Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

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

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Location: teleconference

Date: Wednesday, February 15, 2023

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

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

NuSCALE DESIGN-CENTERED SUBCOMMITTEE

+ + + + +

WEDNESDAY

FEBRUARY 15, 2023

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The Subcommittee met via Teleconference, at 1:00 p.m. EST, Walter L. Kirchner, Chair, presiding.

COMMITTEE MEMBERS:

WALTER L. KIRCHNER, Chair

RONALD G. BALLINGER, Member

VICKI M. BIER, Member

CHARLES H. BROWN, JR., Member

VESNA B. DIMITRIJEVIC, Member

GREGORY H. HALNON, Member

JOSE MARCH-LEUBA, Member

DAVID A. PETTI, Member

JOY L. REMPE, Member

MATTHEW W. SUNSERI, Member

ACRS CONSULTANTS:

DENNIS BLEY

STEPHEN SCHULTZ

DESIGNATED FEDERAL OFFICIAL:

MICHAEL SNODDERLY

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

1:00 p.m.

CHAIR KIRCHNER: Okay, let's begin, then. This meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguards, NuScale Design-Centered Subcommittee.

I am Walt Kirchner, the Chair or lead member for this meeting. Members in attendance today are Ron Ballinger, Vicki Bier, Charles Brown, Vesna Dimitrijevic, Greg Halnon, Jose March-Leuba, David Petti, Joy Rempe, and Matt Sunseri. We also have our consultants, Dennis Bley and Stephen Schultz, with us. Mike Snodderly is the Designated Federal Official for this meeting.

The Subcommittee will discuss NuScale's standard design approval application for its updated small modular reactor.

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

The Committee can only speak through its published letter reports. We hold meetings to gather information and perform preparatory work that will

support our deliberations at a full Committee meeting.

The rules for participation in all ACRS meetings were announced in the Federal Register on June 13, 2019. The ACRS section of the U.S. NRC public website provides our charter, bylaws, agendas, letter reports, and full transcripts of all full and Subcommittee meetings, including slides presented there. The agenda for this meeting was posted there.

A portion of this meeting will be closed to protect NuScale proprietary and export controlled information to pursuant to 5 USC 552BC4.

As stated in the Federal Register notice and in the public meeting notice posted to the website, members of the public who desire to provide written or oral input to the Subcommittee may do so, and should contact the Designated Federal Official five days prior to the meeting, as practicable.

The communications channel has been opened to allow members of the public to monitor the open portions of this meeting. The ACRS is now inviting members of the public to use the MST link -- Teams link to view slides and other discussion materials during these open sessions. The MS Teams link information was placed in the agenda on the ACRS public website.

We received no written comments or requests to make oral statements from members of the public regarding today's session. Written comments may be forwarded to Mike Snodderly, today's DFO.

There will be an opportunity for public comment, and we have set aside 15 minutes on the agenda after our open session for comments from members of the public listening to this meeting.

A transcript of the open portions of the meeting is being kept, and it is requested that speakers identify themselves and speak with sufficient clarity and volume so that they can be readily heard. Additionally, participants should mute themselves when not speaking.

And I see that we have a number of people on the line. Please mute your phones if you're not speaking.

We'll now proceed with the meeting, and I call upon Tom Griffith of NuScale to begin today's presentations.

And, Tom, before you begin, I just want to say thank you to NuScale for this informational briefing. And the floor is yours.

MR. GRIFFITH: Thank you. This is Thomas Griffith from NuScale Power. I'm the acting licensing

manager for SDAA. I have with me Kristopher Cummings, who is a licensing engineer 5 for NuScale, as well as Brian Meadors, our chief licensing engineer.

Thank you for having us. This is an opportunity for NuScale to provide an overview of the submitted US460 standard design. In essence, this presentation is a continuation of our June 22, 2022 meeting. And with that, I'll turn over the floor to Kris Cummings to start the presentation.

PARTICIPANT: You need to turn your volume down. Okay.

MR. CUMMINGS: Can you hear me?

CHAIR KIRCHNER: Yes.

MR. CUMMINGS: Great, thank you. And now you can see me. Thank you.

So it's good to be here again in front of the ACRS. And like Tom said, we're here to provide additional details on the application that's been submitted to the NRC for approval of the US460 design.

We gave you much information about the design enhancements and improvements and additions back in the June meeting. We are going to have a very brief recap of that here in the open meeting, touch on the technical and topical reports, and then we'll go into more detail in the closed session about the

technical and topical reports and various other areas.

I do want to recognize the support for the Department of Energy for this particular project, both the design certification and also the standard design application. And also there's support for the UAMPS project in Idaho for the building of the first NuScale SMR. Next slide.

Before I get into the content, I also want to acknowledge the participation in this meeting of our customers. We have individuals from UAMPS, CFPP, and our parent company, Fluor. For the purposes of this meeting, they're basically observers for this particular meeting, because we are focused on the NuScale submittal of the US460. Next slide.

And, Mike, could you work to admit additional NuScale people to the -- to the meeting, please? That would be appreciated.

MR. SNODDERLY: Understood.

MR. CUMMINGS: So why are we here? And we had a very similar slide in our --- in our meeting in June. Again, we've gone through an optimization of the NuScale design that was submitted and approved in the DCA that will become effective here in about a week that will allow for better -- better customer use and deployment.

We pretty much maintained the approved technical and licensing basis from the DCA while maintaining the overall safety and risk profile.

From a high-level perspective, the design changes were a redesign of the site layout for the -- for the six-module configuration in increased power output on a per-module basis, with additional optimization to ease manufacturing, maintenance, and operation. Again, maintaining similar or improved safety margins from what was in the DCA.

