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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

November 15, 2005

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE ON POWER UPRATES

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TUESDAY,

NOVEMBER 15, 2005

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The meeting came to order at 8:30 a.m. at the Quality Inn and Suites, in Brattleboro, Vermont. Dr. Richard Denning, Chairman, presiding.

PRESENT:

RICHARD DENNING, Ph. D., CHAIRMAN
MARIO BONACA, Ph. D., MEMBER
THOMAS KRESS, MEMBER
VICTOR RANSOM, Ph. D., MEMBER
JOHN SIEBER, MEMBER
GRAHAM WALLIS, Ph. D., MEMBER

ALSO PRESENT:

VINCE ANDERSEN
SANJOY BANERJEE
RALPH CARUSO
MICHAEL DICK
JOHN DREYFUSS
ED DUDA
RICK ENNIS
BRIAN HOBBS
CORNELIUS HOLDEN
GRAHAM LEITCH
STEVE JONES
BILL MAGUIRE
CRAIG NICHOLS
ROBERT L. PETTIS, JR.
ASHOK THADANI
JAY THAYER, JR.
DANIEL YASI
CHRIS WAMSER

I N D E X

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

8:30 A.M.

CHAIRMAN DENNING: The meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguards, Subcommittee on Power Uprates. I am Dr. Richard Denning, Chairman of the Subcommittee. I am a Senior Research Leader at Battelle Memorial Institute and also a faculty member of the Ohio State University.

Committee Members in attendance are Dr. Graham Wallis, Sherman Fairchild Professor Emeritus, Thayer School of Engineering of Dartmouth College; Dr. Thomas Kress, retired Head of Applied Systems Technology, Oak Ridge National Laboratory; Dr. Victor Ransom, Professor Emeritus, Purdue School of Nuclear Engineering; Mr. Jack Sieber, retired Senior Vice President, Nuclear Power Division, Duquesne Light Company; and Dr. Mario Bonaca, retired Director, Nuclear Engineering Department, Northeast Utilities.

ACRS consultants that are in attendance are Dr. Sanjoy Banerjee and Mr. Graham Leitch. Dr. George Apostolakis of MIT of the Subcommittee will be joining us tomorrow.

The purpose of this meeting is to discuss the extended power uprate application for the Vermont

Yankee Nuclear Power Station. The Subcommittee will hear presentations by and hold discussions with representatives of the NRC staff and the Vermont Yankee licensee, Entergy Nuclear Northeast, regarding these matters. The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate. Ralph Caruso is the Designated Federal Official of this meeting.

The rules for participation in today's meeting have been announced as part of the notice of this meeting previously published in the Federal Register on October 27, 2005. The meeting was also announced in an NRC press release issued on November 8, 2005.

A transcript of the meeting is being kept and will be made available as stated in the Federal Register Notice. It is requested that speakers first identify themselves and speak with sufficient clarity and volume so that they be readily heard. We request that members of the audience refrain from talking so that the presentations can be heard by everyone who is here today. We all want this meeting to be as productive as possible, so I would encourage everyone who is here today to listen carefully to all the presenters and speakers.

We have received several requests from members of the public to make oral statements today, and they will have the opportunity to make those comments this afternoon. In addition, to accommodate members of the public who were not able to contact the ACRS staff in advance, we have set up a sign-up list at the table at the entrance to the room for this afternoon's public comment session. We will take speakers one at a time from the list, until the close of business at 7:00 p.m. If time does not allow us to hear all of the people who wish to speak, they can submit written comments to the ACRS at the NRC's Washington, D.C. address, or by email to Mr. Caruso at the addressed listed on the agenda. We would ask speakers to limit their comments to 5 minutes, in order to allow us as many people to speak as possible.

This is the first of two ACRS Subcommittee meetings that will consider the Vermont Yankee power uprate request. On November 29 and 30, the Subcommittee will meet at NRC Headquarters in Rockville, Maryland to hear presentations regarding other technical subjects, including some that involve proprietary information. That meeting will also be open to the public, except for those portions during which proprietary information will be discussed.

The full ACRS is scheduled to consider this application on December 7, 2005, in Rockville, Maryland, and that meeting will also be open to the public. It's our understanding that there was a press released that indicated that that meeting would be on December 8, so please take notice that Full Committee meeting will be on December 7, not December 8.

We are now ready to begin with the meeting and I call Mr. Holden of the NRC Staff to begin.

MR. HOLDEN: Good morning and thank you. My name is Cornelius Holden and I'm the Deputy Director of the Division of Operating Reactor Licensing in the Office of Nuclear Reactor Regulation.

The purpose of our briefing today is to present our review of Entergy's application for an extended power uprate for Vermont Yankee.

This is a unique opportunity for the people of Vermont to observe the independent review process that the NRC conducts for all power uprate, all extended power uprates and I thank the ACRS for their willingness to meet here in Vermont.

The proposed extended power uprate would increase the maximum licensed power level from 1593 megawatts to 1912 megawatts thermal, an increase of 20 percent. The NRC has previously approved 105 power uprates. Of the 105, 13 are considered extended power uprates requiring major modifications to the plant to achieve this increased power level.

Of the 13 extended power uprates that the Staff has approved, 11 were for boiling water reactors. From a percentage standpoint, the proposed Vermont Yankee extended power uprate would match the 20 percent uprate approved in 2002 for another boiling water reactor, the Clinton Plant. From a thermal megawatts standpoint, 7 previously approved extended power uprates exceeded the 319 megawatt increase proposed for Vermont Yankee.

Our review of the proposed extended power uprate for Vermont Yankee is the second to be completed using our extended power uprate review standard, RS-001. The first was the Waterford Plant, a pressurized water reactor.

The review standard was developed to ensure a thorough and complete review of power uprates. This has been a thorough NRC review. The Staff's review of Vermont Yankee uprate has taken over two years to complete and involved over 9,000 hours of review by the Headquarters Staff.

The review was challenging, due to several major technical issues. The issues included steam dryer integrity and related flow-induced vibration issues; crediting for containment accident pressure; transient testing; and the analytical methods and codes used by the fuel vendor. In addition, an engineering inspection resulted in several findings which, in fact, impacted the review.

Several of these issues will be discussed today and tomorrow and the remainder of our review of this power uprate will be conducted at the next Subcommittee review in about two weeks.

One thing I wanted to note is the NRC's Office of Nuclear Reactor Regulation recently implemented an organizational restructuring. This resulted in numerous changes to division and branch names, but since the Vermont Yankee review was performed using the review standard, and the review standard is organized by the previous branch names, we've decided to use those previous organizational names in our slides for the technical review branches.

