: A lot of the advanced
19 reactor components or design developers have said,
20 well, we really could use that to show we've made
21 progress. I don't know of anything we do that is
22 exactly like that other than you accept the
23 application. Are you planning to do something along
24 that lines or --

25 MR. SHAMS: So not in that format. We

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 believe what we have achieves the goal, perhaps
2 addresses the problem perhaps in a different way. So
3 we do have standard design reviews that ultimately can
4 look at any sort of -- any size, if you would, or any
5 part of a design, but we also have the -- what we're
6 sort of building truly now is the pre-application
7 review, which really could stand a small white paper
8 that's a couple of pages to just a dozen of topical
9 reports that cover broad areas.

10 So we feel like we have a flexible
11 approach that can actually achieve that. How does the
12 design meet our regulation at this point? So we have
13 a way to get there, but not -- perhaps not as
14 structured as what CNSC has.

15 CHAIR REMPE: Okay. Thanks.

16 MEMBER PETTI: Mo, I have a question. I
17 hope the internet is good. It's been going in and
18 out.

19 There was a time before I was on ACRS
20 where designers felt that it was easier to get through
21 the Canadian system than the U.S. system. And when I
22 was part of the MIT study we pushed on that and were
23 assured that that really wasn't the case, that these
24 were at very high levels in the regulatory
25 authorities.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 My sense was there were different
2 approaches that got you to the same place though. And
3 they asked the same questions, just maybe in a
4 different order. Is that your sense, that maybe this
5 was a misnomer that was out there about the Canadian
6 versus the U.S. regulatory approaches?

7 MR. SHAMS: Absolutely. I would align
8 myself with that thinking. They're different
9 approaches. They're asking questions in a different
10 order per se that they ultimately end up in the same
11 place. I kind of mentioned that a little bit earlier.
12 When we did the LMP comparisons we recognized that
13 there are differences in dose limits off site and the
14 like, but at the end of the day the philosophy, the
15 safety, the defense-in-depth and the like they're very
16 similar.

17 Now I think the ease versus not comes from
18 the degree of prescription in regulations, what Dr.
19 Rempe was pointing to, the VDR approach and its
20 ability to provide early feedback per se and perhaps
21 our guidance and our regs were not as structured and
22 perhaps not as well communicated to vendors as could
23 have been. So we've learned from that feedback.

24 So I agree with you, it's more a
25 perception than a reality, but we also had some role

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 to play to make sure that that perception is
2 addressed. And whatever we need to add in our
3 guidance we could, which we did facilitate that new
4 risking and a little easier start to the process
5 before you actually come and apply with a full.

6 MEMBER PETTI: Thanks.

7 MR. SHAMS: Thank you.

8 MR. DUDEK: Any additional questions?

9 (No audible response.)

10 MR. DUDEK: Hearing none --

11 DR. BLEY: I'm sorry. I got my buttons
12 confused on my computer.

13 MR. DUDEK: Yes?

14 DR. BLEY: I want to follow up on that
15 just a little bit. I was of the same mind as your and
16 Dave's discussion there. Our pre-licensing process
17 seems pretty thorough now and this -- we're seeing
18 more and more of vendors submitting topical reports
19 before their application comes in, which seems to give
20 them some of the benefits they were thinking they had
21 through the Canadian process. Can you say anything
22 more about that?

23 MR. SHAMS: Of course. Yes. I want to
24 say that over the past couple years we're seeing -- we
25 started -- it was an idea. We started it. I was

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 talking with the staff about it not too long ago. The
2 road map. We were able to describing the road map for
3 non-light water reactor applicants, that there are a
4 number of ways to be able to get feedback and be able
5 to give perhaps staff formal positions. But it was a
6 concept and everybody sort of approached it in a timid
7 way.

8 I would say now we have dozens of --
9 whether it's white papers or topical reports and
10 they're being done in a systematic way. Your feedback
11 on it is incredibly valuable. We pass that along. We
12 address it as appropriate. And I think they're
13 definitely seeing that value. And I would also point
14 to the work that we've been doing on the Kairos design
15 and review. And that also presents a great example of
16 how successful it has been to use topical reports and
17 address certain areas early and how that feeds into
18 the application and stabilizes the review and supports
19 a schedule, an appropriate schedule and an aggressive
20 schedule, if you would.

21 So I think it's growing, Dr. Bley. It is
22 growing. And I can see more and more of the
23 applicants relying on that, figuring out ways. And
24 we're getting topical reports in areas that didn't
25 traditionally get topical reports. They were

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 envisioned in the past to be for approving a software
2 or what -- we're looking at other than that now with
3 other areas, whether it's source term, whether it's
4 fuel qualification, whether it's regulatory
5 applicability. So I think it's working, in my view.
6 I know it's another rosy pictures, but forgive me for
7 that.

8 DR. BLEY: Yes, I kind of like -- agree
9 with your rosy picture there. I think they're not
10 getting much credit for it, at least in things that
11 end up in the press. But I think that's been pretty
12 successful so far.

13 MR. SHAMS: Thank you.

14 CHAIR REMPE: I agree it's successful in
15 some ways, but then we're also seeing multiple
16 versions of topical reports coming in from some
17 vendors. And I think -- again, I've mentioned it in
18 other meetings, but maybe we need to think about are
19 we giving them so many SSCs and iterating that it's
20 going to make the process more expensive and maybe
21 they need to have some guidance on when enough is
22 enough. So I guess don't go too far is I guess I feel
23 obligated to say on that.

24 MR. SHAMS: I think it's a fair point. I
25 think I wouldn't paint every product we receive as

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 being an optimal product. I think just the line is
2 always a subjective one and different vendors approach
3 it differently. Some would go above the line to make
4 sure that they meet the line; others they want to inch
5 their way to get to that line. And that's exactly
6 what you described about multiple iteration.

7 We try to meet vendors where they are and
8 provide the feedback we can, but we're also going to
9 be honest that we're not here to grade homework, you
10 know. We're here to be able to provide the best
11 service possible to them and to the public. So
12 anyway, yes, it's definitely an evolution and I think
13 the vendor plays a role into getting their stuff here
14 on time and at quality.

15 DR. BLEY: And I'd throw in one practical
16 side. I do agree with Joy we have to be careful and
17 it probably will end up with less efficiency in some
18 areas, but then the people doing this development are
19 getting their funding in increments. They kind of
20 have to come at it in pieces, too.

21 MR. SHAMS: They certainly do. And their
22 accountability -- if we point to particular projects
23 that are funded by government per se or partially
24 funded by government, they have to meet certain
25 metrics and they have to see progress for the NRC. So

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 they do have -- they do have accountability that they
2 need to adhere to, too.

3 MR. DUDEK: Okay. If there's no
4 discussion --

5 MR. SHAMS: Mike, back to you.

6 MR. DUDEK: All right.

7 MEMBER BROWN: Yes, this is Charlie Brown.
8 I couldn't get my mic open. Apologize for that.

9 MR. SHAMS: No worries.

10 MEMBER BROWN: Yes, it is me, Charlie
11 Brown. I am on the line. Can people hear me okay?

12 MR. SHAMS: Yes, yes, we can hear you.

13 MEMBER BROWN: I'm trying to segue back to
14 a statement made in one of the earlier slides. Can't
15 remember which one. I guess I'm a little skeptical,
16 or maybe I'm the resident skeptic here as opposed to
17 all the smiling faces and shining sun that has been
18 thrown down on the discussion.

