UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

In the Matter of	**Docket No. 50-423-OLA**
Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Unit 3)	**ASLBP No. 862-01-OLA-BD01**
	August 27, 2008

CONNECTICUT COALITION AGAINST MILLSTONE AND NANCY BURTON'S NEW CONTENTIONS AND REQUEST FOR LEAVE TO SUBMIT NEW CONTENTIONS BASED ON RECEIPT OF NEW INFORMATION AND REQUEST FOR CONTINUING WAIVER OF E-FILING REQUIREMENTS

The petitioners, Connecticut Coalition Against Millstone and Nancy Burton (collectively, "petitioners" or "CCAM"), herewith submit two new contentions[1] based on receipt of new information not previously available, accompanied by a request for leave to submit such contentions in accordance with the provisions of 10 C.F.R. § 2.309(f)(2) and a request for continuing waiver of electronic filing requirements.[2]

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[1] This submission is filed within thirty (30) days of the NRC's posting on its website of the official transcript of the July 8, 2008 proceedings of the Advisory Committee on Reactor Safeguards which occurred on July 28, 2008.

[2] The petitioners further reference their three (3) pending motions which pertain to the filing of new and/or amended contentions and the pendency of consideration by the Atomic Safety and Licensing Board ("ASLB") Panel's of such motions as per its Memorandum and Order dated August 14, 2008.

This submission initially sets forth the two new contentions, each supported by the Declaration of Arnold Gundersen,[3] and thereafter addresses the applicable provisions of 10 C.F.R. § 2.309(f)(3).

Introductory Statement

On July 8, 2008 at the U.S. Nuclear Regulatory Commission's ("NRC") Advisory Committee on Reactor Safeguards ("ACRS") subcommittee meeting at NRC headquarters in Rockville, Maryland, on the Dominion Nuclear Connecticut, Inc.'s ("Dominion"), application for a power uprate at Millstone Unit 3, new information was revealed by Dominion and the NRC's staff which was previously unavailable to the petitioners and which is material to the application and which gives rise to the petitioners' present submission.

New Contention 1

Statement of the Issue

(1) Temperature spikes in the hot legs of the Millstone 3 reactor - and the use of a new 4-second filter - present critical new and unreviewed safety issues not addressed by the application.

Basis for the Contention

Dominion notified the NRC and its staff *per* ACRS that it had been experiencing periodic, random temperature fluctuations in the hot legs of the reactor at Millstone Unit 3 at the July 8, 2008 ACRS session. Following upon the applicant's statement,

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[3] The Gundersen Declaration dated August 26, 2008 is appended hereto and incorporated by reference herein as Exhibit A.

Westinghouse representatives stated that it was aware of other four-loop Westinghouse units that had also experienced similar hot leg random temperature fluctuation, herein referred to as hot leg phenomena.

During the July 8, 2008 morning ACRS session, Dominion's representatives stated that the temperature oscillations occurring in the hot leg phenomena were approximately several seconds long and several degrees above the normal hot leg temperature. *Both the petitioners and NRC staff and ACRS were previously unaware of this hot leg phenomena until informed of it by Dominion and Westinghouse at the July 8, 2008 ACRS subcommittee hearing.*[4]

The introduction of this new evidence presented to ACRS regarding Dominion's application to uprate power at Millstone Unit 3 led to extensive discussions during the meeting, thereby eliciting further "new" - i.e., previously undisclosed or withheld - information from Dominion of which the petitioners were theretofore unaware.

Specifically, ACRS questioned Dominion as to whether or not any temperature decreases were also present to offset any temperature increases. During the morning session, Dominion's representatives did not know the answer to this question. Later in the day, Dominion had determined that there were simultaneous offsetting drops in the opposite hot leg (1 and 4, 2 and 3). In the morning, Dominion's representatives states that these temperature "spikes" lasted only several seconds in duration, but by the afternoon, the Dominion representatives stated that the "spikes" had been measured to

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[4] *See* Gundersen Declaration at ¶¶ 10.2-13.

last as long as 15 seconds.[5]

ACRS also questioned the applicant regarding the possible cause of the spikes, and the applicant acknowledged that the cause was uncertain; however, the Applicant also believed that the hot leg phenomena is most likely caused by uneven mixing of water coming out of the top of various bundles in the core. Westinghouse also suggested that this uneven mixing of water might be the likely reason for the phenomenon of a hot leg spike. The petitioners remain concerned that the applicant had no meaningful understanding as to whether the temperature "spike'" magnitude, duration or frequency might increase as a result of the applicant's proposed Millstone Unit 3 power increase.

More disturbing is the fact that in the past, these periodic temperature swings have caused spurious reactor trips. Dominion's representatives called this phenomenon "upper plenum anomaly". In order to mitigate the effects of these temperature "spikes," Dominion has proposed adding an electronic filter to effectively create a four-second running average for these temperature "spikes" in an effort to smooth them out over time. The applicant claims that by using such a filter, the margins in the "upper plenum anomaly" will be improved if the power uprate is approved. The applicant claims that the four-second electronic filter it plans to install at Millstone Unit 3 during the upcoming refueling outage in October 2008 would address these temperature swings and "re-establish DNBR margin" (Departure from Nucleate Boiling Regime). The applicant

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[5] *Id.*

also alleges that by installing this filter it most likely improve the DNBR Margin Safety Analysis Limit from 1.39 to 1.60.