There are no open issues in the draft safety evaluation. However, the licensee has provided several supplements since the safety evaluation was provided to the ACRS and the Staff is evaluating whether any changes to the draft are warranted prior to either subsequent ACR Subcommittee or the Full Committee meeting on December 7th.

Unless there are any questions, I'd like to turn the presentation over to Rick Ennis, who is the Project Manager for Vermont Yankee.

MR. ENNIS: Thank you, Cornie. Good morning, my name is Rick Ennis and I'm the Project Manager for Vermont Yankee in the NRC's Office of Nuclear Reactor Regulation.

I will present some background information regarding the NRC's review of the proposed Vermont Yankee EPU. I'll also discuss the agenda for the meeting today and tomorrow, as well as for the meeting at NRC Headquarters scheduled for two weeks from now.

Vermont Yankee was licensed for full power operation in February of 1973. The original license authorized operation at 1593 megawatts thermal, same power level that's in the license today. Entergy's application followed the guideline in General Electric's constant pressure power uprate, CPPU topical report. The topical report was approved by the NRC in a safety evaluation dated March 31, of 2003.

After I conclude my remarks, Entergy will discuss the CPPU approach including how the 20 percent uprate will be achieved. Entergy will also discuss the plant modifications necessary to implement the proposed EPU.

Throughout this meeting you will hear references to the term PUSAR, P-U-S-A-R. The PUSAR is the Power Uprate Safety Analysis Report which summarizes the results of the safety analyses performed by General Electric, to justify the proposed EPU for Vermont Yankee.

A proprietary version of the PUSAR is included as attachment 4 to Entergy's application dated September 10th of 2003 and a nonproprietary version is included as attachment 6 to the application.

As Cornie mentioned, the NRC Staff's review is based on NRC review standard RS-001, review standard for extended power uprates. RS-001 includes a safety evaluation template and matrices which direct the Staff to those technical areas that should be reviewed and specific guidance and regulatory criteria that apply. The intent of the review standard is to enhance consistency, quality and completeness of the reviews.

During this review, the NRC staff issued eight rounds of requests for additional information, RAIs, that included nearly 400 questions. Entergy has submitted 41 supplements to the original application, many as a result of the Staff RAIs.

As discussed in safety evaluation section 1.5, the NRC Staff performed audits and independent calculations, analyses and evaluations in selected technical areas. And these activities will be discussed during the presentations for the respective review areas.

The topics that we've chosen to discuss today and tomorrow are intended to focus on some of the key issues raised by stakeholders, such as the State of Vermont and the New England Coalition.

Later this morning, we will discuss the NRC Staff review related to the EPU power ascension and test program. Part of the scope of this review includes an evaluation of the transient testing necessary to ensure that plant structure, systems and components will perform satisfactorily at EPU conditions. This technical area is discussed primarily in safety evaluation section 2.12. Further discussion on testing related to the condensate and feedwater system is contained in safety evaluation section 2.5.4.4.

Tomorrow morning we'll discuss Entergy's request to credit containment accident pressure -- it's also called containment overpressure -- in order to provide adequate net positive suction head to the emergency core cooling system pumps. This technical area is discussed primarily in safety evaluation section 2.6.5. The risk aspects of credit and containment accident pressure is contained in safety evaluation section 2.13.

Tomorrow, we'll also discuss an engineering inspection that was performed at Vermont Yankee back in 2004. An overview of the findings in the inspection that impacted the EPU review is contained in safety evaluation section 1.6. And section 1.6 references the relevant portions of the safety evaluation section 2.0 that provide the resolution of each of the inspection finding issues as they relate to the EPU amendment review.

As I'm sure you're aware, Vermont Yankee EPU amendment request will be the subject of an upcoming hearing before the NRC's Atomic Safety and Licensing Board, the ASLB. At present, there are three contentions that may be argued at the hearing. These contentions relate to topics we'll discuss today and tomorrow.

Two of the contentions are from the

Vermont Department of Public Service and both of those relate to the crediting of containment accident pressure. The third contention from the New England Coalition relates to transient testing.

The engineering inspection that we'll discuss tomorrow relates to an issue raised by many stakeholders including the Vermont Public Service Board regarding the request for an independent safety assessment at Vermont Yankee.

At the ACRS Subcommittee that is scheduled for November 29th and 30th at NRC Headquarters, the NRC Staff intends to present the areas of review not covered by the meeting today and tomorrow. Some of the major technical issues covered at the meeting will include the Mechanical and Civil Engineering Branch review of steam dryer integrity and flow-induced vibration issues. And the Reactor Systems Branch review of the analytical methods and codes used by Entergy's fuel vendor, General Electric.

Finally, I'd like to briefly mention a few of the major milestones with respect to the Vermont Yankee EPU schedule. Following the ACRS Subcommittee on November 29th and 30th, and the ACRS Full Committee meeting on December 7th, the NRC Staff will incorporate ACRS comments and prepare a final safety evaluation.

The Staff expects to complete that effort by the end of February of 2006. No date has been set for the ASLB hearing, however, it is expected that the ASLB will schedule it some time after the final safety evaluation is issued.

Unless there are any questions, I'd like to turn it over to Entergy for an overview of the proposed EPU.

MR. THAYER: Good morning and welcome to Vermont. Mr. Chairman, distinguished Members, ACRS consultants, this morning I'd like to provide an introduction and a little bit of a background to the Vermont Yankee power uprate from Entergy's perspective. Before I do that, I'd like to introduce the members of our team. Here with me to my right is Mr. Craig Nichols who has been the Power Uprate Project Manager for the duration of the project. Also presenting today and tomorrow, Mr. Brian Hobbs; Mr. John Dreyfuss, our Engineering Director.

In addition, there are many members of the plant staff here with me today. I'd like to call your attention to several who may be requested to answer questions: Mr. Bill Maguire, our General Plant Manager; Mr. Chris Wamser, our Manager of Operations;

Mr. Norm Radamacher, our Director of Nuclear Safety Assurance.

Before I begin with the overview of power uprate, I'd like to provide some context about the Vermont Yankee plant. On a day-to-day basis, the Entergy Vermont Yankee Station provides one third of the electricity consumed in the State of Vermont. The price of that electricity is considerably below market and those rates are fixed through the year 2012, which coincides with the end of the existing license life.

Vermont Yankee provides over 600 jobs, $10 million in taxes annually, and annual impact of over $200 million to the Tri-State region where we are located.