Just to go back to the DCA, the steam generator was over-designed for the 160 megawatt application. And really, we've taken another look at that and determined ways that we can allow for increased power output while maintaining the same design limits.

We have performed additional testing and we will get into some of that in the closed portion, that has helped to validate the performance of the increased power and design feature enhancements of the NPM at that increased power level.

And then there were additional safety features added. We touched on a lot of that in June, and we will certainly touch on that in this presentation today.

And, finally, we didn't talk about much about PRA in June, but we will today in the closed portion. But overall, we've reassessed the PRA within the application and have been able to conclude that it doesn't significantly alter the PRA risk insights from the DCA, the design in the SPA doesn't significantly impact that.

MEMBER REMPE: Kris, this is Joy.

MR. CUMMINGS: Yes.

MEMBER REMPE: In the open session, can you state whether you went through and not only reassessed the frequency part of the PRA, but also the consequence part where appropriate. And you actually went through and, for example, ran another MELCOR run to look at in-vessel retention?

MR. CUMMINGS: Yeah, Joy, we've got all of the PRA discussion in the closed portion for today's meeting.

MEMBER REMPE: Okay, but in the open session, can you say that you did reassess the consequence? Or you can't even say that in the open session?

MR. CUMMINGS: Yeah, we've really tried to preserve the PRA discussion for the closed session today.

MEMBER REMPE: Thank you.

MR. CUMMINGS: All right, next slide. So I want to talk a little bit about the application content. We talked about this in June, but I think it's again important to reiterate, you know, what is part of the scope of the SDA. Next slide.

So what we've done is basically consolidated a bunch of the slides that we presented in June to illustrate here with the gold and the green one, differences from the DCA. So in particular, what is and isn't required by the regulations to be part of a standard design application versus a design certification application.

And so for instance, in particular Part Two, which is the tier one information, and Part Three, the Environmental Report, while required by a design certification, are not required as part of a standard design approval, or standard design application, excuse me. And so those are not included as part of the SDAA that was submitted on December 31.

The green rows are essentially information that while not required by a standard design application, per the regulation subpart 10 CFR 52, Subpart E, we have included this information for the conveniences of future customers and applicants. In

particular, combined operating licensed applicants if they chose to use the SDAA in their application.

And those two particular areas are the technical specifications and then the license conditions in ITAAC. And a lot of that is, well, we've put them together for DCA and we could -- we could leverage that work and provide that additional information as part of the SDAA.

Any questions on that? All right, next slide.

So, again, as I mentioned previously, we're going to provide a brief overview of the design changes, not to the same level of detail that we did in June, but certainly just to familiarize everybody with the overall design changes. So next slide.

As mentioned before, the big change here is the change from a 12-module to a 6-module. And so that needs to accommodate various design changes. In particular, a smaller footprint. You've got less modules so you've got less support. Information like turbine generators needed. So that allows for us to accommodate a reduced footprint with the overall plant site.

One other change that we've -- that we've included that we discussed back in June was the

introduction of dry cooling via air-cooled condensers. That is part of the standard plant design, that is part of the SDA.

And, now, as you can see on the figure, we have a single one-by-six turbine building that is to the east of the reactor building. In the DCA we had two turbine buildings, one to the north and one to the south. So that's allowed, again, a consolidation of the site.

And then there's various other conforming site layouts, site layout changes that we -- that we decided to implement to accommodate that reduced footprint. Next slide.

All right, we've shown this again before in June, but again, this is the reactor building design changes. You can see it's a much more compact reactor building, in large part because of the reduced number of modules from 12 to 6. We have reclassified the seismic classification of parts of the reactor building. Some of the roof and floor slabs are SC2. The details of that were provided in June in the closed session.

We've also transitioned to a steel plate composite wall from what was previously reinforced concrete in the ECA. And that's supported by our NRC-

approved building design and analysis LTR, licensed topical report.

We've also lowered the pool level, which accommodates long-term cooling but still allows us to maintain spent fuel pool and ECCS coverage during the events that that's needed. It also allows us additional room to rearrange the containment vessel penetrations.

The similar reductions in the sizes and quantities of the SSCs that are in the reactor building, most of that's associated with the reduction in the number of modules. And then there's also conforming changes associated with the new design of the building, in particular the reactor building crane and the bioshield.

And with the bioshield, as we discussed back in June, it's that basically because of the lower water level, we've extended the bioshield. So now, as in DCA, the bioshield extended down to the water level. And again, we're doing that, it's just the water level's lower.

And the finally we have COO items for the spent fuel storage racks and the reactor flange tool. Those are both areas that are not going to be the responsibility of the COL applicant.

MEMBER PETTI: Just a question for clarification. So the bioshield is actually deeper than it was in the previous design.

MR. CUMMINGS: That is -- it's, yeah, deeper, longer. There's you know --

MEMBER PETTI: Oh, okay, thank you.

MR. CUMMINGS: So that point where it shows bio, biological shied, there was one panel, and now there's two.

MEMBER PETTI: Thanks.

MEMBER BROWN: Could I ask a question? Charlie Brown.

CHAIR KIRCHNER: Yeah, please.

MEMBER BROWN: Is the water level now lower in the reactor pool building now that -- I'm trying to remember whether it covered upper, closer up to the top of the head or not.

MR. CUMMINGS: Yes, it did. So that the reactor pool level was reduced by about 18, 19 feet.

MEMBER BROWN: Thank you. So you're really using the bioshield then to pick up that change, from a radiation standpoint?