19 The object was if an applicant wants to
20 submit something, eh submits one design approach or
21 application. Does he go to both the NRC and the CNSC
22 and they both review it, or does just one review and
23 the other one accepts the review of the NRC? I'm
24 having a tough time figuring out how this becomes
25 somebody doesn't do something. If you've got two

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 people reviewing it, obviously the applicant is going
2 to have to review it with both commissions in order to
3 get it accepted.

4 So where is this commonality that -- I'll
5 use my area of I&C for an example. I mean, we get an
6 FSAR as part of an application that comes in and
7 there's a chapter that deals with the electric power
8 system as well as the I&C. And you all review that.
9 We review it. You provide an SE. We review it.
10 Whether -- if there's a topical report, we go through
11 that if necessary and we provide comments. And if you
12 note back in most of the design approvals we've done,
13 we have made comments particularly in our areas on the
14 power -- electric power and the I&C where changes have
15 been made during the application process to satisfy
16 the committee.

17 Now is there a similar committee on this;
18 I tried to figure that out from all the paperwork we
19 had, that provides a similar type approach with the
20 ACRS on the Canadian side?

21 MR. SHAMS: So that's a very specific
22 question. I don't understand the Canadian system that
23 well at that level of detail. But I know there is a
24 commission level review of their products, their
25 activities, their licensing actions. So that part is

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 similar.

2 Whether or not there is an intermediate
3 level in between, an independent body like yourselves,
4 I cannot comment on that. I don't know the answer to
5 that.

6 MEMBER BROWN: The reason I asked the
7 question, I'm trying to -- just looking at my area now
8 --

9 MR. SHAMS: Sure.

10 MEMBER BROWN: -- all of a sudden they,
11 the applicant submits something to you guys, and they
12 come in and say, well, CNSC has already accepted this
13 and approved the design, does that mean we turn into
14 a rubber stamp and say that, no, we don't have to
15 review it because it's already been accepted by the
16 Canadian's commission?

17 MR. SHAMS: That's a great question. So,
18 if you allow me, I'll elaborate on this a little bit.
19 So the short answer to that is no. I mean, just let
20 me start by saying that. The answer to that would be
21 no. That's not what we're going to do.

22 Now, how best we can leverage that review
23 by the Canadians is really the main exercise that
24 we're doing here.

25 So there are a number of examples where,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 if a regulator has already done the review and the
2 other regulator could use it, and I pointed to AP1000
3 as a good example of that. It went through the review
4 on the U.S. side. The ACRS looked at it. Everything
5 was done.

6 So the Canadians had a great opportunity
7 to be able to leverage that and add to it what they
8 feel is appropriate to arrive to their independent
9 licensing decision. It's not a rubber stamp on their
10 end either, because they actually also have to prove
11 to their stakeholders that that design, being their
12 own independent way, that that design is safe.

13 But they have an incredible resource in
14 you as having done and looked at it. And I'll point
15 to the, you know, to I&C, the example you provided.
16 And the ACRS had approved already that I&C platform.
17 They didn't find any issues, or those have been
18 already addressed and what have you. So that presents
19 a great opportunity.

20 Now, if we are approaching issues today
21 that are -- we're at the same starting point. So, to
22 your point, there's a learning curve. Perhaps there's
23 a set of two eyes on it. Whether it's initiating
24 events, whether it's a code for a design of
25 containment or assessing containment performance, then

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 we're at a place where we're both looking at it.

2 What we aspire to in the future is having
3 the ability now to have done that work together and
4 looked at containment codes together, looked at --
5 maybe in the next round, we have the ability to be
6 able to rely on each other, construct, you know,
7 perhaps a broader team that part of it looks at
8 Chapter A versus another part is looking at Chapter B,
9 having the ability to rely on each other, review and
10 protect.

11 But, ultimately, the licensing decision is
12 independent. And that does not change. That is not
13 going to change. So, ultimately, we have to stand by
14 our decision, whether we've done the review entirely
15 independently by ourselves per se or relied on some of
16 these insights, technical insights, from our partners.
17 And the same is the other way around, whether they've
18 done an entire review on their own or relied partially
19 on some of our work. But the licensing decision is
20 independent.

21 MR. DUDEK: So let me dovetail into that
22 a little bit, Mo, in that licensing decisions and an
23 important key aspect is that -- I think a little bit
24 of your original question was, is common information
25 being submitted to both regulator. Yes. All

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 information that we have been reviewing and
2 collaborating on, GEH is submitting the same
3 information to CNSC as they're submitting us.

4 Now, we're lockstep in Canada in some
5 respects in that we're having monthly, if not weekly,
6 meetings on some of these items. So we know where
7 they're at in their review and their processes and
8 procedures, and they know where we're at associated
9 with these commonly submitted elements.

10 And that's beneficial at the end of the
11 day. So, if an interesting issue or a tough technical
12 item does come up, we're collaborating and
13 coordinating, and our technical reviewers are
14 discussing it across borders.

15 And to your point of that licensing
16 decision and whether we're able to accept something or
17 they are able to accept something from one regulator
18 to another, you know, that's the whole IAEA initiative
19 right now on harmonization, right, the NHSI
20 harmonization initiative where a mature regulator can
21 accept a licensing decision from another mature
22 regulator.

23 And I'm not sure we're quite there yet.
24 That's the golden goose at the end of day. And that's
25 the effort that we're talking about behind on the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 international fronts for the last six months, and we
2 will continue throughout this next year. So that's an
3 important aspect, and that's a goal to get to.

4 Mo, anything else to add?

5 MR. SHAMS: Nothing, Mike. Thank you.

6 MEMBER BROWN: Yeah, let me elaborate on
7 your, or at least try to take your comments, your
8 discussion and point it somewhat. AP1000, we
9 actually, the Committee actually challenged part of
10 the I&C design in which the vendor had to go provide
11 some additional information.

12 For example, I think this was the one
13 where we were focusing on the deterministic, well, it
14 wasn't really deterministic, processing of the overall
15 I&C system in terms of straight through, on whether it
16 was an interrupt driven, blah, blah, blah, how did you
17 make sure you could always, the thing always went from
18 point A to point B in a required time.

19 They actually came back, and we had to put
20 program limits in terms of application code that was
21 installed into that system so that it would not
22 potentially just jam it up because it was trying to
23 execute so many routines. So the other part was a
24 couple of the design details that they actually
25 cranked in based on some of those comments as well.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 The other big issue that we, one of the
2 big issues was the passive valves. There was a big
3 back and forth between the Committee and the staff
4 relative to the --

5 (Simultaneous speaking.)

6 MEMBER BROWN: -- the triggering
7 mechanism. I won't call them one of the more
8 pejorative type of words.

9 (Simultaneous speaking.)