In 2001 and 2002, Entergy had a unique opportunity to perform a due diligence on this plant prior to purchase. That due diligence provided a thorough investigation of station design, licensing basis and documentation and review of the plant operating history and review of maintenance history and practices, a review of equipment history and long-term capital investment plan; and also, most importantly, a review of the personnel who operated the Vermont Yankee station.

What we found were those same personnel

displayed a strong and open safety culture and a desire for continuous improvement and learning.

Entergy then proceeded to make a decision to purchase the plant and executed that purpose in July of 2002. During this time, an EPU feasibility study was also performed. That study took place over the 2001 to 2002 time frame in a very unique environment since Entergy did not own the plant at that time.

This study was very thorough. It identified system and component margins and it provided a basis for equipment replacement and upgrade once the decision to proceed with power uprate was made.

This feasibility study provided the basis and allowed for important decisions to be made as far as new equipment. We had a chance to consider the application of new technologies when we did the power uprate. This provided for safety and reliability-based decision making.

Also, we had choices in the equipment, based on industry best-performing components. We also used operator input into those decisions to increase the confidence of the operations team in operating the plant.

And then we had a chance to take those modifications to the station, as it would operate under power uprate and put those improvements into the simulator and mimic the equipment changes and monitor the equipment performance.

We also had several unique opportunities when we designed the power uprate, not possible under the previous operation of Vermont Yankee because in 2002, Vermont Yankee had become part of the Entergy fleet. That brought standardized programs, standardized processes which were being used across 11 plants and were being studied on a continuous basis for best practices.

Also --

MEMBER WALLIS: Let me ask you, how many plants do you have that resemble Vermont Yankee?

MR. THAYER: Resemble, we have five boiling water reactors in the Entergy fleet. However, two of those are boiling water reactors-6s. The Fitzpatrick plant and Pilgrim plant are probably more close to resemble Vermont Yankee.

The Entergy fleet is also operated on a day-to-day basis on a very stringent program of performance management. We use standard performance indicators across the fleet. We challenge each other with those performance indicators and we always look to improve the performance across a wide range of performance indicators. This provides accountability to operating standards both for a station staff and the rest of the fleet.

Through this fleet arrangement, we also have a unique opportunity with access to resources: engineering, outage, assessment resources and what we call our peer groups which are peer-level relationships that our employees have with employees across the fleet. This provides a very strong basis for operation and we believe it provides a very strong basis for our move to the extended power uprate.

As far as implementation of the uprate which you'll hear my colleague, Mr. Nichols, talk about in a few minutes, the actual modifications to the station have been made over two outages. We just restarted the plant last Friday afternoon from a 19-day refueling outage which completes the second phase of the power uprate modifications from a hardware standpoint. The plant is physically modified for a power uprate and configured.

The bulk of the modifications were actually made in the spring of 2004. Following that outage, significant amount of testing, start up measurement and one cycle of complete operations have been completed with those significant modifications in place, which Mr. Nichols will detail in a few minutes.

We also had over that cycle two automatic shutdowns which challenged many of those same modifications and control systems and I'm happy to report to the Committee, those systems worked well, even under the challenge of the automatic shutdowns.

CHAIRMAN DENNING: Would you tell us a little bit more about -- tell us a little bit more about the shutdowns and the nature of the transient that the system went through?

MR. THAYER: Yes. In July of 2004, shortly after the May 2004 restart from the outage that I was talking about, we have a shutdown due to a short circuit in our isolated phase bus duct leading from the generator leads out to the main transformer. That short circuit caused a 100 percent load reject and a trip of the plant. Because the fault was so close in, it also resulted in a transfer of the shutdown loads over to the off-site power facilities. It was a delayed transfer, so we had a group 4 isolated which slightly complicated the trip.

But as I said before, the control systems, the operating systems, the operators were fine and following the trip itself was a rather uneventful recovery. That electrical fault was repaired and 18 days later, the plant was brought back on line.

The second trip occurred this July, operating at 100 percent power and in our 345 kV switch yard, an insulator associated with a motor operated disconnect switch on the elevated 345 kV structure, insulator failed structurally and physically fell over, which interrupted our -- the output of the station. Again, a close-in electrical fault, plant tripped. Actually, the characteristics of the plant trip were very similar to the trip in June of '04. The plant responded well. Operators responded well to the trip and the trip recovery was rather uneventful.

CHAIRMAN DENNING: Thank you.

MR. THAYER: The final piece of the modifications, of course, is the operator interface with those modifications. We have spent the year 2005 preparing for the operating procedures, the start-up test plan, the operator training. And I'm happy to report to you this morning that our operators have been through one complete phase of their training cycle related to power uprate modifications. Because we knew we had some time, we took the time to actually table top the procedures, many of these procedures that will be used to operate the plant in the uprated condition.

We got great input back from the operators to refine, further refine those procedures and before those procedures were taken into the plant simulator, all the operator comments were incorporated from all the operating crews and we feel that added another level of refinement to those operating procedures. We've very happy with that process. And I think it also gave the operators the confidence that they need. Although they have never operated the plant above 100 percent of the existing power, they could use a simulator to experience what the systems looked like, what their indications look like, how systems perform under steady state as well as transient conditions and it's been a very, very thorough operating training cycle.

MR. LEITCH: So Jay, I understand the simulator has been upgraded to look like EPU conditions, the instruments have been rescaled?

MR. THAYER: That's correct. We have, as I said before, over two cycles we've modified the plant which includes the indication in the control room. Those indications have been mimicked in a simulator to keep up and now we train that 100 percent on our routine operating training cycles, but the simulator, the core model all has the capability to go to 100 percent power uprate.

MR. LEITCH: Thank you.

MR. THAYER: So we've tested -- just to continue, we've tested the fidelity of the simulator through uprate conditions, and as I said before, that produced a lot of operator familiarity and confidence in what the plant would look like operating at 120 percent original power.

We appreciate this opportunity today to discuss these important aspects of power uprate with this Committee and with that, I will turn it over to Mr. Nichols for more detailed discussion.

MR. BANERJEE: Of the seven BWR EPUs that NRC has dealt with, were any of those from Entergy?

MR. THAYER: I will have to check for you, but the most recently completed power uprate in the Entergy system was for the Waterford station and I believe that was categorized as an EPU.

MR. BANERJEE: Thanks.

CHAIRMAN DENNING: Let me pursue the same line a little bit further and that is with regards to the national experience with similar reactors, is there close cooperation through BWR owners group? Do you work closely with other plants that have done virtually the same EPU?