MR. CUMMINGS: To ensure that we have a similar level of radiation protection and dose rates in the reactor building, yes, we want -- we did not

want to have a streaming path, you know, between the water and, you know, not having a bioshield there. So yes, that's for radiological protection.

MEMBER BROWN: Okay, thank you.

MR. CUMMINGS: All right, next slide. So this is just an overview or an overhead view of the reactor building. You can see in particular the reactor building crane and its coverage. And then the fuel handling equipment including the spent fuel pool, the new fuel elevator, and the refueling machine.

There's also, you can see the locations where the reactor vessel flange tool and the containment vessel flange tool would be located, along with the dry dock and the area where we allow the module to be imported into the -- into the reactor building. Next slide.

In terms of changes to the NuScale power module itself, we've already mentioned the increased power level. There's also additional conforming changes with the associated pressures and temperature changes associated with that power level increase. As in the DCA, the NPM is safety-related and risk-significant.

And we have re-performed the safety analysis in Chapter 15 of the SDAA to accommodate the

increased power level and the various other design changes that we've made.

We have made a material change in the lower reactor vessel pressure from SA-508, low-alloy stainless steel to FXM-19 austenitic stainless steel. That's -- there's no expected radiation embrittlement for that material. And allows us a removal of the reactor pressure vessel surveillance program. We do have some additional information on that in the context of our technical reports in the closed session.

And then we also have a material change for the upper containment vessel from SA-508 low-alloy stainless steel to F6NM martensitic stainless steel. And that's to accommodate the higher design pressure with the reduced wall thickness with -- because of the stronger material properties associated with F6NM. Next slide.

So this is a summary of the changes of the module protection system set-points for design-basis events. A couple that I want to point out here. So on the table on the left, the last four columns, we've talked about this back in June, but we've just summarized.

We basically replaced the high CNV water

level and the low RCS pressure with the low RPV riser level and low, low RPV riser level. And that's to accommodate the changes in the ECCS design. Essentially, it allows ECCS to get actuated prior to uncovery of the riser holes.

The other one that I wanted to point out that we haven't mentioned previously was the third -- the third row in the, again, the table on the left. That's the high RCS average temperature. That's a new set-point that we've added. And that's to accommodate slow-moving reactivity events.

The table on the right is basically set-points that were in DCA that we have not modified, either the set-point itself, or the level, the particular value of that set-point. But you can see there's some other changes in the values of the set-points.

And again, those are to accommodate the changes in the design. Again, the power level and the ECCS design.

MEMBER REMPE: So Kris, I looked ahead, and the technical reports have -- the one on the guided wave water level instrumentation for low pressurizer pressure has not been submitted.

And I believe I asked this question

whenever we talked about the EPC report, and I was -- the status I guess I heard from NuScale is that no additional work has been done in that development of that sensor. Is that still a true statement, or are you guys planning to submit this report? It's not listed in your slides here.

MR. CUMMINGS: Yeah, we did not have any update today on the sensor.

MEMBER REMPE: Are you planning to submit that technical report as part of this SDA? Because I looked ahead in the open slides and I did not see it listed.

MR. CUMMINGS: Yeah, we just don't have an update today on the -- on the sensor. But we'll take that, know we took that action in June also, but we'll follow up on that.

MEMBER REMPE: Okay, and you'll let us know whether you're going to submit it on the docket and to describe your progress in developing that sensor.

MR. CUMMINGS: Yeah, we'll take an action.

MEMBER REMPE: Thank you.

MR. CUMMINGS: All right, next slide.

DR. BLEY: In the closed session, are you going to address the bases for these changes in the

set-points? I'm looking at the pressure ones especially, or can you do that?

MR. CUMMINGS: Yeah, we can get into that, yes.

DR. BLEY: Thanks.

MR. CUMMINGS: Okay, next slide. All right, so this is really just a listing of the topical reports. We've got a set of topical reports that have already been approved by the NRC. Some of those were either part of the DCA that didn't need to be modified, or they're ones that were outside of the DCA or SDA, things like control room staffing.

One that we have submitted as part of, I'll say as part of the SDA was the Framatome Fuel Methodologies applicability. That's now been approved. That really was just to update and show that those fuel methodologies from Framatome were equally applicable to the -- to the increased power, NuScale power module.

Currently under review by the NRC are the critical heat flux statistical subchannel analysis methodology and the rod ejection analysis. So we've had good engagement with the NRC staff on those particular topical reports. And those are in various stages of review.

And then the other five topical reports, those were submitted with the SDA application. And those are currently under acceptance review the NRC and are on a similar timetable to the SDA acceptance review. Next slide. And next slide.

This is really a listing of the various technical reports that we've either updated or are new from DCA, listed by chapter in parenthesis. We'll be going through more in more detail these technical reports in the closed portion of the meeting.

All right, with that, that's the gist of the presentation for the open session. But I'm open to questions, and we can get the appropriate staff on the line if need be.

MEMBER REMPE: So this is Joy, and I was slow on the button. On the technical reports, I don't believe, but Mike Snodderly can correct me, but I don't think we've seen any of them. But we will as part of our review be allowed to get access to all of these technical process --

CHAIR KIRCHNER: Joy, this is Walt.

MEMBER REMPE: Yeah.

CHAIR KIRCHNER: Not to answer for Kris, but a lot of these technical reports have been included with the chapters that are part of the SDAA

application. So for example, I can tell you I've looked at quite a few of these. The one on use of austenitic stainless steel for the lower reactor pressure vessel, you know, that was attached to, I believe, Kris, that was attached to either Chapter 4 or 5.