The petitioners believe that introduction of this new information - materially at odds with the application - so late in the licensing process introduces three new unresolved safety issues that must be analyzed by NRC prior to acceptance of applicant's license amendment to increase Millstone Unit 3's power generation. The significant issues which must be analyzed include the following:

1. **Cyclic Fatigue** – If the temperature in one hot leg increases while the opposite leg temperature decreases, this introduces cyclic fatigue issues, which have not been discussed or analyzed in any correspondence between the applicant and the NRC. Not only has the phenomenon of hot leg spikes not been analyzed for the proposed power uprate, but the entire issue of hot leg spikes has not been analyzed for Millstone 3's current operation. These cyclic fatigue issues must to be analyzed prior to any further proceedings in the uprate license process, and should also be analyzed in light of Millstone Unit 3's current operations.
2. **Conflicting Temperature Spike Data** – Moreover, during the ACRS meeting, the applicant acknowledged that these temperature "spikes" create operational problems, including periodic spurious reactor trips caused because the calculations used to determine DNBR are driven by the hot leg temperature.

    2.1. The unveiling of 15-second "spikes" conflicts with the applicant's newly created 4-second spike filter design. *In fact, the Applicant appeared unaware the "spike" duration could exceed 4-seconds until the afternoon*

session.

2.2. During the afternoon session of the ACRS subcommittee hearing on July 8, 2008, the applicant informed the ACRS and the NRC staff that many times the duration of the "spikes" has lasted as long as 15 seconds. *Such new revelations by the applicant clearly contradict and undermine any claimed margin improvements assumed by the applicant in its use of a 4-second filter.*

2.3. Furthermore, the information submitted by Dominion during the morning session information did not support its assertion during the afternoon session that the duration of the "spikes" could be as long as 15-seconds. *In fact, given that Dominion now says that the "spikes" may last as long as 15 seconds, the 4-second delay seems arbitrary and may in fact cause a reduction in the safety margin rather than an improvement.*

3. The petitioners challenge whether adding a 4-second delay to a rise in hot leg temperature would improve the response to an actual accident. In the event of an accident having an incipient signal which is an actual rise in the hot leg temperature, Millstone's response to that accident would be delayed by 4 seconds as a result of the proposed modifications.

Prior to a public presentation of the hot leg phenomena by Dominion and Westinghouse at the ACRS subcommittee July 8, 2008, no member of the ACRS had any prior knowledge of these temperature "spikes" in any of the Westinghouse Pressurized Water Reactors. In addition, none of the material presented to the ACRS regarding these hot leg phenomena has been previously analyzed or discussed during any portion of the Millstone Unit 3 docket. Therefore, it would be extremely unreasonable to expect that the petitioners might have been able to identify probable safety issues caused by these hot leg phenomena of oscillating temperature "spikes" in the original petition to intervene and request for hearing.

Until the July 8, 2008 ASLB hearing, the information provided by the applicant was vague and misleading regarding the issue of its hot leg random temperature fluctuation, herein referred to as hot leg phenomena. At the ASLB hearing for the first time during the entire license amendment application process - inaugurated by Dominion's filing of its applicatioon one year ago on July 13, 2007 - the petitioners learned that the hot leg temperature "spikes" were as long as 15 seconds. It is unclear how a 4-second filter can "smooth out" a fifteen second "spike."

Furthermore, for the first time, the petitioners learned that not only is there a temperature "spike" in one leg but there was also a temperature drop in the other leg. This means that while one leg is getting hotter, the opposite leg is getting colder, which, over the life of the reactor, induces thermal stresses which have not been analyzed by the applicant. These temperature cycles represent an un-reviewed safety issue that, until July 8, 2008, was unknown to both the petitioners and the ACRS.

The applicant claims that this change will increase reactor stability, but the petitioners vehemently disagree. Rather, the 4-second filter may in fact *mask* initiation of safety features from prompt and appropriate operation in the event of an actual incident. Furthermore, the applicant has yet to explain on the current docket how stability can be enhanced by placing a 4-second filter on a 15-second "spike." As one of the members of the ACRS stated, "But it just seems like nature is trying to tell you something, and you're filtering it out."[6]

The applicant produced slides allegedly indicating that safety margins would dramatically improve using the 4-second filter. The applicant did not explain how the safety margin would improve given that a 15-second "spike" would not be addressed by a 4-second filter.

The Issue Raised Is Within the Scope of the Proceeding

New Contention 1 raises issues central to the critical issue of unanalyzed metal fatigue which may reasonably be expected to occur as a direct result of the proposed Millstone Unit 3 power generation uprate and Dominion's apparently flawed approach to mitigate the problem which may only mask the problem and lead to unsafe occurrences.

The Issue Raised Is Material to the Findings the NRC Must Make to Support the Action Involved in the Proceeding

The hot leg phenomenon discussed herein is material to the findings the NRC must make to support approval of the proposed power uprate. The issue has not been adequately analyzed and without complete analysis there can be no assurances that

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[6] *Id.* at ¶ 10.6.

already "stretched" operating conditions will not be subject to unanalyzed metal fatigue and its serious safety consequences.

Statement of Facts and Expert Opinion and References to Pertinent Portions of the Application

The Declaration of Arnold Gundersen, which is incorporated by reference herein as Exhibit A, sets forth the facts and expert opinion which support this contention.

Specific locations within the Docket where the 4-second filter is discussed but left unanswered and unalyzed include but are not limited to the following:

Serial No. 07-0450 Docket No. 50-423 Attachment 1 Page 5. 2.2.5 TS Table 2.2-1, Reactor Trip Instrumentation Trip Setpoints, Table Notations
Serial No. 07-0450 Docket No. 50-423 Attachment 1 Page 17. 5.5 Over Temperature Delta Temperature (OT.T) and Overpower Delta Temperature (OP.T) Setpoints
Serial No. 07-0450 Docket No. 50-423 Attachment 1 Page 37. 6.1.5.3 Involve a significant reduction in a margin of safety. And, 6.1.5.4 Conclusion
Serial No. 07-0450 Docket No. 50-423 Attachment 1 Page 36.
6.1.5 Over Temperature Delta Temperature (OT.T) and Overpower Delta Temperature (OP.T) Setpoints
6.1.5.1 Involve a significant increase in the probability or consequences of an accident previously evaluated.