10 MEMBER BROWN: But there was a lot of back
11 and forth on that.

12 So it seems to me, I mean, once you all
13 have made a decision and we've adjudicated that
14 between, you know, we've made comments and if we
15 either accept it or not in the Commission rules, I'm
16 trying to figure out how you take that and you swing
17 that, how do the Canadians deal with some of the more
18 controversial type issues.

19 And bringing up AP1000 is a good point,
20 because a lot of issues came up during that review on
21 the design.

22 MR. SHAMS: Yep, yep.

23 MEMBER BROWN: And I'm not saying it was
24 on the staff, because we all agreed at the end we were
25 going forward with it.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 MR. SHAMS: Yep.

2 MEMBER BROWN: But that's, there was a --
3 how does the CNSC now take that and do an independent
4 review? I mean, if they, they kind of -- we're
5 building those right now. Okay.

6 MR. SHAMS: I think it's a great, great
7 great question, because it really talks to the
8 practicality of all this. None of this is static.
9 None of this is frozen in time.

10 You know, we make the best decision. You
11 give us the best feedback. We offer the Commission
12 the best recommendation we have at the time. And a
13 decision is made based on that. But there's processes
14 as we go forward to update and, you know, rectify
15 things depending on their safety significance and the
16 like. In terms of -- so that's how we maintain the
17 safety of the design if we end up finding something in
18 the end that we need to update.

19 As far as what, you know, how the
20 Canadians would benefit from that, I think it's going
21 to have to be dependent on the point of time in which
22 they're, you know, picking up our work per se and
23 relying on it. It would be -- if it's at the time
24 that we're still in dialogue with you, so there's
25 definitely a risk of, you know, you giving us some

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 feedback that leads to change things, if it's a time
2 further down on it, that's a more, you know, a reduced
3 risk if you would.

4 You know, we interact with them and others
5 as well. We interact on a periodic basis. And all
6 these issues come up.

7 You know, if we have a dialogue going on
8 AP1000, I envision such issues being brought up. If
9 we identify things clearly that's being done in
10 public, but it's more than just, you know, sort of
11 offering it in public and everybody can go read the
12 newspaper. But, no, there is our interaction with
13 them, whether it's, you know, biannually or any
14 discussion on all the different issues and topics that
15 we're, you know, interacting on.

16 We have also relationships with the
17 Canadians on oversight. You know, they had, we had
18 exchanges with the residents team or inspectors,
19 looked at AP1000 as well or other activities that
20 we're doing just for the oversight framework as a
21 whole but also for the specific technologies that they
22 had an interest in as well.

23 So these are all different mechanisms by
24 which we continue to interact and adapt through
25 changes and, you know, things that we identify along

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 the way. So I hope that gets to the point that it's
2 not frozen in time and forgotten from that point going
3 forward.

4 MEMBER BROWN: Okay. Well, thanks. Don't
5 take my queries as saying that -- you know, I'm not
6 trying to pour cold water. I think this is in the
7 positive --

8 MR. SHAMS: No.

9 MEMBER BROWN: -- area that it would be
10 useful for both countries to be able to simplify the
11 process somewhat so that we can build more of the
12 plants. I mean, it's -- the easier we can make it for
13 the applicants to be able to come up with a common,
14 common designs that satisfy both countries'
15 requirements and regulations, the better off we are in
16 the long run in terms of --

17 MR. SHAMS: Absolutely.

18 MEMBER BROWN: -- both countries. So --

19 MR. SHAMS: Absolutely, absolutely.

20 MEMBER BROWN: -- I'm just, I just don't
21 want us, the U.S., either the Commission or the
22 Committee, in my own mind to be brought up to the
23 point, well gee, it's already been accepted and go
24 forward. That's not a good end point for this
25 harmonization approach.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 MR. SHAMS: A hundred percent. We
2 couldn't agree more. And that is not the goal for
3 what we're doing.

4 I think there is a lot of efficiency to be
5 gained in technical, common technical positions,
6 reviews, data, software. But the licensing process
7 and the interactions with you all and the Commission,
8 that's intact. That's not being viewed as an area to,
9 you know, to change.

10 MEMBER BROWN: Okay. Thank you very much
11 for your patience with my --

12 (Laughter.)

13 MEMBER BROWN: -- my inquiries. Okay?

14 MR. SHAMS: We're grateful for the
15 questions, by the way, absolutely grateful. Thank
16 you.

17 MR. DUDEK: Absolutely. That's why we're
18 here.

19 MEMBER MARCH-LEUBA: This is Jose. Since
20 we have plenty of time, let me bring something related
21 to this. Mostly what we're doing on these
22 incorporations is not the licensing itself, but it's
23 the topical reports.

24 And it's not unusual for the NRC staff to
25 basically commission a review of a topical report

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 from, say, a national laboratory. So an expert or a
2 number of experts from a national laboratory do all
3 the technical review for a topical report. And then
4 the NRC staff does the final ten percent, comprise the
5 SER.

6 In that sense, it wouldn't be unheard of
7 if we were to commission the review of a topical
8 report to the Canadian regulators. And then we, the
9 NRC staff, do the final ten percent, of course, on
10 final SER.

11 So, since there is so much more emphasis
12 on topical reports for deciding new reactors, I think
13 there is some benefits to be gained by incorporating
14 more. If I am a regulator and I review a critical
15 heat flux correlation, why doesn't a greater number to
16 have to review from the scratch the same critical heat
17 flux correlation? I mean, if it's already been
18 reviewed, you have to reincorporate.

19 But, so there is a lot to be gained there.
20 I'm used to leaving intact the ACRS and the Commission
21 positions on roles. But 90 percent of the work is
22 done together.

23 MR. DUDEK: Well, Jose, let me take that.
24 And hopefully we can -- I'd like to parlay that into
25 the next slide just real quick, because that's where

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 I'm going to get into some of those details about how
2 we're delegating some of the work under those topical
3 reports. And we've actually expanded it to white
4 papers now as well. So, you know, the CNSC takes a
5 piece. We take a piece. And then we align on that
6 common position.

7 MR. SHAMS: Thanks, Mike. So, Jose, let
8 me answer your question. Absolutely, I think that is
9 the concept. The mechanics probably would be
10 something that we have to work out, you know, because
11 there are certainly deltas between a laboratory doing
12 it for us.

13 But your description of the concept is
14 spot on, to what degree can we use something that's
15 already been done. And that's actually, again, that
16 is what's being done today on the fuel side of things.
17 You know, we didn't quite tell you yet, and Mike is
18 going to walk through that, but when we show you what
19 we're doing for fuel, it's exactly the concept you
20 were describing.

21 We've already reviewed several topical
22 reports associated with the fuel for BWRX-300. And
23 the Canadians are having the ability now to look at
24 these reports and review them in a way that satisfies
25 their need for effect.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 And then ultimately after writing an SC,
2 which is in your description, would be that ten
3 percent, you know, the write-up now built on the
4 strength of what the NRC has already done in this
5 area.

6 And we're not just providing the reports
7 and the SCs that we bring. But we're actually making
8 ourselves available to meet and discuss and actually
9 provide, you know, human insights into these reviews
10 and how they were done and explanations. So I think
11 the model is quite close to what you've described.