MR. CUMMINGS: Chapter 5. So the individual topical reports would have been submitted or attached with the chapters as they were submitted.

MEMBER REMPE: So I'm interested in the instrument set-point methodology technical report. Is that attached to Chapter 7, for example?

MR. CUMMINGS: That's correct, yeah, that's correct.

MEMBER REMPE: Thank you. Okay, I just, I haven't gone through all the chapters yet, so thank you.

CHAIR KIRCHNER: Okay, members, any other questions of Kris at this point? Okay, I thank you, Kris.

At this point, Mike, I think we turn to the public for any comments. Is that correct?

MR. SNODDERLY: Yes, Walt.

CHAIR KIRCHNER: Okay, so members of the public who are online, please unmute yourself,

identify yourself, any affiliation as appropriate, and make your comment.

I see Ed Lyman has his hand up. Why don't we start with you, Ed.

DR. LYMAN: Yeah, thank you. Can you hear me?

CHAIR KIRCHNER: Yes. Go ahead.

DR. LYMAN: Yes, Edwin Lyman from the Union of Concerned Scientists. I would just like to comment that I'm disappointed NuScale was unwilling to answer the simple question about what's included in its probabilistic risk assessment at this point.

It doesn't seem reasonable that they would conceal that information from the public at this point. And frankly, if this design is really safe, as the company bills it to be, I don't know they are trying to hide.

That's my comment. Thank you.

CHAIR KIRCHNER: Okay, thank you. Other members of the public?

MS. FIELDS: This is Sarah Fields.

CHAIR KIRCHNER: Good afternoon, Sarah. Go ahead.

MS. FIELDS: Obviously there's a lot of conversation that's going to go on behind the fence.

And I wonder whether when those documents and -- that are going to be discussed, like the PRA and PRA information, are going to be made publicly available. So that's my question.

CHAIR KIRCHNER: Okay. Thank you, Sarah. Further comments?

MR. CUMMINGS: Hey, Walt, I just wanted -- I just wanted to mention that the information is in the application itself. That is publicly available information that can be gotten off of the NRC's website.

We simply, for the purposes of this meeting, in anticipation of getting into some of the proprietary information that may be embedded in some of our methodologies chose to have some of those discussions in the closed session.

As we go through this review process, we certainly will, I anticipate being back in front of the ACRS, and some of those discussions will be more open.

And but, you know, we're very sensitive to the fact that right now we are in the pre-application phase. The NRC is undergoing their application review, their acceptance review, and so yeah, if people are looking for more information, they can

certainly go look at what we've submitted on the docket.

CHAIR KIRCHNER: Thank you for that, Kris. Other public comments? Pausing a little bit longer than usual because we have so many people on the Teams meeting.

Okay, not hearing any further comments , that will conclude the open portion of our meeting today. For those of you that have the invitation, we'll leave this Teams meeting and rejoin on a separate invitation on Teams.

Thank you for your presentations, Kris. And with that, we'll close the open portion of this meeting.

(Whereupon, the above-entitled matter went off the record at 1:31 p.m.)

February 14, 2023 Docket No. 52-050

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Submittal of Presentation Materials Entitled "US460 Design and SDAA Overview Update," PM-135236, Revision 0 (Open Session)

The purpose of this submittal is to provide presentation materials to the NRC for use during the upcoming Advisory Committee on Reactor Safeguards (ACRS) NuScale Subcommittee Meeting on February 15, 2023. The materials support NuScale's presentation of the US460 design and overview of the NuScale Standard Design Approval Application.

The enclosure to this letter is the nonproprietary version of the presentation entitled "US460 Design and SDAA Overview Update (Open Session)."

This letter makes no regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions, please contact Thomas Griffith at 541-452-7813 or tgriffith@nuscalepower.com.

Sincerely,

Mark W. Shaver
Acting Director, Regulatory Affairs
NuScale Power, LLC

Distribution: Michael Dudek, NRC
Getachew Tesfaye, NRC
Bruce Bavol, NRC
Mike Snodderly, NRC

Enclosure: "US460 Design and SDAA Overview Update," PM-135236, Revision 0 (Open Session)

Enclosure:

“US460 Design and SDAA Overview Update ,” PM-135236, Revision 0 (Open Session)

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US460 Design and SDAA Overview Update

ACRS Presentation (Open Session)

February 15th, 2023

Kristopher Cummings
Licensing Engineer V

Brian Meadors
Chief Engineer, Regulatory Affairs

Tom Griffith
Licensing Manager, Acting - SDAA

Acknowledgement and Disclaimer

This material is based upon work supported by the Department of Energy under Award Number DE-NE0008928.

Agenda – Open Portion

- SDAA Content
- US460 Design Overview
- Topical and Technical reports

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Why we are here and how did we get here?

- The SDA submittal is an engineering optimization of the NuScale DCA to allow for better customer use and deployment. The SDA maintains the approved technical and licensing basis from the DCA while maintaining the overall safety and risk profile.

High Level Design Changes

- Redesigned site layout to accommodate a 6 NPM configuration
- NPM optimized for increased power output; ease of maintenance, manufacturing and operation while maintaining safety margins:
  - Steam generator was over designed for 160MWth application (DCA) and allows for increased power output while maintaining design limits
  - Additional testing has been performed to validate performance of NPM engineered safety features at an increased power level
  - Additional engineered safety features added to eliminate certain events and simplify Chapter 15 analysis
- Current evaluation of SDA design changes does not significantly alter the DCA PRA risk insights.