MR. THAYER: Yes, we do. That's -- I appreciate that question because that was a fundamental part of the project when we set it up was to gain from the operating experience of others. As a matter of fact, the Duane Arnold plant was licensed several years ago. I'm not quite sure of the exact year, but the Duane Arnold plant in Iowa is extremely similar to Vermont Yankee. It's a sister plant. I believe they're operating today at 114, maybe 115 percent of their original licensed thermal power. While we looked at the Duane Arnold feasibility study, we looked at how they implemented power uprate. We looked at some of their lessons learned and some of their equipment problems that they had with power uprate as to avoid those same issues.

Also, the Brunswick plant, the two Brunswick plants were licensed for an EPU back in the 2001 or 2002 time frame. We also took lessons learned from the Brunswick plant, modeled our start-up test program, looked at many of the modifications, looked at their operating experience and I've got to tell you that the industry, as a whole, is very open with regards to sharing technical information, operating experience, equipment history. We've had actually several assessments from people coming in from the industry, taking a look at our extended power uprate project and giving us critical feedback on some of the decisions that we've been making, the equipment selections, the implementation, the start-up test plan. So the industry is very open and willing to give that critical, constructive feedback to a plant making these changes.

MEMBER WALLIS: How did you decide on 20 percent?

MR. THAYER: I think I'll defer to Mr. Nichols. The feasibility study looked at the pinch points in the various equipment primary system and the power generation systems and I believe the 20 percent was the -- it's kind of the edge of the envelope --

MEMBER WALLIS: Was there something that limited you? What was it that limited you to 20 percent?

MR. THAYER: Can you answer that Craig?

MR. NICHOLS: This is Craig Nichols from Entergy. The 20 percent is the limit of the licensing topical report provided by General Electric from original license thermal power, so therefore that provided the upper bound.

We performed our evaluation --

MEMBER WALLIS: Is there some regulatory limit that limits you to 20 percent or is it just that GE didn't go beyond 20 percent in their topical report?

MR. NICHOLS: That's correct. At this time, they just didn't go beyond --

MEMBER WALLIS: Beyond 20 percent. There isn't some physical limit which is preventing you from going beyond that?

MR. NICHOLS: No, for each plant there's certain limits. For us, the modifications that we performed allowed us to go past each of those physical limitations to achieve the 20 percent.

MEMBER WALLIS: Maybe we'll come back to this later.

MR. THAYER: Thank you.

MR. NICHOLS: Good morning. I would also like to add my thanks to the Members of the ACRS Committee and the Staff for your efforts to support a meeting in Vermont. I know that the local stakeholders appreciate the opportunity to participate in this review.

My name is Craig Nichols. And as Mr.

Thayer noted earlier, I have been the Project Manager for the power uprate at Vermont Yankee Power Station since we began the feasibility study in December of 2001.

This morning, I'd like to start off our presentation with an overview of the Vermont Yankee EPU project. The power uprate at Vermont Yankee represents the single largest undertaking at the facility since original plant construction and start up. All systems, components and analyses were reviewed for impact. Analyses were updated to newer technologies and standards and as Mr. Thayer noted, equipment upgrades took advantage of newer technology and efficiency improvements.

To implement the power uprate, Entergy assembled a team of selected managers, supervisors and engineers, all of whom have over 20 years of Vermont Yankee and nuclear industry experience. The project team also includes an individual licensed as a Senior Reactor Operator on loan from our Operations Department to provide operational perspective and act as a liaison with the operating staff.

To that, we added task owners. These individuals, in some cases, Vermont Yankee retirees, are all senior industry individuals who acted as liaisons to the plant and Entergy fleet-wide departments that own the particular analyses, systems and components. It is these owner departments that provided the actual acceptance of the analyses performed as part of the uprate, not as an individual team.

The project was separated into over 100 specific task areas, the detailed engineering evaluations by GE, for the nuclear steam system supply; Stone and Webster, a nuclear architect/engineer for the balance of plant; and specialty evaluations by other firms including Areva, Erin and Entergy.

As part of the project, assessments were performed of these vendor efforts to ensure completeness and quality. As noted previously, extended power uprates have been implemented at numerous facilities throughout the nation, including a number of boiling water reactors at values from approximately 5 to 20 percent.

As there is significant industry experience with BWRs, Entergy has sought to take advantage of the lessons learned for our power uprate. As part of the feasibility study, as Mr. Thayer noted, we benchmarked facilities such as Duane Arnold, Dresden and the Brunswick station to learn more about project staffing and execution, analysis and modification scope and vendor interface.

Additional benchmarking and self-assessments were performed at various stages throughout the project, including just prior to our initial submittal to the NRC and most recently as we prepare for implementation.

We also established a project-specific operating experience program in concert with the station Formal OE Program to provide continuous feedback on power uprate specific-industry events. We are members of the Boiling Water Reactor Owners Group Committee on Power Uprates, as well as the VIP Committees looking at structural components.

As noted previously, Vermont Yankee is currently licensed to 1593 megawatts thermal. There have been no prior uprates of the unit. The operating cycle length is nominally 18 months and all fuel is provided by GE.

Under the new license, Vermont Yankee will have a maximum reactor power of 1912 megawatts thermal. There is no change in operating reactor pressure creating the reference to this as a CPPU or Constant Pressure Power Uprate.

There's also no change in operating cycle length or maximum core flow.

MEMBER WALLIS: You say there's no change in the fuel type, but there must be a change in fuel management or something to get more power.

MR. NICHOLS: Precisely.

MEMBER WALLIS: So how do you get more power out of the same fuel type?

MR. NICHOLS: Vermont Yankee operates with 368 fuel assemblies and the energy increase for the power uprate is accomplished by the slight increases in core average enrichment and an increase in batch fraction. Batch fraction --

MEMBER WALLIS: You do change the fuel itself, as part of a class of fuel, but you actually do change it.

MR. NICHOLS: That is correct.

MEMBER WALLIS: And you replace more of it per cycle and that sort of thing?

MR. NICHOLS: That's correct. The so-called batch fraction or number of cycles -- number of fuel assemblies that replace each cycle will increase by approximately 20 percent.

MR. LEITCH: The fuel that's in the reactor now upon coming back from this most recent outage, is that all GE 14 by 14 fuel? In other words, do you have the capability today to go to EPU?

MR. NICHOLS: Yes. Vermont Yankee began the transition to the GE 14 fuel, the 10 by 10 fuel assembly back in 2002. In the recently completed refueling outage, we completed that transition and all fuel assemblies are GE 14 fuel.

MR. LEITCH: Okay, thank you.