12 And we're looking to see the same thing on
13 the other side as well. What we haven't mentioned yet
14 is BWRX is envisioned to be built in Canada ahead of
15 the U.S. by a year or so. So we can see a great deal
16 of value in seeing, you know, issues or inspections.
17 We can leverage what's being done in that regard and
18 see how we can benefit this side of the border with
19 this information.

20 MEMBER MARCH-LEUBA: Going back one step
21 further up --

22 MR. SHAMS: Sure.

23 MEMBER MARCH-LEUBA: -- for the philosophy
24 point, one thing we do, we, NRC staff. By that, I
25 mean you. I'm ACRS. One thing NRC does with

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 regulatory guides is they endorse and incorporate by
2 reference, say, for example, on NEI position.

3 MR. SHAMS: Sure.

4 MEMBER MARCH-LEUBA: I don't think we are
5 going that far. I think that to keep everybody happy
6 it would be best if we do the topical report
7 commissioning a national laboratory model in which
8 they do 90 percent and we do 10 percent. So I just
9 wanted to bring that to your attention. I mean, when
10 we say incorporating by reference, people start
11 getting cold feet, I think.

12 MR. SHAMS: It's a great idea. And we'll
13 definitely reflect on it and see. And as I say, we'll
14 find the right mechanics for it. But the idea, we
15 absolutely share the same vision on that.

16 DR. BLEY: This is Dennis again. Michael,
17 you tossed out white papers. And I guess if you're
18 not planning to say more about it, please say some
19 more now, because those aren't something that you
20 actually approve. What's the role of white papers in
21 all of these processes we're talking about?

22 MR. DUDEK: So I'll answer that in just a
23 minute. But I'd like to go back to the previous slide
24 first and answer your first question with some
25 additional information on it. Can you go back one

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 slide?

2 So, Member Bley, just to answer your
3 question on some of the codes and what we've done and
4 how they apply to the proposed regulators, I would
5 refer you to that first joint report on the
6 containment evaluation method. And I just sent the
7 joint report to Mike Snodderly and the ML number is
8 22031A279. And that ML number is for that joint
9 report. And it gives some additional details on that
10 code piece.

11 But colloquially, let's start -- and to
12 your white paper discussion, let's discuss what work
13 is actually being done right now. And this is
14 colloquially called our five-member or five-topic
15 discussions, CNSC, NRC, TVA, OPG, and SaskPower. So
16 essentially it's now six with the addition of
17 SaskPower.

18 And as Mo very graciously said, OPG is a
19 step ahead. And they will be building a year ahead of
20 us. We will be learning a lot about their processes
21 and procedures and how this is going to go forward.
22 And SaskPower is now a new member to our five-party
23 discussions, as they may be purchasing the GE Hitachi
24 as well. So next slide.

25 So what are we doing? And it goes to that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 white paper and that topical report discussion. And
2 that's to say that we have three work plans that are
3 currently underway, you know, under the structure of,
4 you know, the MOC and the charter that was signed by
5 the EDO in 2022. We have an annex to that charter,
6 which is really the work plans themselves. What work
7 is actually going to be done? What are we actually
8 doing? And what are we actually collaborating on?

9 And we've decided to collaborate on three
10 items, three technical items, that we've been, that
11 the three entities, us, CNSC, and GEH, have aligned on
12 that would be of benefit to discuss. And it's really
13 those advanced construction techniques, the safety
14 strategy white paper, and a fuel verification and
15 validation report that we're, that both countries are
16 looking at.

17 So I'm going to describe a little bit more
18 about each one of them if that's okay.

19 First and foremost, the advanced
20 construction technique project, so NRC and CNSC are
21 currently reviewing, each reviewing the white paper
22 that was submitted to both SCs by GEH. And this is
23 really, you know, goes to the bottom line of steel
24 plate composite containment vessel construction for
25 the reactor building structural design.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 This white paper is, describes the use of
2 what they call steel bricks. Now, these steel bricks
3 will be used for the construction of most walls and
4 floor for the BWRX-300 integrated reactor building.
5 And these steel bricks will be filled with cement and
6 with steel tie rods and will be a structural element
7 for the containment and reactor building structures.

8 New and novel designs, something that the
9 U.S. at least hasn't seen before. I think it's been
10 used in a couple other entities. But, you know, this
11 is new to at least me. And I'm learning a lot about
12 it.

13 So they did submit this white paper to us.
14 We have been reviewing it since October 14, 2022. We
15 have had a public meeting on it. And that was in
16 November 12, 2022. We had a joint public meeting on
17 it between the NRC, CNSC, and GEH.

18 And now we're working to put that joint
19 report and put that meeting summary and those joint
20 efforts and those joint learnings of what we've done
21 over the last, you know, three to four or five months
22 together. And we should see something come together
23 on that by March, the end of March of 2023.

24 Any questions on steel bricks before we
25 move on?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 MEMBER KIRCHNER: Mike, this is Walt
2 Kirchner. Happy New Year first, and then, also Mo.

3 Just, Mike, you were, weren't you the
4 lead, your staff the lead on the NuScale steel plate
5 composite PR review?

6 MR. DUDEK: It's not, the steel plate
7 composite isn't quite what these steel bricks is. And
8 what I mean by that, this steel brick technology is
9 almost two steel plates put together with tie rods,
10 and then you fill it with concrete as part of the
11 structural element. So it's a little bit different
12 than what the NuScale design entailed.

13 (Simultaneous speaking.)

14 MEMBER KIRCHNER: Without getting into
15 proprietary details, the basic concept is the same.

16 MR. SHAMS: It is. And it's the same
17 concept that AP1000 used as well. So I'm --

18 MEMBER KIRCHNER: Right.

19 MR. SHAMS: -- I'm with you. And I know
20 you remember in those days, they came in and presented
21 to you on what AP1000 was and was not. So, yes, you
22 know, it's not particularly that different. But there
23 are proprietary elements that are somewhat different,
24 yes.

25 MEMBER KIRCHNER: Of course, but back in

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 that time, Mo, since you brought it up, this is Dennis
2 again --

3 MR. SHAMS: Yep.

4 MEMBER KIRCHNER: -- there were no
5 consensus standards on steel plate composite
6 constructions. There are now. So I assume that's
7 having, feed into --

8 MR. SHAMS: It is, yeah, it is definitely
9 helping quite a bit to have -- do you remember --
10 you're right. The dialogue back then was the data
11 that we've used and the testing that was assembled at
12 the time. I think we're in a better place now.

13 But there's also -- and Mike, you know,
14 I'm sure will have the ability to describe. There is
15 a testing program that's taking place for that
16 particular design that BWRX-300 is adopting. And
17 they're working with BUE and -- in particular to do
18 the sum validation of their data and their models.
19 So, yes, it's both. There's data as well as better
20 foundation in terms of codes.

21 MEMBER KIRCHNER: Okay. Thanks.

22 MR. DUDEK: Yeah, and some of those
23 initial tests are being done out at the University of
24 Purdue. And we're slated to go out and see some of
25 those additional steel brick tests later this year as

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 part of the -- project.