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Standard Design Approval (SDA) Application Content

SDA Application Content

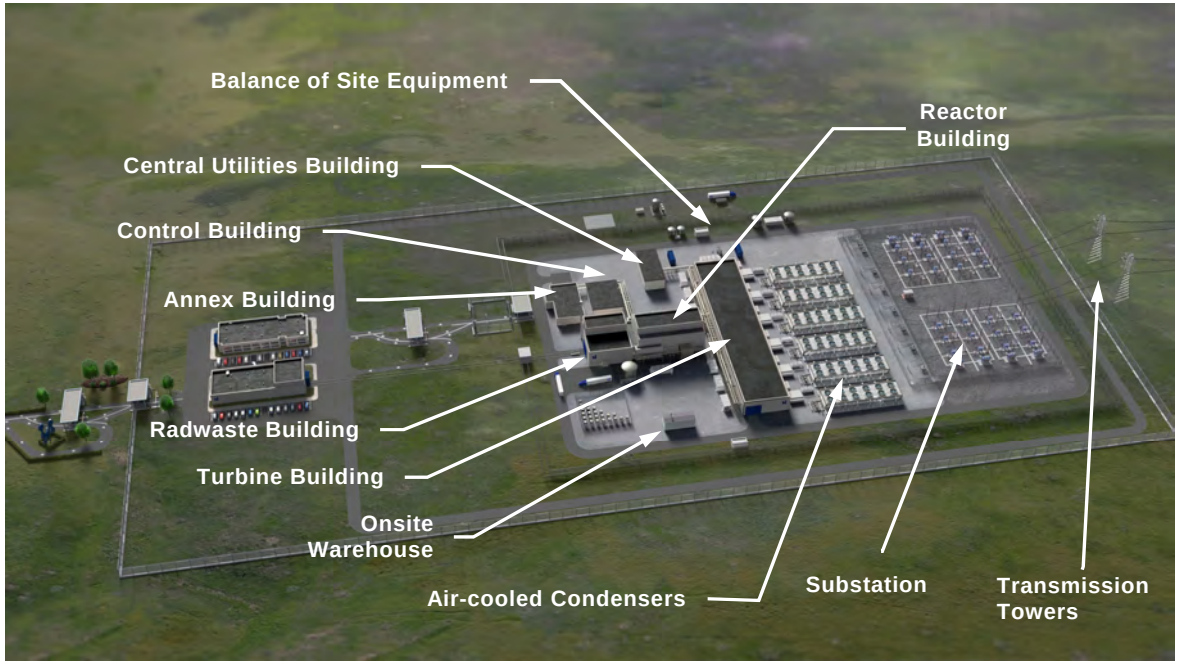
APPLICATION PART	DESIGN CERTIFICATION (10 CFR 52 subpart B)	SDAA – Required by Regulation (10 CFR 52 subpart E)	SDAA – Needed to Support COL	Include as Part of SDAA Submittal
Transmittal Letter	Yes	Yes	N/A	Yes
Part 1: General and Financial Information	(financial info. Not required)	(financial info. Not required)	N/A	Yes
Part 2: Safety Analysis Report – Tier 1	Yes	No	No	No
• Ch. 1 – Introduction	Yes	No	No	No
• Ch. 2 – Unit Specific SSCs Design Descriptions and ITAAC	Yes	No	ITAAC Only	ITAAC Only (see Part 08)
• Ch. 3 – Shared SSCs and Non-SSCs Design Descriptions and ITAAC	Yes	No	ITAAC Only	ITAAC Only (see Part 08)
• Ch. 4 – Interface Requirements	Yes	No	No	No
• Ch. 5 – Site Parameters	Yes	No	No	No (in FSAR Ch. 2)
Part 2: Safety Analysis Report – Tier 2	Yes	Yes	Yes	Yes
Part 3: Environmental Report	Yes	No	No	No
Part 4: Technical Specifications	Yes	No	Yes	Yes
Part 5: Emergency Plans	Optional (Limited Scope) Not in NuScale DCA	No	No	No
Part 6: Security Plans	Optional (Limited Scope) Not in NuScale DCA	No	No	No
Part 7: Exemptions, Departures, and Variances	Yes, if Applicable	Yes, if Applicable	N/A	Yes – Exemptions
Part 8: License Conditions; Inspections, Tests, Analyses and Acceptance Criteria	Yes, (ITAAC only) NuScale DCA references Part 2 Tier 1	No	Yes (only ITAAC)	Yes (only ITAAC)
Part 9: Withheld Information	Yes, NuScale DCA provides list of tables and figures	Yes	N/A	Yes
Part 10: Quality Assurance Program Description	Yes, NuScale DCA references separate topical report	Yes	Yes	Yes
Part 11: Supplemental Information (e.g., Limited Work Authorization)	Yes, if applicable None for NuScale DCA	No	No	No