MR. NICHOLS: This chart provides a comparison of key parameters that current license thermal power and then for the uprate license. Again, note that there is no change in reactor pressure which greatly simplifies the analyses in overall power uprate approach.

CHAIRMAN DENNING: Now this is the dome pressure? If you look at the differences between the old core and the new core as far as flows and stuff like that, you have 20 percent average or total flow. If you look at quality across the core, it looks virtually the same. It's just -- is that what it looks like? Does the quality, as it goes up the channel, looks virtually the same as at the two power levels, it's just that you have 20 percent higher flow and 20 percent higher power?

MR. NICHOLS: Right. The core flow, the

quality of a void fraction, overall void fraction remains unchanged going up a rod line.

CHAIRMAN DENNING: Yes.

MR. NICHOLS: So we increase steam flow and feed flow by approximately 23 to 24 percent to make the heat balance work. So the increased steam flow, we could.

CHAIRMAN DENNING: Yes. Now the pressure drops through the core, it must be higher.

MR. NICHOLS: Slightly higher.

CHAIRMAN DENNING: So the inlet pressure is lower now? You're talking about the dome pressure being the same. Reactor dome pressure. Where is the pressure different and where is it the same? Is the inlet pressure lower?

MR. NICHOLS: I would have to defer that question. Mr. Duda, if you could stand up? Do you want it answered now?

CHAIRMAN DENNING: He can answer it later if he's going to come up later.

MR. NICHOLS: Would you like me to pull that up now?

CHAIRMAN DENNING: Okay, pull it up now.

(Pause.)

MR. NICHOLS: What you see here is the

heat balance at current license thermal power.

MR. BANERJEE: Do we have those slides somewhere?

MR. NICHOLS: We're handing those out now. This is the reactor heat balance at current license thermal power and we also have one for the license power uprates so we can go through those differences.

MEMBER WALLIS: So it's not 1020?

MR. NICHOLS: That's peak versus nominal.

MEMBER WALLIS: What is it? Peak is what it actually reaches.

MR. NICHOLS: Can you repeat the question, please, Doctor?

MEMBER WALLIS: What is it at 1025?

MR. NICHOLS: 1025 in the diagram is the dome pressure, the actual dome pressure.

MEMBER WALLIS: It is when you're operating?

MR. NICHOLS: Correct.

MEMBER WALLIS: So why is it -- this may be trivial, but why is it 1020?

MR. DUDA: This is Ed Duda from Entergy. The 1025 in the diagram is the dome pressure.

MEMBER WALLIS: This is just a trivial question. Why is it 1020 in the other slide? It's

1025 in the picture. It may be a trivial matter. Just a matter of consistency.

MR. DUDA: The reactor is operated at anywhere between 1000 and 1010 psig by operating procedure. And the analysis is done at 1010 psig and the reactor is nominally operated at 1005 psig. We have letters from GE that state that that is acceptable, that these are within the range of operating pressures.

MEMBER WALLIS: So when you give us numbers on these slides, you're going to give us what you actually do or what you nominally do?

I'm sorry to sound like a lawyer, but I would like to get it clear. What is it you actually do and what is it you nominally do?

MR. NICHOLS: The number provided in the chart is the mid-range, the moral operating pressure. The 1025, this comes out of the reactor heat balance analysis --

MEMBER WALLIS: Heat balance is a real --

MR. SEIBER: These are maximum values.

MR. NICHOLS: That is the maximum dome pressure for the analysis.

MR. SEIBER: And these are the design values as opposed to the operating values.

MEMBER WALLIS: I think the operating values are what matter, what you do with them matters, not what you nominally do.

MR. SEIBER: From a licensing standpoint the design is what counts.

MEMBER WALLIS: I'm not quite sure. I mean the NRC only licenses what you nominally do, or does it license what you actually do?

MR. NICHOLS: We nominally operate at 1005 psig. As far as maximum pressure, our maximum over-pressure analysis is done at 102 percent power. That's done at 1025 psig to give us a bounding value for overpressure.

MEMBER WALLIS: That's 1040 psig.

MR. NICHOLS: Correct.

MEMBER WALLIS: So you've gone up by another 20?

MR. NICHOLS: Right, to make the analysis bounding. That's an analytical value.

MEMBER WALLIS: So when we say reactor dome pressure, this isn't the maximum. This is some sort of license value?

MR. NICHOLS: The 1025 psia on the diagram is the maximum operating pressure.

MEMBER WALLIS: You just had a 1040 just

now.

MR. NICHOLS: 1040 was from an analytical basis. We analyzed the ASME over-pressure event at 102 percent power and 1040 psia to ensure that the pressure is bounding.

CHAIRMAN DENNING: That pressure is measured at the steam outlet, is that basically what -- when you say it's the maximum, it's the dome pressure.

MR. THAYER: Mr. Chairman, I sense we've used some terms interchangeably here. I regret that. You brought up a very good point. Why don't we construct a table for after the break, identifying the different pressures, how they're used, which are the operating pressures, which are used for analysis only and the units that those pressures, so we can clarify this issue. I think we can run through the various pressures and make it clear for the Committee.

MR. SEIBER: I think it would also help if you would just use either psia or psig to get rid of that 15 pound or 14.7 pounds.

MR. THAYER: That's an excellent suggestion.

CHAIRMAN DENNING: There are a couple of questions though. The total core flow is the same on both of these?

MR. NICHOLS: That's the maximum core flow.

CHAIRMAN DENNING: When you say the maximum core flow, how do you mean?

MR. NICHOLS: It's the 100 percent core flow number. Vermont Yankee is licensed to a maximum of 107 percent core flow. Under an increased core flow license which is approximately 51.5, 51.4 M pounds. That's the maximum license core flow under increased core flow. 48 M pounds is the 100 percent core flow number.

CHAIRMAN DENNING: In the table that you had before, where you talked about going from 6.4 million pounds per hour to 7.9, what am I missing? What's the difference?

MR. DUDA: That's the steam flow.

CHAIRMAN DENNING: Oh, that's the steam flow. This is the mass flow -- oh, wait a second. Now I'm totally confused.

MEMBER WALLIS: The mass flow goes around the core is the same. There's more steam made out of it.

CHAIRMAN DENNING: I see, so it's a difference in recirculation. I understand. Some little liquid water is recirculating. This is the steam flow. Okay. Now I understand.

MR. BANERJEE: So doesn't the average quality change then? The average quality must change.

MR. DUDA: No. As we go up a rod line, the average void fraction, the core average void fraction may change very slightly, but it doesn't change significantly. As you go up in core flow, what you will end up doing is initially causing the voids to be swept away and you'll create more power in those areas and then the voids will come back, due to the increased power generation in those areas, will bring the voids back to approximately the same void fraction, but now you've got more core flow. So essentially, if you're creating the same void fraction, but with more flow, you've got more steam flow going out.