Attachment 1, Millstone Power Station Unit 3, License Amendment Request, Stretch Power Uprate, Descriptions, Technical Analysis and Regulatory Analysis for the Proposed Operating License and Technical Specifications Changes.
Serial No. 07-0450 Docket No. 50-423 Attachment 1 Page 5
2.2.5 TS Table 2.2-1, Reactor Trip Instrumentation Trip Setpoints, Table Notations
"As part of the OT.T optimization, a four second filter is being added to the Thot input, prior to the modules that calculate Tavg and†.T,††to smooth out temperature spikes observed in the Thot signals. The filter allows additional optimization of the OT.T/OP.T settings to improve the trip margins for the OT.T and OP.T reactor trips, and also add stability to the rod control system. As a result, the rate lag compensator card for Tavg input to the OP.T is being eliminated from the control system, and the second term (K5 term) in Note 3 equation for OP.T is deleted."

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5.5 Over Temperature Delta Temperature (OT.T) and Overpower Delta Temperature (OP.T) Setpoints

In Technical Specification Table 2.2-1 Reactor Trip System Instrumentation Trip Setpoints, the second term, the K5 term, in the Note 3 equation is being deleted.

The rate lag compensator card for Tavg input to the OP.T is being eliminated from the control system.

In the past, MPS3 has experienced hot leg temperature spiking associated with the phenomena known as upper plenum anomaly. These spikes may lead to pre-trip alarms for the OT.T and OP.T setpoints. In the limiting condition, inadvertent trips may be experienced. To address the potential for these phenomena to be more frequent at uprated conditions, a DNBR study was performed to determine the optimum solution that would provide margin from spurious alarms and trips, while still maintaining the required margin for DNBR. As a result of the study, it was decided to implement a design change that will add an electronic filter to the hot leg temperature signal from the hot leg RTDs. The filter will reduce the number of spurious alarm trips due to potential hot leg temperature spiking. To offset the DNBR impact of the filter, the OT.T and OP.T setpoints were optimized. As a result of the optimization study, it was determined that the K5 term in the OP.T equation is no longer needed. As a result, the electronic card implementing the K5 term will be removed and replaced with the electronic card to implement the hot leg temperature filter.

As documented in LR Section 2.8.5 (Attachment 5), the DNBR analysis shows that the DNBR limits will be met for all FSAR Chapter 15 events as required, assuming the implementation of the hot leg temperature filter and the optimized OT.T and OP.T setpoints.

With the implementation of the hot leg temperature filter, the current margin to spurious alarms and trips due to temperature spikes from the upper plenum anomaly will be maintained. Thus, any increase in the likelihood of a spurious trip due to the upper plenum anomaly is expected to be minimal.

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Thus, these changes will not create the possibility of a new or different kind of accident.

6.1.5.3 Involve a significant reduction in a margin of safety.

As shown in LR 2.8.5 the SPU conditions in combination with the installation of the hot leg RTD filter and the modified OT.T and OP.T setpoints have been incorporated in the revised accident analysis. The results of these analyses show that the appropriate DNBR and fuel melt limit criteria have been met. Thus, these changes do not result in a significant reduction in the margin of safety.

6.1.5.4 Conclusion

Therefore, there are no significant hazards associated with the change in the OT.T and OP.T setpoints.

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Serial No. 07-0450 Docket No. 50-423 Attachment 1 Page 36

6.1.5 Over Temperature Delta Temperature (OT.T) and Overpower Delta Temperature (OP.T) Setpoints

6.1.5.1 Involve a significant increase in the probability or consequencesof an accident previously evaluated.

The Over Temperature Delta Temperature (OT.T) and Overpower Delta Temperature (OP.T) reactor trip setpoints are credited in the analysis of a number of events (e.g., steam line break and rod withdrawal at power) to ensure that the DNBR criteria and the fuel temperature melt temperature limit are met. An additional consideration in determining the optimum OT.T and OP.T reactor trip setpoints is the potential for spurious alarms and trips due the temperature-spiking phenomenon known as Upper Plenum Anomaly. MPS3 has experienced pre-trip alarms due to this phenomenon. To minimize the potential for spurious alarms and trips, an electronic filter will be installed for the hot leg RTD temperature signal.

A scoping study was performed to determine the optimum OT.T and OP.T setpoints that will assure that the DNBR and fuel temperature melt limit are met while minimizing the likelihood for a spurious trip.

As shown in LR Section 2.8.5, the revised accident analyses demonstrate that all DNBR and fuel melt limits have been met. Thus, there is no significant increase in the consequences of an accident.

In the scoping study, the potential for increased temperature spikes were considered. With the installation of the hot leg RTD temperature filter and the revised OT.T and OP.T setpoints, it is expected that the margin for inadvertent pre-trip alarms and inadvertent trips will be comparable to current pre-uprate conditions. Thus, it is concluded that the installation of the hot leg temperature filter and OT.T and OP.T setpoints will assure that there is no significant increase in the probability of any evaluated accident.

A Genuine Dispute Exists with the Applicant on a Material Issue of Law or Fact

The petitioners have demonstrated herein that a genuine dispute exists with Dominion on a material issue of fact, namely, that temperature spikes in the hot legs of the Millstone 3 reactor - and the use of a new 4-second filter present critical new and unreviewed safety issues not addressed by the application.