2 MEMBER KIRCHNER: Mike, this is Walt
3 again. That brings up an interesting thing.

4 I'm not familiar with how the Canadians
5 deal with ANSI and other American standards. Probably
6 in this topical area we're talking about civil and
7 also ASME.

8 You mentioned earlier your joint work on
9 the pressure vessel for the X-energy. You know,
10 nominally at least on the U.S. side, one would look to
11 ASME code case or such to cover a novel high
12 temperature design like that.

13 How does it work with the Canadians in
14 terms of standards? Do they rely a lot on the ASME
15 boiler and pressure vessel code? That would seem to
16 be, you know, the go-to place for that pressure vessel
17 work for X-energy.

18 MR. SHAMS: I can take that, Mike.

19 They do, Dr. Kirchner. Yeah, absolutely,
20 they do. We do have a common utility, if you would,
21 for the ASME code. I believe it's, you know, it's
22 integrated in their thinking and approach for building
23 nuclear plants.

24 And when we did do a joint effort on the
25 X-energy vessel construction code, we had a common

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 view that what was presented was viable. So that
2 gives you an example of them, you know, adopting an
3 ASME code revision or a section per se. So, yes,
4 they're definitely embracing that code.

5 MEMBER KIRCHNER: Does the same hold for
6 IEEE as well? Just excuse my unfamiliarity with the
7 Canadian licensing processes.

8 MR. SHAMS: Sure.

9 MEMBER KIRCHNER: Do they look generally
10 to IEEE for the electrical and digital standard base?

11 MR. SHAMS: That's a little bit deeper
12 than I know about their regulatory framework. So
13 don't know the answer to that.

14 But I would like to offer a more general
15 answer, as I think they have a lot of, they see a lot
16 of value in American codes and standards per se. But
17 they're also well integrated internationally. So
18 you'll see international products, you know, that
19 they're using as well. But I don't know the answer to
20 the IEEE specifically.

21 CHAIR REMPE: Let's go on to your second
22 bullet because of time. We're using up the allocated
23 time rapidly. Thank you.

24 MR. DUDEK: Absolutely. And this second
25 work plan is what we colloquially call the safety

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 strategy. And this is the NRC and CNSC are currently
2 reviewing a white paper entitled safety strategy. And
3 it's for that BWRX-300.

4 So the white paper was submitted to the
5 NRC in early December, December 6, 2022. And it
6 really looks to incorporate the selective guidance
7 from the IAEA's safety standards for specific safety
8 requirements in SSR2/1, Revision 1.

9 GEH is not requesting specific regulatory
10 endorsement of the IAEA standard by either the NRC or
11 CNSC. However, the objective of the safety strategy
12 is to establish the design and a high level strategy
13 of safety when using defense in depth concepts between
14 the two countries associated with the IAEA standards.

15 GEH believes that this is accomplished
16 through the incorporation of the design requirements
17 through selective guidance. And it also believes that
18 it's consistent with the current NRC and CNSC
19 regulatory requirements.

20 So we're really looking on how does the
21 NRC do business, how does CNSC do business, and can we
22 parlay our understanding for that associated with this
23 IAEA standard.

24 We've had an initial public, joint public
25 meeting in December 14th. We have been providing,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 meeting regularly with CNSC and providing that
2 preliminary feedback to GEH. We're working on a
3 meeting summary and a meeting feedback. And we're
4 taking a look at, a comprehensive look at this topic
5 --

6 (Audio interference.)

7 CHAIR REMPE: -- GEH. Yet the CNSC and
8 the NRC would say if you follow this IAEA standards
9 it's likely you're going to meet our regulatory
10 requirements. Is that what they'd like to have you
11 say and you're trying to evaluate it for something
12 that there would be a gap by just following the IAEA
13 safety standards?

14 MR. DUDEK: Yeah, I think very simply
15 we're looking at that gap.

16 CHAIR REMPE: Okay. And then could I have
17 you send a copy of this white paper to Mike so that it
18 could be provided to the ACRS members and slides from
19 that meeting?

20 MR. DUDEK: Sure. I think we can do that.
21 I'll take that as a note.

22 CHAIR REMPE: Okay. Thank you.

23 MR. DUDEK: Mo, anything to add?

24 MR. SHAMS: No, Mike, you covered it.

25 Thank you.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 DR. SCHULTZ: Mike, this is Steve Schultz.
2 Just a question on the IAEA standard and work here.

3 Over the past two years at least, the IAEA
4 has been looking at the revision of the, of the
5 Revision 1 standard going forward to apply to new
6 reactor designs. And has that been something that the
7 GEH folks have incorporated into their reviews here
8 and to this strategy?

9 MR. DUDEK: I think it's their proposal at
10 this time. I'm not sure that they've actually
11 incorporated it. They've submitted a white paper
12 floating this idea to us on how this would work and
13 whether we can get our arms around it. And then I
14 think they have a topical report or I believe they
15 have a topical report planned for later this year
16 that's going to flesh this out even further.

17 DR. SCHULTZ: Good. Thank you.

18 And I did note in looking at the
19 information we have been provided on the overall
20 licensing approach for CNSC and NRC that for the CNSC,
21 their defense in depth approach is almost readily
22 adapted from the IAEA approach, though I'd be
23 interested in seeing that work that you're going to
24 forward to Mike so --

25 MR. DUDEK: Sure.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 DR. SCHULTZ: -- we can review that.
2 Thank you.

3 MR. DUDEK: Sure. I will forward what I
4 can. And I'll round with Mo and Brian on what I can
5 find. Okay.

6 DR. SCHULTZ: Thank you.

7 MR. DUDEK: Absolutely. So, without any
8 further discussion on that, we'll move on to the third
9 topic of the, the third work plans. And that's really
10 the fuel verification and validation, you know, and
11 this GNF2 fuel that the BWRX-300 design is proposing
12 to utilize. But we've seen that same fuel as part of
13 the ESBWR. So the NRC is very familiar with this
14 design.

15 And we've had several public meetings with
16 CNSC over the last three months to try to bring
17 understanding and commonalities across, and
18 harmonization across borders of what we've seen and
19 what we've known and trying to brief and get CNSC
20 comfortable with reviewing that information that GEH
21 is going to send to both of us. So it's more of a
22 mentor-mentee of mature regulators at that point for
23 at least this topic.

24 Mo, anything to add on that?

25 MR. SHAMS: No, Mike. I would, you know,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 the only item I point to is this is really again the
2 prime example of how are we leveraging this activity
3 to gain efficiency, to gain mileage, if you would.

4 It's by things like this, what we've done
5 versus what they have done and how we can share that
6 knowledge and help the other regulator move forward
7 quicker, faster and with a foundation of great work
8 that's done by the other regulator. So this is a
9 prime example of that.

10 DR. BLEY: A quick question from Dennis.

11 MR. SHAMS: Sure.

12 DR. BLEY: I've heard the phrase another
13 mature regulator many, many times --

14 MR. SHAMS: Yes.

15 DR. BLEY: -- which on the surface makes
16 sense. To get specifics, into specifics, it might be
17 hard to pin down. Is IAEA, are they declaring who are
18 mature regulators? Are you guys? Where is that -- is
19 that really a big deal here, or is that just language
20 that's floating through?