MR. BANERJEE: I'm just confused. Is the core flow the same before the uprate?

MR. DUDA: The maximum licensed core flow is the same before and after the uprate. We can operate at a variety of core flows currently at 100 percent licensed thermal power. We are able to operate at 1593 between 75 percent rated core flow and 107. For EPU, we will be able to operate only between

99 and 107 percent core flow. That is going up a rod line.

MR. BANERJEE: So the actual operating core flow, not what is licensed has gone up?

MR. DUDA: Not necessarily. There are times now when we do operate at 100 percent rated core flow.

MR. BANERJEE: Right.

MR. DUDA: We just have a wider range at 100 percent.

MR. BANERJEE: You have a wider range, but on the average, you must be operating with the EPU at a higher average core flow, otherwise your quality will go up.

MR. DUDA: Yes, power flow.

MEMBER WALLIS: You've got more steam and the same amount of water flowing in these channels, right?

MR. DUDA: Not at any given instant. If we --

MEMBER WALLIS: At the top of the core, you're making more steam and you have the same amount of water flow as before, so you have more steam for unit flow of water. This is trivial. This is obvious. I don't understand why the answer isn't yes.

MR. DUDA: It depends on where you started.

MEMBER WALLIS: It doesn't depend on anything. If you're making more steam, you've got the same amount of water, you've got a bigger ratio of steam before the water flow. This is a grade 5 question or something.

MR. DUDA: We have more steam flow coming out of the reactor.

MEMBER WALLIS: Right, and therefore you have higher void fraction.

MR. SEIBER: And the mass flow through the reactor is the same, so the quality has to change.

MR. BANERJEE: I think there might be some confusion as to what you're licensed as a core flow and what you actually use as a core flow. Clearly, if you're saying the void fraction is the same or the quality is the same coming out and you're getting more power out of that core, then the flow must go up. Either that or the quality must go up. One or the other.

MR. DUDA: As I said before, if we look at the map and we're operating at the current licensed thermal power at 75 percent core flow --

MR. BANERJEE: Which slide is that?

MR. DUDA: That is Slide 10.

CHAIRMAN DENNING: Why don't you go ahead and describe that slide then.

MR. DUDA: If we're operating at the corner of the 1593 megawatt thermal line, it would be 75 percent core flow. And we increase core flow, we do not significantly change void fraction, but what happens is we actually are increasing the core flow. So since there is a higher void fraction -- there is a higher core flow with the same void fraction that will cause an increase in steam flow.

MR. BANERJEE: That's fine, but that means you've increased the core flow.

MR. DUDA: Yes, but --

MR. BANERJEE: It's either one or the other.

MR. DUDA: The idea of the uprate is our licensed core flow, what we are licensed to operate to has not changed.

MR. BANERJEE: Sure, we agree. All we are saying is your average core flow is higher in practice.

MR. DUDA: Average on a daily basis.

MR. BANERJEE: Yes.

MR. NICHOLS: As you increase power, you

would increase the core flow.

MEMBER WALLIS: Is it increased by 20 percent?

I don't think so. So we have a basic problem here understanding what you're doing. It's so trivial, it should be a matter of one minute to explain it. And I don't understand why there's a difficulty.

MR. HOBBS: The answer to your question is that yes, quality goes up.

MEMBER WALLIS: So this, after five minutes we've got the right answer?

MR. HOBBS: Yes.

MEMBER WALLIS: Maybe we should move on then.

CHAIRMAN DENNING: Yes, let's move on and if you want to come back later and further discuss it, we'll do that, but why don't we move on now?

MR. BANERJEE: Just one question which is not exactly related to this, I presume though that you planned the core more, right?

MR. NICHOLS: That's correct.

MR. BANERJEE: The outlet quality, unless you are throttling the inlet flows different, the outlet quality from the various channels is varying. Are you throttling the flows different at the inlets or are you just living with the change in quality?

MR. DUDA: I'm not sure how to answer.

MR. BANERJEE: Okay, so the core is flatted.

MR. DUDA: Right.

MR. BANERJEE: Are you throttling the inlet flows differently or are you just allowing the quality of the outlets at different locations of the channel to change now? I'm just asking what are you doing?

MR. DUDA: They change as they will change, yes. We did not change the --

MR. BANERJEE: The inlet flows are all the same?

MR. DUDA: Correct.

MR. BANERJEE: So how you have a much more even distribution of quality. Is that correct?

MR. DUDA: Yes.

MEMBER WALLIS: You didn't change your throttling at the inlets at all, so the original design is still there?

MR. DUDA: Correct.

MEMBER WALLIS: When we meet at the end of the month, can someone give us -- before then, can someone give us some output from your calculations of these void and quality distributions and flow rate distributions across the core, things like that, so we get more technical information about what's happening?

MR. NICHOLS: Certainly.

CHAIRMAN DENNING: And we'd also like as part of that, critical power ratios. I'd like to see how they look now versus -- in the uprate versus the current.

MR. NICHOLS: We'll make sure that information is available and during the Reactor Systems Branch section of the meeting down there, we'll be able to discuss that.

CHAIRMAN DENNING: Okay.

MR. NICHOLS: As we went through a few minutes ago, this figure shows the effective change of the power uprate on the reactor operating domain, also known as the power-to-flow map.

Prior to the start of the power uprate project, the plant was licensed for the ELLLA or Extended Load Line Limit Analysis boundary, which is the black upward sloped line. That was the limit of the operating domain.

Following the implementation of ARTS/MELLLA, the boundary was expanded out to the Maximum Extended Load Line Limit Analysis boundary, which is the blue line.

MEMBER WALLIS: Now when we look at this map, thermal power really means steam flow. They're tied together. They're roughly proportionate.

MR. NICHOLS: Roughly proportionate.

MEMBER WALLIS: So you can think of this as steam flow versus total flow.

MR. NICHOLS: That's correct.

MEMBER WALLIS: Thank you.

MR. NICHOLS: With the power uprate, the MELLLA boundary is extended up to 1912 megawatts thermal creating the red bounded region at the top of the power-to-flow map.

MEMBER WALLIS: So the fact that you've called them ELLLA and MELLLA, what does that mean?

MR. NICHOLS: Pardon me?

MEMBER WALLIS: What's really happened here? Why is one different from the other?

MR. NICHOLS: The MELLLA was a license submittal change that allowed us to analyze, perform analyses with core operation out in that small region you see to the left.