New Contention 2

Statement of the Issue

The NRC's review of the Millstone Unit 3 uprate application does not comply with mandatory legal standards set forth in the NRC's "Review Standard for Extended Power Uprates."

Basis for the Contention

The NRC's "Review Standard for Extended Power Uprates" (RS-001)[7] requires that the NRC conduct an independent analysis of applications for power generation uprates in excess of 7 per cent, as is the case with the instant application, when there is no similar plant design upon which to base conclusions. Insofar as Millstone Unit 3 has a unique, one-of-a-kind containment which has already been "stretched," the application to uprate power requires a separate, independent and in-depth calculational analysis to be conducted by the NRC.[8]

According to statements by NRC staff at the July 8, 2008 ACRS hearing, NRC Staff was unable to conduct any confirmatory analysis and relied solely on the assurances of the applicant.

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[7] The instant application, although characterized by Dominion and the NRC as an application for a "stretch" power uprate, actually is an application for an extended power uprate as it seeks an uprate in excess of 7 per cent; moreover, Dominion informed the ACRS on July 8, 2008 that it intends to apply in the near future for a further Millstone Unit 3 uprate of 2 per cent after it replaces electric generators. Clearly, the combined uprates would qualify as a single extended power uprate if unified; the applicant should not be allowed to elude NRC extended power uprate review by submitting, separately and *ad seriatim*, applications for a *de facto* 9+ per cent power uprate.

[8] Refer to Gundersen Declaration at ¶¶14.1-16.

The Issue Raised Is Within the Scope of the Proceeding

The scope of the proceeding is defined by law and is a question of law and it incorporates the standard of application review and analysis as dictated by applicable standards of administrative policy and review. The NRC's "Review Standard for Extended Power Uprates" governs. Thus, the issue raised by New Contention 2 is clearly within the scope of this proceeding.

The Issue Raised Is Material to the Findings the NRC Must Make to Support the Action Involved in the Proceeding

The issue raised by New Contention 2 is material to the findings the NRC must make as a matter of law to support the action involved in the proceeding. The findings the NRC must make will not carry legal validity absent the independent, in-depth calculatory and confirmatory analysis required by its own governing standards as set forth in RS-001.

Statement of Facts and Expert Opinion and References to Pertinent Portions of the Application

The petitioners incorporate by reference herein the Declaration of Arnold Gundersen, Appendix A, ¶¶ 14-16. This contention has application to the NRC's review of the Dominion application *in its entirety*.

A Genuine Dispute Exists with the Applicant on a Material Issue of Law or Fact

The petitioners respectfully represent that a genuine dispute exists with the applicant regarding the review required of its application. The applicant has argued that its application should be characterized as a "stretch" application, thereby effectively evading comprehensive and in-depth review by the NRC. At the same time, Dominion has represented that in many aspects its application meets

standards for an extended power uprate. It is the petitioners' contention that as a matter of law the application is an "extended power uprate" which must be reviewed as such by the NRC, and that such review must include an in-depth and independent calculational and confirmatory analysis as required by the NRC's governing set of standards set forth in RS-001.

The petitioners request a continuing waiver of the NRC's E-filing requirements for the reasons set forth in their pending motions for said waiver.

Respectfully submitted,

CONNECTICUT COALITION AGAINST MILLSTONE
NANCY BURTON

[Signed in original]

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	**Docket No. 50-423-OLA**
Dominion Nuclear Connecticut, Inc. (Millstone Nuclear Power Station, Unit 3)	**ASLBP No. 862-01-OLA-BD01**
	August 27, 2008

CERTIFICATE OF SERVICE

I certify that copies of the "**CONNECTICUT COALITION AGAINST MILLSTONE AND NANCY BURTON'S NEW CONTENTIONS AND REQUEST FOR LEAVE TO SUBMIT NEW CONTENTIONS BASED ON RECEIPT OF NEW INFORMATION AND REQUEST FOR CONTINUING WAIVER OF E-FILING REQUIREMENTS**" was transmitted on August 27, 2008 by email and by U.S. Mail, First Class, postage pre-paid to the individuals and offices as indicated below:

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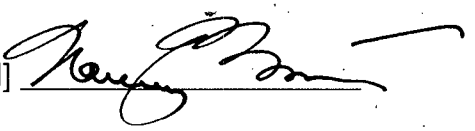
[Signed in Original] 
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EXHIBIT A

UNITED STATES

NUCLEAR REGULATORY COMMISSION

In the matter of

DOMINION NUCLEAR CONNECTICUT INC.	)	Docket No. 50-423
MILLSTONE POWER STATION UNIT 3	)	
LICENSE AMENDMENT REQUEST	)	
STRETCH POWER UPRATE	)	

DECLARATION OF ARNOLD GUNDERSEN SUPPORTING CONNECTICUT COALITION AGAINST MILLSTONE IN ITS PETITION FOR LATE FILED CONTENTIONS DUE TO NEW INFORMATION

I, Arnold Gundersen, declare as follows:

1. My name is Arnold Gundersen. I am sui juris. I am over the age of 18-years-old. I have personal knowledge of the facts contained in this Declaration.

2. I reside at 376 Appletree Point Road, Burlington, Vermont.

3. The Connecticut Coalition Against Millstone has retained me as an expert witness in the above captioned matter.

4. I have a Bachelor's and a Master's Degree in Nuclear Engineering from Rensselaer Polytechnic Institute (RPI) cum laude.

5. I began my career as a reactor operator and instructor at RPI in 1971, progressed to the position of Senior Vice President for a nuclear licensee, and I am currently an internationally recognized energy advisor and vetted expert witness on nuclear safety and engineering issues.