21 MR. SHAMS: So I wouldn't say it's a big
22 deal between us and the Canadian regulator, because
23 we're both, I would say fit the category of mature
24 regulators. I think it's -- in our vision, you know,
25 early on, it continues to be is we start with folks

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 that we have a great deal of commonalities to start
2 building a model that works and we can identify where
3 we can benefit from each other and when we cannot.

4 So I wouldn't characterize either of us as
5 an immature regulator. But does that exist? Yeah.
6 Certainly, you know, developing nations, those that
7 are early on in their journey with these reactors and
8 these technologies, we would probably say that they
9 still need a bit to gain to get to a mature regulator.
10 And that would be the group that would be looked at as
11 not particularly a mature regulator.

12 DR. BLEY: So, as this grows and goes
13 forward, with you and the Canadians and maybe other
14 countries coming in I guess it's this group of
15 regulators who decide who gets to come into the club
16 in the future.

17 (Simultaneous speaking.)

18 MR. DUDEK: I think it's more in depth
19 than that. I think the IAEA forum under the SMR
20 regulators forum, which we're discussing and defining
21 some of these terms, there's over 30-plus countries
22 that are in those discussions and aligning on, you
23 know, who is a developing country and who is a mature
24 regulator.

25 And it's pretty clear in those

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 discussions. You know, if you license multiple
2 reactors, if you have a good operating fleet, and you
3 have well established processes and regulatory
4 procedures, then I think for all intents and purposes
5 you're a mature regulator in at least the IAEA's view
6 and how we're defining and how you'll see some of
7 these reports coming out for those --

8 DR. BLEY: Okay. Thanks, Michael. That's
9 --

10 MR. DUDEK: -- for those countries.

11 DR. BLEY: That's what I was looking for.
12 And I guess IAEA is kind of the lead on this, if there
13 is such a thing as a lead.

14 MR. DUDEK: Yes. Okay. Next slide, so
15 bringing up the tail end here on next steps if we can.

16 And the next steps are really, you know,
17 the U.S. and Canada are routinely exchanging
18 information. As I said, these are monthly, daily, and
19 weekly activities.

20 And it's anticipated that pre-application
21 engagement to identify additional potential projects
22 and technical areas are, you know, highly sought
23 after. And we're discussing them on a routine basis
24 between our senior managers and our staff to come up
25 with these collaborative reviews and these

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 collaborative ideas.

2 And really the thanks is to GEH for, you
3 know, really coming to the table and giving us this
4 opportunity on these topics and really sending some
5 challenging topics in front of us that we can both
6 align on and interact on. And we want to be
7 successful at the end of the day. And we want to
8 provide them some benefits. So, you know, all of this
9 is in the back of our minds.

10 So, while the focus of current projects is
11 on pre-application and interactions, you know, really
12 at the end of the day, you know, we're cooperating and
13 collaborating with an important entity to our north to
14 review on specific sections and topics. And
15 hopefully, you know, that golden goose at the end of
16 the day is harmonization and CNSC's and NRC's goal of
17 conducting joint reviews and these joint activities on
18 topics and activities jointly.

19 So, with that being said, I'll turn it
20 over to, back to either you, Chairman Rempe, or Mo and
21 Brian for any additional thoughts that you have.

22 CHAIR REMPE: Okay. So this is Joy. Mo
23 or others on the staff, do you have any final
24 comments?

25 MR. SHAMS: No, thank you. No, the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 questions have been incredibly thoughtful. And I hope
2 that we were able to respond to your inquiries and
3 will provide the information you requested. But other
4 than that, no, back to you.

5 CHAIR REMPE: You've done a great job. I
6 found this presentation very helpful.

7 I want to remind members and consultants
8 that there is going to be a closed session. But if
9 there's any other questions you want to ask in the
10 open session, this is the time to do that. And then
11 we'll open up the line for public comments. I see
12 your hand up, Dennis.

13 DR. BLEY: Yeah, just a quick one in an
14 area that I guess I'm not too concerned about. But
15 Congress has passed the laws that establish NRC as the
16 nuclear regulator for the United States. Is there any
17 legal issues that are troublesome here with making
18 these kind of cooperations work?

19 MR. SHAMS: We haven't encountered any.
20 And as long as it remains in a place that doesn't
21 particularly impact our sovereignty and our ability to
22 make our licensing decisions independently, we see
23 this as another merging of our interactions that we
24 have been doing for a while, whether it's bilateral or
25 multilateral through IAEA, other organizations. So,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 no, our legal advisers did not find issues with what
2 we've been doing.

3 DR. BLEY: Okay. Thanks a lot. And
4 thanks for the --

5 MR. SHAMS: Sure.

6 CHAIR REMPE: Charlie, I saw your hand up
7 next.

8 MEMBER BROWN: Yeah, thanks. I wanted to
9 -- the two white papers, which are pretty high level
10 type documents when you get right down to it,
11 strategies for doing various things, as well as the
12 details on the construction techniques item, the -- I
13 wanted to emphasize a little bit of Jose's comment
14 relative to the topical reports. That's where the
15 rubber hits the road in the details, the piece parts
16 that you put these plants together with in most
17 circumstances.

18 And I know in my area we've, there's been
19 a couple of topical reports that have been reviewed,
20 and then they have been used by other applicants. And
21 they've flown through the review process with barely
22 a wink and a nod. I mean, they were agreed to once.
23 And they were accepted by the next applicant, and away
24 we went. And they worked very, very well.

25 So the topical reports are, I just wanted

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 to emphasize what Jose said, that those are an
2 important linchpin when we're getting down to the
3 details about what the plants and what the applicants
4 are going to design the specific systems utilizing.
5 That was my only thought. So don't lose sight of
6 that.

7 MR. SHAMS: No, no, we're not. And I
8 thank you for the feedback on that. And we want to --
9 I don't know if we answered the question as crisply as
10 we could have been.

11 The white papers are not replacing topical
12 reports by no mean. They serve a different purpose.
13 They serve a purpose of are we on the right track per
14 se and what elements are missing versus not. So
15 that's, the purpose they kind of offer is an
16 opportunity to provide feedback.

17 A topical report is a topical report.
18 It's a licensing tool. It gets your review. It gets
19 our SC and a staff position is preserved and can be
20 incorporated by reference. So they serve different
21 purposes.

22 CHAIR REMPE: Okay. And then I saw Greg's
23 hand up.

24 MEMBER HALNON: Yeah, thanks, Joy. If
25 you've covered, I got two questions, and if you've

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 covered them already, I apologize.

2 MR. SHAMS: Sure.

3 MEMBER HALNON: One of them is, do you
4 ever see a situation where you might endorse a
5 Canadian standard so that there's only one effort by
6 the licensee to, or the applicant to establish their
7 documents?

8 MR. SHAMS: I would probably say certainly
9 there's no reason for us not to. I'd say I would
10 point more to more international thing, like an ISO
11 9000 per se. So that's more of an example of what you
12 pointed to. That would be an opportunity for us to
13 endorse something that licensees can use on this side
14 of the border versus the other. But conceptually,
15 there's no reason not to. Yes, if we find something
16 in there that supports us and our reviews, we would do
17 it, yes.