MEMBER WALLIS: This is something that GE did?

MR. NICHOLS: It's another GE topical

report.

MEMBER WALLIS: All right.

CHAIRMAN DENNING: And is it basically marginal, margin to dryout that determines that type of thing? Is that basically what is limiting? What gives you a limit?

MR. NICHOLS: I don't believe I can answer that.

d?

MR. DICK: This is Michael Dick with General Electric. Could you repeat your question, sir?

CHAIRMAN DENNING: Is it basically margin to dryout? Why is it limiting? Why do we have a limit? Is it a margin to dryout?

MR. DICK: Well, no, realistically, the operating domain as far as in a boiling water reactor, just allows as far as an analysis regime where the plant can operate and to -- well, I guess to answer your question succinctly, yes, absolutely, because we perform analysis within that operating domain, where the plant operator needs to operate throughout the cycle. Okay? So that all thermal limits are adequately made through the cycle.

And if I can just try to interpose a

little bit on this operation, as far as in the ELLLA domain, what that allowed is an original licensed thermal power allowed the plant to operate at 100 percent of its original power level with core flow as low as 87 percent. Expansion -- now, interestingly enough, if you extended that ELLLA operating domain up to 100 percent core flow, you would only be able to reach power uprate of about 92 percent, okay?

Now, the MELLLA operating domain which allows operation as low as -- original licensed thermal power with core flows as low as 75 percent, extending that up, as you see in the red region, that's what allows us to be able to get up to 120 percent uprate.

So then answering the gentleman's earlier question as far as an analytical boundary for why was 120 percent uprate chosen? Basically, in order go do 120 percent uprate, go up to 120 percent, your core flow has to be up literally 99 percent. So analytically you could actually get 121 percent uprate, but we basically limited that within our topical reports to 120 percent of original license thermal power.

As far as in future submittals or ability to go further uprates, yeah, sure, they're possible.

MEMBER WALLIS: There's MELLLA plus which is somewhere in the works?

MR. DICK: That's true, that's true.

MEMBER WALLIS: Now this is a straight line and I can't believe that you're on the limit all the way along a straight line.

MR. DICK: It's not effectively a straight line. It's actually a quadratic -- it's very close to a straight line.

MEMBER WALLIS: So you're approaching some limit all the way along this line or just near the top of it?

MR. DICK: No, because actually what we do is analyses are actually done in areas that are actually more conservative in that region, either at higher pressures or at higher -- at different flow rates. And realistically, within this operating boundary, a lot of your structural limitations occur actually down to what we would either call the natural circulation line or the minimum pump speed line. Because in that area, you have very, very high inlet subcooling into the reactor. And those areas, let's say if you had a recirculation line break, your mass and energy releases would be much higher in that realm because of the subcooling. And we conservatively do those analyses at higher reactor dome pressures than the plant can -- would typically operate, do the operation of the pressure regulator in those areas.

MR. BANERJEE: What is the limitation for the ELLLA line and the MELLLA line, what's changed?

MR. DICK: What's changed in it is is the analysis boundary allowing operation at -- and referring back to original licensed power is being able to operate the plant at rated conditions at a lower core flow.

Now if I could try to interject that to an earlier question, as far as with dome pressure and then what happens in the inlet, yeah, going into -- for the extended power uprate at VY, actually, the recirculation -- even though core flow is not changed, it is the recirculation speed will have to increase slightly and we've calculated that to be about 1.8 percent or about 30 RPM.

Now what that does is that's to overcome the slight increased core pressure drop which is about a little more than a pound going from current license power at 100 percent core flow to EPU power at 100 percent core flow.

MR. BANERJEE: I'm completely lost.

MR. DICK: I'm sorry.

MR. BANERJEE: Please, is there any DNB limit, critical bar issue limit that's allowed you to go from the ELLLA line to the MELLLA line? Has something changed there?

MR. DICK: No.

MR. BANERJEE: What's the physical limitation?

MR. DICK: There's no physical limitation with that.

MR. BANERJEE: So why were you on the ELLLA line first and now on the MELLLA line?

MR. DICK: Because this is just basically with changes in analysis techniques.

MR. BANERJEE: Ah.

MR. DICK: That allow --

MR. BANERJEE: What analysis technique has changed?

MR. DICK: Analysis techniques, as far as needs of the plant to operate at extended boundaries. For example, ELLLA was determined originally because the original power-to-flow map boundary basically allowed the plant only to operate at 100 percent power, a line that would intersect at 100 percent original power and 100 percent core flow.

The problem is that during plant start ups and operation, you have Z nontransient, that reactor operators are having to shuffle rods around and such like that. And so they didn't want to have to -- they would exceed that upper boundary occasionally. Okay?

So what we did was we had developed a product that allowed extended operating domain or expansion of the operating domain, basically to be able to operate in those regions.

MR. BANERJEE: So what aspect of the analysis changed which allowed you to move from ELLLA to MELLLA?

MR. DICK: Well, realistically, no aspect has. It's just as you operate at those different limiting conditions which are typically at the -- say at the natural circulation line, minimum pump speed line or as far as you see, those cut off areas, and it would be -- let me see, on that map it would be 83 percent of EPU power and 75 percent core flow and 83 percent power and I believe 87 percent core flow. Those are areas in the map that are analyzed as far as --

MEMBER WALLIS: I'm sorry, I'm afraid we're going to have to move on. But it seems to me all you're doing is describing the picture, but giving no rationale for it. I don't see the rationale for these straight lines, why you've changed from one to another. I think we've been through this at some other meeting of the Committee.

CHAIRMAN DENNING: It does sound like we have to look at --

MEMBER WALLIS: It's just as if someone drew a line on the graph and said that's what it's going to be. There's got to be some reason why it's there.

I think we've got to move on. We could be on this forever. But maybe this could be explained better when we meet again.

CHAIRMAN DENNING: Right, and perhaps we ought to get the report.

MR. THAYER: Dr. Wallis, I think we understand your question and I'd be happy to provide a thorough explanation, perhaps to clear up some of the questions here this morning.

Thank you.

MR. NICHOLS: Okay, the next two slides provide a list of the major modifications performed as part of the project. The first slide includes those modifications required to actually support the increased steam flow and electrical generation.

MR. SEIBER: Did you replace or do

anything with the main unit transformer?

MR. NICHOLS: The main unit transformer or generator step-up transformer had previously been replaced with one that would accommodate the power uprate.

MR. SEIBER: And the capacitor bank has resulted from your grid stability analysis or somebody's grid stability analysis?