Gold – differences from DCA Green – Included for COLA

US460 Design Changes

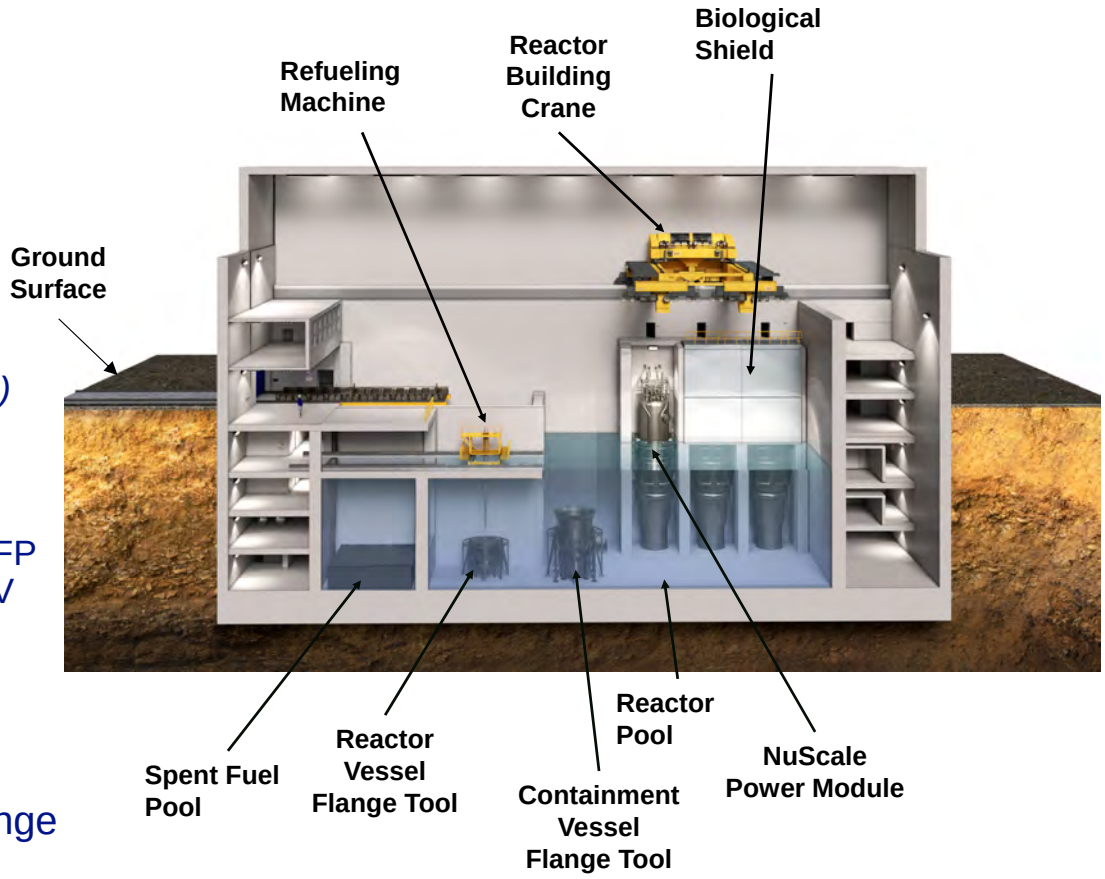
Site Design Changes

- Reduced footprint
- Dry cooling via air-cooled condensers
- Single (1x6) turbine building
  - Rather than two (2x3)
- Conforming site layout changes