18 MEMBER HALNON: Okay. Second question, do
19 you ever -- well, when is it not appropriate? Do you
20 foresee any circumstance or situation where you would,
21 if an applicant came in and said we want a joint
22 review, you would say no, thank you?

23 MR. SHAMS: That's a great question. I
24 didn't mean to -- but it's a tough question. I would
25 say that the characteristics and the aspects that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 Donna went through early on is to make this as
2 efficiently as possible.

3 You know, I'll start by saying we're open
4 for business. If anybody -- you know, it's a public
5 service operation. So, if anybody is submitting an
6 application to us, we certainly have a place for them.
7 Whether or not they did the right priorities or their
8 budget, of course, that plays a factor in, you know,
9 how quickly we can get to it.

10 Now, in terms of a joint collaborative
11 effort on a review, that would have to be impacted by
12 a number of factors, you know, how well is that
13 application oriented for the two regulators to
14 collaborate, is one far ahead of the other, you know,
15 do we have similar design or are there differences.

16 So those are the factors, what's on our
17 plate versus what's on their plate, is it going to be
18 built in both countries versus both in one but not in
19 the other. So those would be the criteria and the
20 attributes that we would use to decide, you know, the
21 priority of that application.

22 MEMBER HALNON: Okay. Thanks, Mo.

23 MR. SHAMS: Sure.

24 CHAIR REMPE: So I know you were going
25 from the phone to the computer, Greg. And I believe

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 it's slide 8. It's where Donna went through those
2 characteristics and criteria that emphasize which ones
3 might be viewed more favorably to use.

4 At this point, I'd like to open up the
5 line for public comments. If you are online, you
6 should raise your hand and, or do a star 6. I don't
7 see -- I saw a hand, but it disappeared. Is there
8 anyone who wants to make a public comment? Okay. I
9 think I've given us enough time.

10 And the phone lines, if you wanted to make
11 a comment, you I believe hit star 6. And that unmutes
12 you. And that would allow you to make a comment. So
13 I'll give you a couple of seconds longer.

14 And not hearing anything, then it's time
15 for us to switch and go to the non-public invitation.
16 And again, I want to thank the staff for the great
17 presentations and their willingness to brief us.

18 I believe, but, Mo, perhaps you or others
19 could confirm this, but I believe the CNSC folks would
20 be allowed to be in this closed session. Is that
21 true? I'm not hearing --

22 MR. SHAMS: No, I'm, yeah, I'm thinking
23 the answer through.

24 CHAIR REMPE: Okay.

25 MR. SHAMS: Yeah. I honestly don't know

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 the answer to that. I would have to confer with my
2 staff on that. I don't know the answer to that. I
3 know --

4 CHAIR REMPE: Okay.

5 MR. SHAMS: -- I forwarded them the link
6 this morning. I don't know if they have the link for
7 the closed session.

8 CHAIR REMPE: Okay.

9 MS. WILLIAMS: Yeah, the information I
10 think we were planning to discuss in the closed
11 session is the subjective meetings that we've had with
12 CNSC. So I don't see a reason why they couldn't.

13 MR. SHAMS: So there's your response.
14 Yeah, ordinarily, you know, we would have to be
15 careful with what's being discussed, whether it's
16 proprietary or not. But this is their information.
17 They are partners with us in this information. So it
18 would be appropriate for them to attend.

19 CHAIR REMPE: So I will trust you to
20 forward that to them.

21 And then let's take -- I know we're
22 running a little bit late. But why don't we take a
23 five-minute break, because it takes a while to confirm
24 everybody is really here that should be here? So
25 let's restart at 3:50 p.m. Does that sound good? And

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1716 14th STREET, N.W., SUITE 200
WASHINGTON, D.C. 20009-4309

1 thank you.

2 MR. SHAMS: Thank you.

3 CHAIR REMPE: Okay.

4 MR. SHAMS: Appreciate it.

5 CHAIR REMPE: Thanks again.

6 (Whereupon, the above-entitled matter went
7 off the record at 3:45 p.m.)

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

CNSC - U.S. NRC Cooperation on Advanced Reactor Technologies and Small Modular Reactors

January 11, 2023

Outline

- Introduction
- Memorandum of Cooperation process
- First products
- Current work
- Future projects

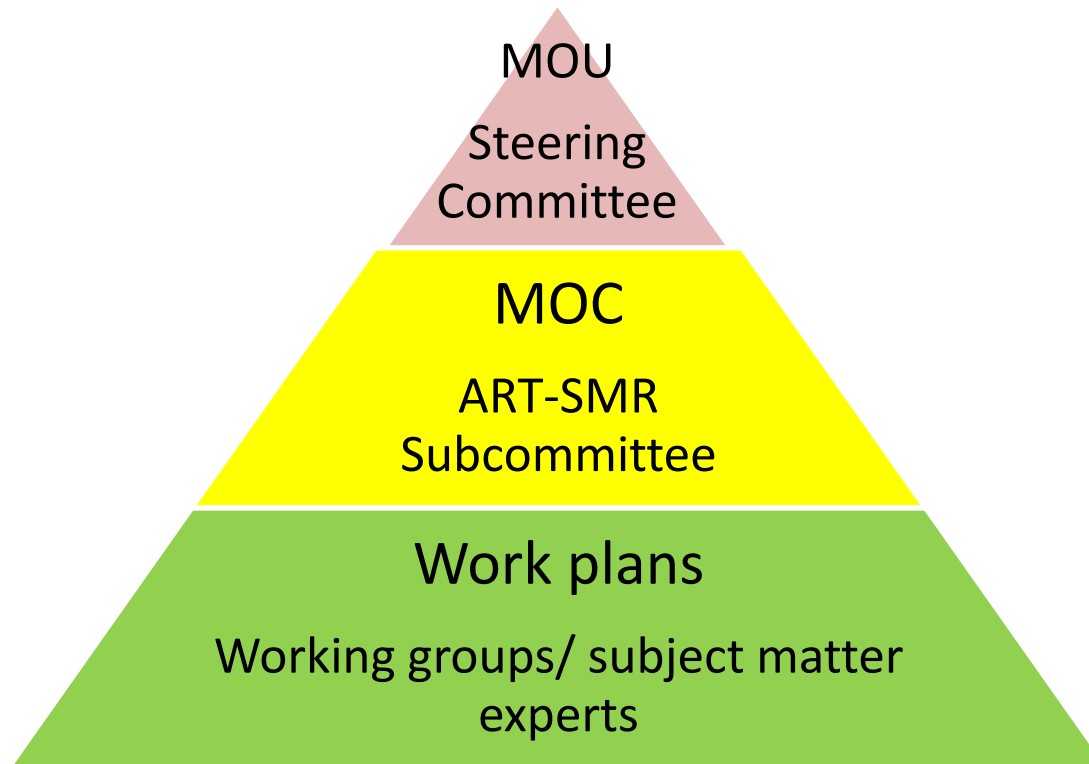


Introduction

- Memorandum of Cooperation signed in 2019 to collaborate on reviews of designs submitted for review in the U.S. and Canada
- Goal - Collaborate on ART-SMR design reviews and share experience
- Benefits to CNSC and USNRC
 - Effective and efficient regulation
 - Risk-informed agile decision-making