6. I have more than 37-years of professional nuclear engineering experience and nuclear safety oversight including, but not limited to: nuclear safety expert witness testimony; nuclear engineering management and nuclear engineering management assessment; prudency assessment; nuclear power plant licensing, licensing and permitting assessment, and review; nuclear safety assessments, public communications, contract administration, assessment and review; systems engineering, structural engineering assessments, cooling tower operation, cooling tower plumes, nuclear fuel rack design and manufacturing, nuclear equipment design and manufacturing, in-service inspection, criticality analysis, thermohydraulics, radioactive waste processes and storage issue assessment, decommissioning, waste disposal, source term reconstructions, thermal discharge assessment, reliability engineering and aging plant management assessments, archival storage and document control technical patents, federal and congressional hearing testimony, and employee awareness programs.

7. My Curriculum Vitae delineating my qualifications is attached.

8. My Declaration is intended to support Connecticut Coalition Against Millstone's Petition For Late Filed Contentions Due To New Information.

9. The Two Contentions my Declaration supports are:

9.1. **Hot Leg Temperature Spikes** – New information not provided by the Applicant Dominion Power *until* July 8 *during* the ACRS hearing clearly shows that neither the Petitioner, the ACRS, nor the licensee have adequate information upon which to develop an informed decision assessing the remaining safety margin caused by modifications to the Millstone 3 nuclear power plant and delineated in its application to increase its power level by more than 7%.

9.2. **Containment Analysis As Required By NRC Statute** – In my opinion, NRC has neglected to meet its statutory obligation to perform any independent confirmatory calculations relating to the unique one-of-a-kind Millstone Point Unit 3 Containment Design. According to its own internal review procedure RS-001, which was newly presented information provided in NRC testimony at the ACRS Hearing July 8-9, 2008 regarding Dominion Nuclear's Millstone Point Unit 3 Application to Uprate its power by more than 7%.

10. **New Contention #1 – Hot Leg Temperature Spikes**

10.1. New information not provided by the Applicant Dominion Power *until* July 8 *during* the ACRS hearing clearly shows that neither the Petitioner, the

ACRS, nor the licensee have adequate information upon which to develop an informed decision assessing the remaining safety margin caused by modifications to the Millstone 3 nuclear power plant and delineated in its application to increase its power level by more than 7%.

10.2. According to the transcript of the July 8, morning session MP3 ACRS meeting, the applicant informed the ACRS that temperature spikes of "less than" "four seconds" and of "very short duration" were occurring in the hot legs of MP3. Furthermore, the applicant stated it planned to install a new four-second filter to improve its safety margin because the filter would smooth out the effect of these "four second" temperature spikes and "eliminate" the spikes.

> "MEMBER BROWN: Obviously that introduces a time response into the t h?
> MR. KAI: Yes.
> MEMBER BROWN: For your Delta-t function. I presume that was cranked you're your other analysis.
> MR. KAI: Yes.
> MEMBER BROWN: You said four seconds which is fairly hefty for the most part. Do you know that this eliminates the spikes?
> MR. KAI: Yes. We've done a study looking at that."
> *ACRS Transcript 7/8/08 Morning Session, Page 95, lines 10-25*

> "DR. WALLIS: And you're going to get a spike and its length is something like four seconds. Is that what you're doing?
> MEMBER ARMIJO: No, it's less than that.
> MR. KAI: It's less than that."
> *ACRS Transcript 7/8/08 Morning Session, Page 96, lines 9-13*

> "MR. KAI: Okay. And like I said, I have this in set point and not in degrees unfortunately. When we benchmarked this, typically the spikes are of very short duration, a couple of seconds."
> *ACRS Transcript 7/8/08 Morning Session, Page 97,Lines 9-12*

10.3. Based upon the applicants "facts" that the spikes were of short, less than four-second duration, the ACRS expressed significant concerns over materials becoming fatigued by the cycles of hot and cold.

> MR. RUSSELL: My name is Paul Russell. I'm a licensed operator at the Unit 3. From the operational standpoint and you did mention that they are just an annoyance to the operators, this is actually a very infrequent annoyance to us. We very rarely get the alarms that come in. It's not something that we'll see a drastic jump-up in our temperature indications. So it is a spike, not necessarily electronic-wise. It's a true indication of the temperature, but it is a very infrequent occurrence. It's not something that we see on a very regular basis.
> DR. KRESS; But it's infrequent at the location you're measuring. Other parts of the system where you're not measuring, it could be happening all the time. I think that's really if you get into a materials concern that's where it would happen. But this sounds like a generic kind of issue for PWRs -
> MR. KAI: Yes, it is.
> *ACRS Transcript 7/8/08 Morning Session, Pages 99-100, lines 16-10*

10.4. The applicant explained that the filters were designed to filter out a four second spike and improve safety margin because "The duration or the spikes are much shorter than the four seconds that we've seen to date."

> MR . BRANUM : Yes, the filters are four seconds. The duration or the spikes are much shorter than the four seconds that we've seen to date.
> MEMBER BROWN : Like what? A half a second? A quarter of a second?
> MR. BRANUM: A second or so.
> *ACRS Transcript 7/8/08 Morning Session, Page 109, lines 13-18*

10.5. The applicant said that their analysis for the four-second filter was based upon "historically what we've seen" not upon any type of analysis or specific computer modeling to thoroughly analyze the causes of the phenomena.