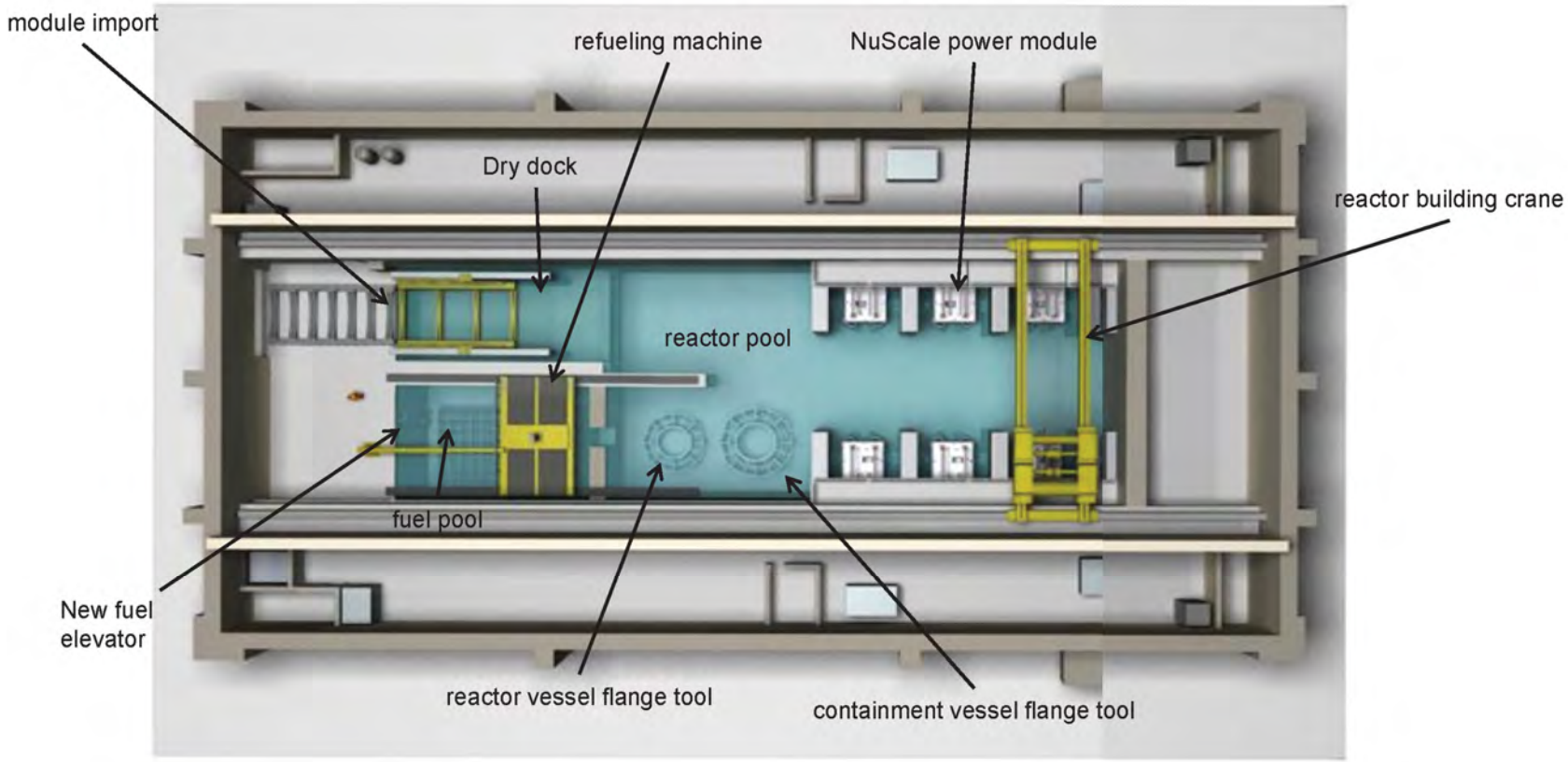


RXB Design Changes

- Six modules
  - 2x3 configuration
- Reclassify seismic class of RXB
  - Some floor and roof slabs are SC-II
- Steel plate composite walls *(from reinforced concrete)*
  - Supported by the BDAM LTR
- Lower Pool Level
  - Improves long term cooling, while still maintaining SFP and ECCS coverage. Allows room to re-arrange CNV penetrations.
- Reduction in sizes and quantities of SSC in RXB
- Conforming changes – i.e., RBC, Bioshield
- COL Items for spent fuel storage racks, reactor flange tool.

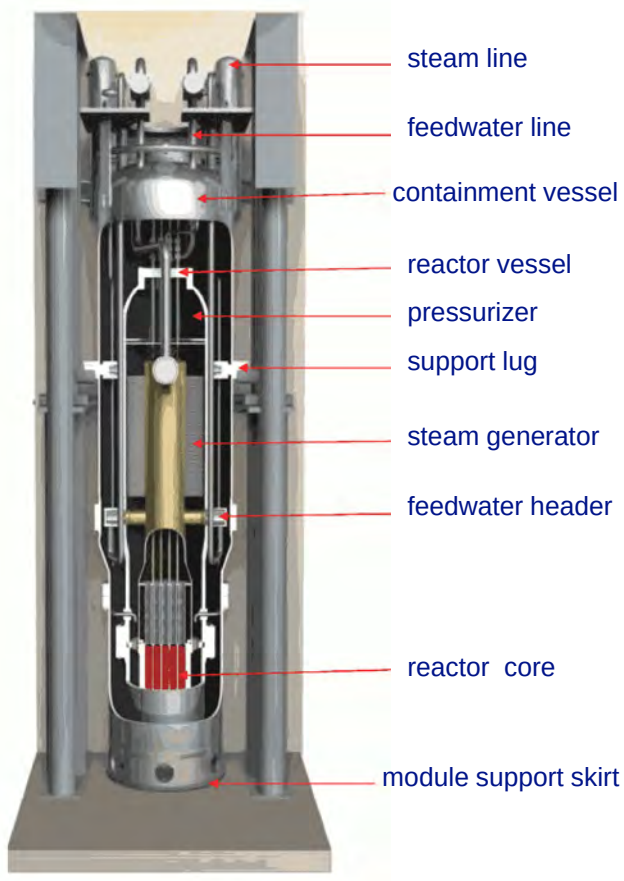


Reactor Building Overhead View



NPM Design Changes

- Increased Power Level *(250MW$_{th}$ from 160MW$_{th}$)*
  - Includes conforming changes (e.g., pressures, temperatures)
  - Safety-related and risk significant
  - Re-performing safety analyses in SDAA
- Lower RPV material change from SA-508 low alloy SS to FXM-19 austenitic SS
  - No expected radiation embrittlement, allows removal of the RPV surveillance program
- Upper CNV Material change from SA-508 low alloy SS to F6NM martensitic SS
  - Stronger material allows for higher design pressure with reduced wall thickness and no need for cladding



Module Protection System Setpoints for Design Basis Events

Setpoints with Changes	DCA	SDAA
High Power (% RTP) [for ≥15% RTP]	120	115
High RCS Hot Temperature (°F)	610	620
High RCS Average Temperature (°F)	N/A	555
High Pressurizer Pressure (psia)	2000	2100
Low Pressurizer Pressure (psia)	1720	1850
Low Low Pressurizer Pressure (psia)	1600	1200
Low Low Pressurizer Level (%)	20	15
High Main Steam Pressure (psia)	800	1200
Low RCS Flow (ft^3/sec)	1.7	1.0
High CNV Water Level (inches)	240 – 264	N/A
Low RCS Pressure (psia)	800	N/A
Low RPV Riser Level (inches)	N/A	540 – 552
Low Low RPV Riser Level (inches)	N/A	460 – 472

Setpoints without Changes	
High Power (% RTP) [for <15% RTP]	25
Source and Intermediate Range Log Power Rate (decades per min)	3
High Power Rate (±% RTP per min)	15
High Source Range Count Rate (counts per sec)	5.0E+05
High Subcritical Multiplication	3.2
High Containment Pressure (psia)	9.5
High Pressurizer Level (%)	80
Low Pressurizer Level (%)	35
Low Low Main Steam Pressure (psia)*	20
Low Main Steam Pressure (psia)*	300
High Main Steam Superheat (°F)	150
Low Main Steam Superheat (°F)	0
Low Low RCS Flow (ft^3/sec)	0
Low AC Voltage (seconds)	60
High Under-the-Bioshield Temperature (°F)	250