Implementation of the MOC



Scope of Memorandum of Cooperation (MOC)

Scope of projects

- Pre-licensing engagement
- Licensing reviews
- Science and research

Development of work plans

Processes for collaboration



Joint NRC/CNSC Products

Pre-licensing Engagement

- X-energy – Xe100 reactor pressure vessel construction code assessment
 - GEH- BWRX-300 Containment Evaluation Method
 - Terrestrial - postulated initiating events

Review Approaches

- Report Comparing the U.S. LMP with the Canadian Approach

Unique Technical Considerations

- TRISO fuel qualification



Lessons Learned and Improvements to the Collaboration Process



Expansion to include UK/ONR



Staff exchanges



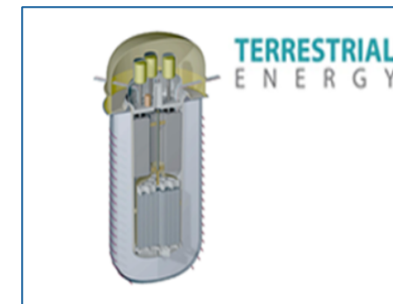
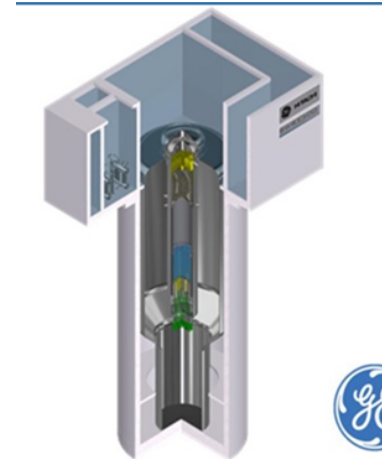
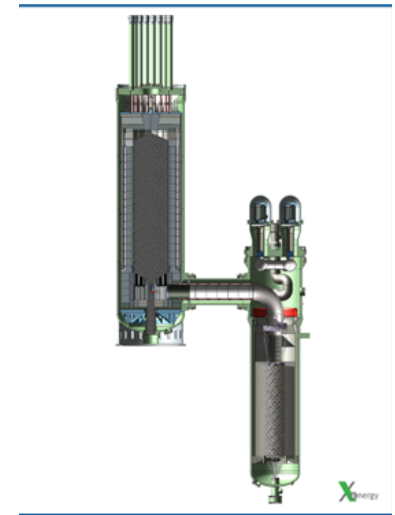
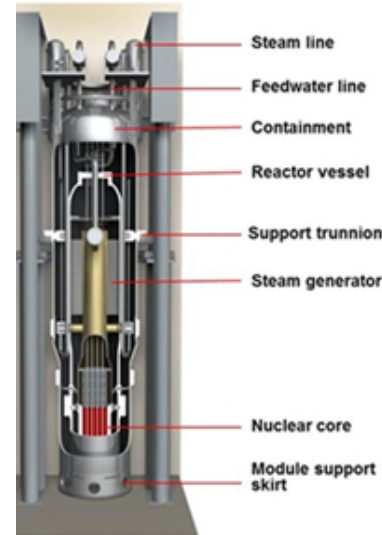
Strengthened communication to external stakeholders



Upgrades to collaboration tools

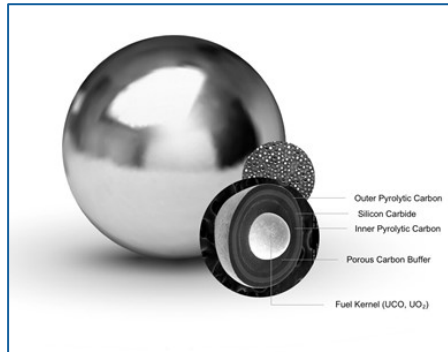
Project Selection

- Request by vendors
- Criteria
 - The extent to which the vendor is engaging in meaningful pre-licensing activity with each regulator
 - The similarity between the vendor's engagement activities in each country
 - The timelines for engaging with each regulator
 - The ability of the vendor to share information about their design with both regulators

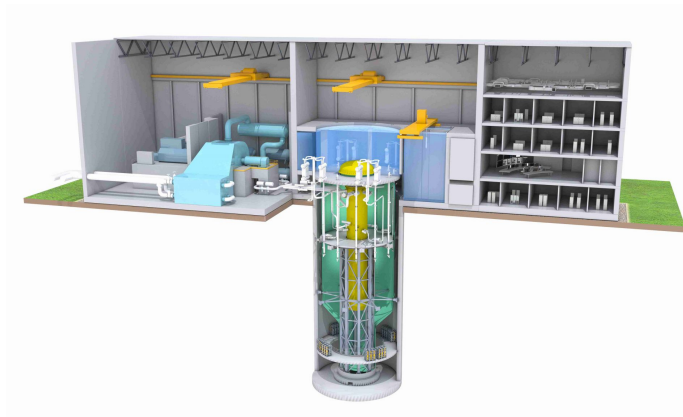


Current Work

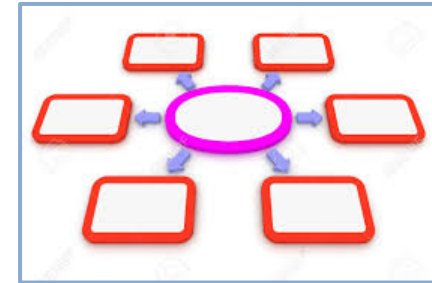
Collaborative work plans underway



TRISO Fuel
Qualification



GEH BWRX-300



Safety Classification
of Structures,
Systems and
Components

Joint Review of GE Hitachi's BWRX-300

- TVA, OPG, SaskPower independently selected the same technology (GE Hitachi's BWRX-300 design)
- NRC and CNSC are conducting collaborative reviews on specific technical topics Under the MOC
- Goal: Efficient and coordinated reviews resulting in common technical positions
- To date, NRC and CNSC have successfully collaborated and issued a joint report on BWRX-300 containment evaluation method.



CNSC-NRC MOC BWRX-300 Current Projects

- BWRX-300: Advanced construction techniques. The NRC and CNSC staff are reviewing a white paper on BWRX-300 Steel-Plate Composite (SC) Containment Vessel (SCCV) and Reactor Building Structural Design
- BWRX-300: Safety Strategy. The NRC and CNSC staff are reviewing a white paper on the Safety Strategy for BWRX-300. The Safety Strategy incorporates selected guidance from the IAEA Safety Standards Specific Safety Requirements No. SSR-2/1, Revision 1, “Safety of Nuclear Power Plants: Design.”
- BWRX-300: fuel verification and validation. CNSC is leveraging previous USNRC reviews of the GNF2 fuel product in the CNSC’s review of OPG’s construction license application.



Next Steps

- Work with vendors and utilities to identify specific technical issues and perform joint reviews of topical reports and white papers in the pre-application phase
- Cooperate on the review of specific sections or topics in licensing applications.