> "MR. HUEGEL... As Mike had explained earlier is when we evaluated the EPU we wanted to make sure that based upon historically what we've seen for a t hot signal that the filter that we'd be installing ln addition to the exact set point was such that (1) you met your DNB design basis and

as I stated earlier (2) also you would have sufficient operational margin..." *ACRS Transcript 7/8/08 Morning Session, Page 114, lines 13-19*

10.6. Moreover, during the hearing the ACRS expressed significant concern that filtering of the short, four-second spikes was worrisome.

> MEMBER MAYNARD: I have a general question on this. I don't know that much about this system, but does Westinghouse or does the staff understand the mechanisms that are causing these temperature fluctuations and have they dispositioned those? The temperature changes are small. At least, that's what we're told. So maybe there is no problem. But it just seems like nature is trying to tell you something and you're filtering it out. And that's a little bit of a worry. *ACRS Transcript 7/8/08 Morning Session, Page 114, lines 22-25 and page 115, lines 1-6*

10.7. Furthermore, Applicant Dominion Nuclear acknowledged that the four-second filter would make it acceptable to "drop a little below the safety limit analysis."

> "MR. HUEGEL: Typically, the process that we would follow is we would try and demonstrate that you meet the safety analysis limit across the board. However, knowing that we have the question about the spiking in the hot leg temperature, we added a filter, knowing that yes, you might drop a little bit below the safety analysis limit, but that's an okay condition because again, the true limit is the design limit. And we allocated some amount of generic DNB margin for that penalty." *ACRS Transcript 7/8/08 Morning Session, Page 139, lines 16-25*

10.8. After a whole morning spent discussing the MP3 four-second spike, at the very end of the July 8 ACRS afternoon session, Applicant Dominion Power introduced new information, which completely contradicted the testimony it provided during the morning hearing.

10.9. The applicant stated new information from the plant, which just arrived from MP3 determined that the hot leg temperature spikes had lasted for as long as fifteen-seconds.

"MR . BURNHAM : This is Robert Burnham. This morning we discussed at length the T hot spikes, and we were going to get some data for you. We've been in contact with the plant, and unfortunately, unless we have a spike in the recent plant process computer history, we can't get the trace, and we haven't seen one for a while . What I can do is report what we had seen in the past through the engineering design changes and the valuations that were done. Initially, early in the cycle, we would see spikes of somewhat longer duration of 10 to 15 seconds, and they would be on the order of magnitude of a degree and a half to 3-1/2 degrees.
MR. WALLIS: That's in a positive direction. You had negative spikes, as well?"
ACRS Transcript 7/8/08 Afternoon Session, Page 272, lines 19-25, continued Page 273, lines 1-8

10.10. The applicant stated that new information from the plant showed that as one leg had a temperature spike, the opposite leg had a temperature drop.

"MR. BURNHAM: What we observed was that while the temperature was going up in one loop, it was actually going down in another loop.
MR. WALLIS: Down in another, so they're sort of symmetrical spikes?
MR. BURNHAM: Yes. We actually saw, for example, loop one in the hot leg, the temperature would go up, loop four the temperature would go down, and saw a similar reaction in loops two and three where they offset each other.
MR. WALLIS: We're talking about one or two degrees, maybe?
MR.BURNHAM: A degree and a half to 3-1/2 degrees. And that would be early in the cycle. Again, we haven't seen those for some time now. Now, typically, what we have been seeing recently is a similar slze spike of magnitude, again, a degree and a half to 3-1/2 degrees of a duration of approximately two to three seconds at the most. And that is what the T hot filter that we're putting in is specifically designed to filter out. And as we discussed this morning, that allows us to change the OPO to delta-T set points to gain margin back, because we're filtering out the spikes that were causing pre-trips and pre-alarms."
ACRS Transcript 7/8/08 Afternoon Session, Page 273, lines 10-25, continued Page 274, lines 1-9

10.11. The applicant acknowledged that it did not "have enough data " on the temperature fluctuations to confirm that the spikes were either regular or turbulent.

"MR. WALLIS: It's a regular thing. It's not just a random turbulent thing which would be all over the place.
MR. BURNHAM: I'm not sure we have enough data to confirm either way." *ACRS Transcript 7/8/08 Afternoon Session, Page 274, lines 18-22*

11. Based upon the dramatic reversal of factual and contradictory evidence presented by Applicant Dominion Nuclear at the July 8, 2008 ACRS hearing regarding Dominion's application to uprate power more than 7% at its Millstone Point 3 nuclear power plant, it is my expert opinion that:

11.1. Applicant Dominion Nuclear has misrepresented the duration of its temperature spiking phenomena to both NRC and the ACRS.

11.2. Applicant Dominion Nuclear appears to have had a gross breakdown in its calculational quality assurance system thereby allowing incomplete analysis to form the basis of a critical licensing application.

11.3. Applicant Dominion Nuclear does not appear to understand the phenomena that cause the temperature fluctuations.

11.4. Applicant Dominion Nuclear appears to have failed to adequately assess available data.

11.5. Applicant Dominion Nuclear has not proven how a four-second filter may be considered even remotely effective in controlling or mitigating material fatigue issues created by a fifteen-second spike.

11.6. Applicant Dominion Nuclear appears to have taken credit for the four-second filter in safety margin calculations and yet provided no analysis for spikes that are in fact as long as 15-seconds in duration.

11.7. In its safety analysis, Applicant Dominion Nuclear has not provided any analysis of the impact of the fifteen-second spike, while it appears it has taken credit in its safety margin analysis for only a four-second spike and possible mitigation of that spike by a four-second filter.

11.8. Moreover, Applicant Dominion Nuclear's safety analysis may have created new and unanalyzed accident scenarios by introducing a four-second filter on a signal whose duration appears to last as long as fifteen-seconds.