*In SDAA, the setpoint bypass is changed from RTP=15% to T_{hot}=500 °F

Topical Reports

SDAA Topical Reports

- Approved Topical Reports
  - Nuclear Analysis Codes and Methods (NACM)
  - Highly Integrated Protection System (HIPS) Platform
  - Accident Source Term (AST)
  - Risk Significance Determination
  - Control Room Staffing
  - Soil-Structure-Fluid Interaction
  - Building Design and Analysis Methodology (BDAM)
  - Framatome Fuel Methodologies Applicability
  - Evaluation Model for Stability Analyses
- Under NRC review
  - Critical Heat Flux (CHF)
  - Statistical Subchannel Analysis Methodology
  - Rod-Ejection Analysis (REA)
- Acceptance Review ongoing
  - Quality Assurance Program Description (QAPD)
  - LOCA Analysis Methodology
  - Non-LOCA Analyses Methodology
  - Density Wave Oscillation (DWO)
  - Extended Passive Cooling and Reactivity Control

Technical Reports

SDAA Technical Reports (by Chapter)

- Pipe Rupture Hazards (3)
- Containment Vessel Ultimate Pressure Integrity (3)
- US460 NPM Seismic Analysis (3)
- NuScale CVAP Analysis (3)
- NuScale CVAP Measurement and Inspection Plan (3)
- NPM Short-Term Transient Analysis (3)
- NuFuel-HTP2™ Fuel and CRA Designs (4)
- Use of Austenitic Stainless Steel for NPM Lower Reactor Pressure Vessel (5)
- Pressure and Temperature Limits Methodology (5)
- Fluence Calculation Methodology and Results (5)
- Containment Leakage Integrity Assurance (6)
- Instrument Setpoint Methodology (7)
- Effluent Release (GALE Replacement) Methodology and results (11)
- NuScale Design of Physical Security System (13)
- Treatment of DC Power in Safety Analyses (15)
- US460 SDAA Technical Specification Development (16)
- Human Factor Engineering and Concept of Operations (18) – 10 Technical Reports

ACRS Open Meeting Attendance on the Afternoon of February 15, 2023

Full Name
Michael Snodderly
Larry Burkhart
Thomas Dashiell
James Cordes - Court Reporter
Dave Petti
Tammy Skov
Gregory Halnon
Derek Widmayer
Ron Ballinger
Vicki Bier
Greg Myers (NuScale Licensing)
Walt Kirchner
Erin Blumsack (NuScale)
Vesna Dimitrijevic
Kevin Lynn (NuScale Licensing)
Gene Eckholt (NuScale Licensing)
Matt Sunseri
Shandeth Walton
Sarah Fields
Scott Head
Andrew Bowman (NuScale Power)
Cindy Williams (NuScale)
Stephanie Meyer - NuScale
Joy Rempe
Kris Cummings (NuScale)
Adam Stein (Breakthrough Institute)
J.J. Arthur (NuScale)
Jeff Luitjens (NuScale)
Meghan McCloskey (NuScale)
Stephanie Terwilliger (NuScale)
Wei Zhang (NuScale)
Sarah Turmero - NuScale Licensing
Doug B (NuScale)
Sarah Bristol, NuScale Power
Jana Bergman
Dong Zheng
Marissa Womble (CFPP)
Hiral Kadakia (NuScale)
Brian Wolf (NuScale)
John Volkoff
Robert Gamble (NuScale)
Blake Bixenman (NuScale Licensing)
Sooyun Joh
Daniel Diefendorf (NuScale)
Yeon Jong Yoo

Matt Featherston
Jason Peyton (NuScale)
Rob Meyer (NuScale)
Augi Cardillo (NuScale)
Brian Meadors - NuScale
Peter Subaiya (NuScale)
Mark Shaver
John Fields
Tom Case (NuScale)
Kyle Hoover (NuScale Power)
David Drucker
Susan Baughn (NuScale)
Seth Robison (NuScale)
Shawn Hughes
Larry Linik
Allyson Callaway (NuScale, Fuels)
Angelo Stubbs
Ken Rooks (NuScale)
Thomas Griffith (NuScale)
Andy Lingenfelter / NuScale NF Engineering
Boyd, Michael
Matthew Presson (TerraPower)
Bergman, Tom
Omid Tabatabai
Leigh Lloveras (Breakthrough Institute)
Joe Remic - NuScale Power
Raul Hernandez
Gus Farra
Bruce Bavol
Taylor Coddington (NuScale)
Bradley Brown
Amanda Bode (NuScale)
Matt Salac (NuScale Power)
Jeff Ehlers (NuScale)
Ben Bristol (NuScale Power)
Keith Tetter
Neil Sheehan
Fehmida Mesania - NuScale Power
Bill Acton (NuScale Power)
Samuel D'Amico (NuScale)
David Nold
Josh Parker (NuScale Power)
Dennis Pereira
Dennis Bley
HQ Xu
Gus Farra
Jon Bristol (NuScale Power)
Gary Becker, NuScale
Shanlai Lu

Alina Schiller
Rani Franovich (Breakthrough Institute)
Shane Scanlon (NuScale)
Edwin Lyman
Hannah Rooks (NuScale)
Stacy Joseph
Marissa Womble (CFPP)
Maurice LaFountain
Getachew Tesfaye
Andrea Kock
Jim Osborn (NuScale Licensing)