11.9. Furthermore, Applicant Dominion Nuclear's safety analysis may in fact be filtering out *the true indicator* of an incipient accident by its attempt to use a filter to eliminate a potentially significant safety signal.

11.10. Finally, and of great concern is that fact that Applicant Dominion Nuclear appears to have failed to conduct any assessment of the thermal stress caused by opposing 3.5 degree temperature increases and decreases in opposing legs of the MP3 reactor vessel piping and which may last as long as 15-seconds.

12. The information provided by Applicant Dominion Nuclear to ACRS during the morning session of the July 8, 2008 hearing is dramatically different from the information provided by the Applicant during the afternoon session. Based upon this new information provided to the Petitioner and the Hearing Officers by Dominion Nuclear during the afternoon session of the hearing, it is impossible for the Petitioner to accurately review or analyze the newly gleaned information. This information was not provided in Discovery and in fact, was not provided until the hearing itself had commenced.

13. In my opinion, the inaccuracy in the information provided to NRC compared to the latest information provided to ACRS is indicative of a gross failure of the quality assurance system at Millstone Point Unit 3. Furthermore, these inaccuracies threaten the usefulness of any and all information provided by the licensee in its application to Uprate. Until all the data in all the calculations has been substantiated and been proven to be accurate, Petitioner's expert has no basis upon which to believe that any portion of the uprate application provided by the licensee accurately portrays the conditions as they exist at Millstone Power Unit 3. Given that Millstone 3 has a very unique Containment, and also has fluctuating hot and cold spiking phenomena occurring that may induce metal fatigue, it is of grave concern to Petitioner's expert that this application to uprate power appears to be more of an industry-wide generic uprate application rather than one that accurately reflects conditions as they exist at Millstone Power Unit 3.

14. **New Contention #2- Containment Analysis**

14.1. In the evidence reviewed, NRC claims to have conducted a RS-001 review of the Dominion Nuclear's Millstone Point 3 Containment.

> "CHAIRMAN SIEBER: Okay. We'll resume our meeting, and I'd like to call on NRR to do the fuel and safety analysis.
> MR. PARKS: Good afternoon. My name is Benjamin Parks. I'm in the Reactor Systems Branch In NRR. I'm joined up here with John Lamb, our Project Manager, and Sam Miranda, also in Reactor Systems Branch. We worked together to review this power uprate. As you can see from our revlew scope, we followed the guidance that was in RS-001 and our review focused on the topical areas covered by RS-001. I don't think that I need to run through the list. The last item on that list was Westinghouse methods. We reviewed an implementation of RETRAN and VIPRE, and we'll discuss a little bit about that, and answer some questions, if you may have some remaining. Our review looked at, it says EPU evaluations, this is a stretch power uprate, we reviewed it to the EPU standard. We think

RS-001 is a pretty powerful guidance document, and the licensee formatted the licensing report, so it was a natural fit, pretty thorough evaluation." *ACRS Transcript 7/8/08 Page 198, Lines 5-25, and page 199, lines 1- 6*

MR. SALLMAN: Good afternoon. My name is Ahsan Sallman. I'm a Reactor Systems Engineer in the Containment and ventilation Branch, Division of Safety Systems . I was the reviewer of the SPU power uprate or the containment for Millstone 3. And, basically, we covered all of the RS-001 standard for the containment. *ACRS Transcript 7/8/08, Page 275, lines 22-25 and page 275, lines 1-3*

"MR.GITTER ...Per the Millstone 3 SPU, the staff used RS-001, which is the renewed standard for extended power uprates...." *ACRS Transcript July 9, 2008 meeting MP3, page 13. Lines 14-16*

14.2. From the evidence provided which I reviewed, it appears that NRC neglected to perform independent calculations to assure the accuracy of Dominion Nuclear's Application to uprate power at MP3.

"MEMBER ABDEL-KHALIK: Did you do any independent confirmatory analyses of any of these calculations?
MR. SALLMAN: No, I did not." *ACRS Transcript 7/8/08 Page 277, lines 19-22*

MEMBER ABDEL-KHALIK: So the fact that the methodology was changed in a lot of these analyses, which resulted in somewhat counterintuitive results, just simply because the methods were different, did not give you pause, or you didn't ask whether or not these changes are actually reasonable. *ACRS Transcript 7/8/08, Page 278, lines 4-9*

MR. SALLMAN ... I guess, it was not necessary to review, do an independent calculation. *ACRS Transcript 7/8/08, Page 278, lines 19-21.*

14.3. According to its direct testimony, NRC Staff was unable to conduct any confirmatory analysis.

CHAIR SHACK: The question yesterday that sort of came up with, you know, how does the staff choose to do or not to do a confirmatory

calculation? You know, you didn't do a confirmatory calculation for the containment that you did for some of the fuel systems? Are there criteria?

"MR. ELBEL: Well, there are sort of criteria. They aren't written down, but basically well, it has to do with the capabilities of the staff, too, and they're improving." *ACRS Transcript July 9, 2008 Page 86, lines 9-18*

"MR. EBBEL ...It's sort of difficult for us to do an independent analysis. It takes time. We're not really set up to do it. The other thing you have to realize, too, for containment, which isn't as true in the reactor systems area, is that we don't have the capability. We're trying to get the capability now of doing the mass and energy release part." *ACRS Transcript July 9, 2008 page 88, lines 6-12*

"MR. EBBEL ...We are going to try to do more independent analysis. And we are going to try to get the capability to do the mass and energy inputs ourselves." *ACRS Transcript July 9, page 89, lines 4-6*

14.4. Disturbingly, the NRC relied solely upon information provided by Applicant Dominion Nuclear.

MR. ELBEL ... But, then, you have to understand, too, that we're not the licensee. We don't have all the detailed information the licensee does. So we have to get this information from somewhere. And the somewhere is the license... But, then, you have to understand, too, that we're not the licensee. We don't have all the detailed information the licensee does. So we have to get this information from somewhere. And the somewhere is the licensee. *ACRS Transcript July 9, 2008 Page 90, lines 7-11 and lines 13-18*

14.5. In its testimony NRC appeared to be unaware that the Millstone Point Unit 3 containment is the smallest "large, dry" containment of any four-loop Westinghouse reactor in the country.

MEMBER BANERJEE: Can you please comment on one thing that was raised yesterday that this plant has a small volume-to-power ratio? Is that true that it has a small volume-to-power ratio?
MR. ELBEL: I don't know offhand.
MEMBER BANERJEE: Okay.
MEMBER SIEBER: 2,200,000 cubic feet containment?
MR. ELBEL: The licensee can probably answer that. I don't know offhand. *ACRS Transcript July 9, 2008, page 91, lines 12-21*

14.6. According to its direct testimony, NRC Staff was unable to conduct any confirmatory analysis and relied solely upon the assurances of its licensee Dominion Nuclear. According to RS-001, NRC "*Review Standard for Extended Power Uprates*", the NRC is required by Statute to conduct an independent analysis. (Page 2.1-3 of RS-001) when there is no similar plant design upon which to base conclusions. Since Millstone Point Unit 3 has a unique one of a kind designed containment, which has already been "stretched", it is my opinion that any license application to uprate power requires a separate and in-depth calculational analysis to be conducted by NRC.

> "(6) Perform audits and/or independent calculations as deemed necessary and appropriate to support review of the licensee's application. In determining the need for performing audits and/or independent calculations, consider the following:
>
> - confidence of the NRC staff in the models and/or methods used by the licensee
> - confidence of the NRC staff in the analysis results
> - familiarity of the NRC staff with the models and/or methods used by the licensee
> - prior use of the models and/or methods for similar plant designs and operating conditions and the NRC staff's experience related to such use
> - NRC staff experience with the impact of proposed changes on analysis results
> - available margin versus level of uncertainty in analysis results
> - efficiency gains that may result from performing audits and/or independent calculations
>
> Any issues identified as a result of independent calculations should be resolved with the licensee. If necessary, the licensee should be requested to update and resubmit any affected analyses. It should be noted that the NRC staff's approval of the application is to be based on the licensee's docketed information." Page 2.1-3 of RS-001

14.7. Given the uniqueness of Dominion Nuclear's Millstone Point Unit 3

containment design (as addressed in my earlier expert report entitled: *Gundersen Declaration Dominion_Millstone 3-15-08.pdf*), it is my opinion that NRC has neglected its statutory obligation to independently assess the analysis of the MP3 Containment. According to RS-001, NRC "*Review Standard for Extended Power Uprates*", NRC is required by Statute to conduct an independent analysis (Page 2.1-3 of RS-001) when there are no similar plant designs upon which to base conclusions. Millstone Point Unit 3 has a unique one-of-a-kind containment, which is unlike any other nuclear power plant in the country, which the NRC has acknowledged on its webpage.

15. In conclusion: Since the information provided by Dominion Nuclear to ACRS during the morning session of the July 8, 2008 hearing directly contradicts the testimony and assertions provided by Dominion Nuclear during the afternoon session, and given that this information was not provided in Discovery and in fact, was not provided until the hearing itself had commenced, the evidence shows that the licensee has not in fact completed the level of analysis required to uprate its Millstone Point Unit 3. Of further concern, it is my opinion, that the inaccuracy in the information provided to NRC compared to the latest information provided to ACRS is indicative of a gross failure of the quality assurance system at Millstone Point Unit 3. Furthermore, I believe that these inaccuracies threaten the usefulness of any and all information provided by the licensee in its application to Uprate, and until all the data in all the calculations has been substantiated and been proven to be accurate, Petitioner's expert has no basis upon which to believe that any portion of the uprate application provided by the licensee accurately portrays the conditions as they exist at

Millstone Power Unit 3. Finally, given that Millstone Point Unit 3 has a very unique one-of-a-kind Containment, and also has fluctuating hot and cold spiking phenomena occurring that may induce metal fatigue, it is of grave concern to Petitioner's expert that this application to uprate power appears to be more of an industry-wide generic uprate application rather than one that accurately reflects conditions as they exist at Millstone Power Unit 3.

16. Therefore, it is my professional opinion that the licensee must resubmit its application with new analysis specific for this one-of-a-kind nuclear power plant containment and reflecting the new phenomena and anomalies so recently uncovered. Additionally, NRC must meet its own regulatory obligation to conduct an independent assessment rather than rely upon the assurances of the licensee due to the unique Containment and the hot-leg anomalies. Moreover, such an independent analysis is in fact required according to RS-001, NRC *Review Standard for Extended Power Uprates* in which regulations state that NRC "must have prior use of the models and/or methods for similar plant designs and operating conditions", which is impossible given MP3's unique one-of-a-kind design, and NRC must also review "available margin versus level of uncertainty in analysis results", which is also impossible given that there is no complete and accurate analysis of the hot-leg spiking anomaly. Moreover, the hot-leg spiking anomaly showed that the licensee has no idea of a variety of critical issues regarding this phenomena and in its presentation Applicant Dominion Nuclear produced contradictory testimony and analysis regarding a four-second hot-leg spike and then in turn presented testimony regarding a 15-second hot leg spike, neither of which has undergone accurate analysis.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this day, August 26, 2008 at Burlington, Vermont.

8/26/08

Arnold Gundersen, MSNE