MR. NICHOLS: That's correct. As part of the power uprate, we were required for the additional generation on the grid to perform a grid stability study for the ISO New England and coming out of that study, because we could only generate 150 MVARs with the uprated generator, that additional voltage support is provided by the 60 MVAR cap bank.

MR. SEIBER: I take it you don't have -- or I take it no one has a pretty reasonable sized power plant near Vermont Yankee?

MR. NICHOLS: There's nothing on the --

MR. SEIBER: You're just sort of out there some place?

MR. NICHOLS: Vermont Yankee, as a base/load generating facility, there are pump storage stations nearby, but not for a base/load generating facility of that size.

MR. SEIBER: And so I take it when you increase the power, you change the voltage distribution around the system which means if you trip that voltage maker up, that's why the capacitors are there?

MR. NICHOLS: That's correct, and that's what they provide at that voltage support.

MR. SEIBER: You could have gone to changing transformers. Is there a reason why you didn't other than economics? Or you can say "I don't know."

MR. NICHOLS: I don't know why we -- we look at the capability of the generator. We've provided that input to the ISO, given the capability of our generator and they came up with the requirement for that amount of VAR support.

MR. SEIBER: The ISO is who?

MR. NICHOLS: I'm sorry, the Independent System Operator.

MR. SEIBER: Okay.

MR. NICHOLS: Is the people that control the grid and manage the studies.

MR. SEIBER: That's what other folks call the TSO?

MR. NICHOLS: Transmission System Operator or Regional Transmission Operator.

MR. SEIBER: Okay.

MR. LEITCH: I just had one question about the condensate filter demineralizer bypass. Some people have installed an additional condensate filter demin. when uprating the power. As I understand these words, rather than doing that, you chose to provide a bypass around the condensate to allow precoating and backwashing at the condensate demins.

Do you intend to do that or do -- or to back down in power to the capability of the existing condensate demins.? In other words, do you actually intend to bypass the condensate demins. when you need to precoat and if so, do you expect there to be a degradation in your water quality?

MR. NICHOLS: We have five condensate demineralizers and all five support extended power uprate flow. If we are taking one out for a backwash and precoat, we will then allow that one demins. flow, that equivalent flow to pass through the filter bypass for that period of time when we're doing the backwash and precoat.

MR. LEITCH: So can you give me any idea how often you would expect the bypass to be open? Would it be 5 percent of the time, 50 percent of the time? Just a rule of thumb. I mean I have no idea how frequently you have to bypass --

MR. NICHOLS: If I could have Mr. Wamser, our Operations Manager, address that?

MR. WAMSER: I'm Chris Wamser, Operations Manager of Vermont Yankee. Typically, the process of backwashing and precoating a condensate demineralizer takes about one hour, so we would expect -- and each demin. nominally gets cleaned about once per month. So I can't come up with a percentage for you, but typically it would be a short duration activity, done under controlled circumstances to bypass, open the bypass, take a demin. out, clean it, put it back in service in the order of about an hour and reclose that bypasser out.

MR. LEITCH: Okay, so that would be quick enough then that you don't really expect to have any degradation in the reactor water.

MR. WAMSER: There should be no negative effect to chemistry during the duration of that activity.

MR. LEITCH: Okay, thank you.

MR. BANERJEE: I have a question. Is ARTS/MELLLA basically an operating procedure to intervene and to sort of cut off instabilities? What does ARTS/MELLLA mean there?

MR. NICHOLS: The ARTS/MELLLA project is what we partially explained earlier, was that expansion of the operating domain from the ELLLA domain out to the MELLLA domain.

MR. BANERJEE: But in practice, what modification do you make to --

MR. NICHOLS: The modification we made was to install new flow control trip reference cards for the APRMs.

MR. BANERJEE: So this was actually to intervene if there was an instability or something? Is that what it amounts to?

MR. NICHOLS: No.

MR. BANERJEE: So what is the need for that?

MR. NICHOLS: It was to provide that expansion of the flow window to the MELLLA domain which was necessary. If we could not operate out at that expanded domain, as Mr. Dick explained earlier, we could not flow up to that 120 percent power point.

MR. BANERJEE: So this was to measure higher up flows or in practice what were these pieces of hardware that you put in?

MR. NICHOLS: The only required piece of

hardware to allow us was the actual flow control trip reference cards which are the -- which contain the set points for the APRMs.

MR. BANERJEE: So this is just to reset the set points?

MR. NICHOLS: That's correct.

MR. BANERJEE: That's all it was.

MR. NICHOLS: That's what the physical modification was.

MR. BANERJEE: So there's no modification to intervene if instabilities start because you're operating at a different operating lines. The instability boundaries will change, right? Obviously.

MR. NICHOLS: Mr. Dick?

MR. DICK: This is Michael Dick with GE. When we did the expansion of the MELLLA domain, one of the analyses that we did was to look at Vermont Yankee's stability solution and we incorporated within that revised set points for the 1D stability to solution for operation within the MELLLA domain.

But the stability analysis is a subsequent task to ensure that stability solution is adequate within that expanded operating domain.

MR. BANERJEE: So there are no changes in anything else other than allowing to go to the higher flow right now?

MR. DICK: To EPU conditions, sir?

MR. BANERJEE: Right. What he's say is that the set points have just been changed, that's all, nothing else.

MR. DICK: For the ARTS/MELLLA project.

MR. BANERJEE: That's correct.

MR. DICK: I think what Mr. Nichols is trying to show here is that the ARTS/MELLLA project was a -- or specifically that expansion of the operating domain, was a prerequisite modification to the plant to allow operations at EPU conditions, nothing more, nothing less.

MR. BANERJEE: But now the stability boundaries changed in the system, didn't they?

MR. DICK: Yes sir

MR. BANERJEE: Do they or do they not?

MR. DICK: Yes, they do and they're analyzed every cycle.

MR. BANERJEE: So what do you do to take account of that?

MR. DICK: We perform the stability analysis based upon the ARTS/MELLLA operating or the MELLLA operating domain.

MR. BANERJEE: Right, you perform the

stability analysis, but do you have to do anything physical that deals with the different --

MR. DICK: No sir.

MR. BANERJEE: So you don't do anything? Even though the stability boundaries may change, you don't have to do anything? The analysis shows that this is okay?

MR. DICK: Yes sir.

MR. WAMSER: If I can, Chris Wamser here, Ops Manager again.

What we do is we devise a new power-to-flow map for each operating cycle showing the new stability boundaries and train on those and incorporate those into our operating procedure. So there's no necessarily change to a direct procedure as a result of that or no hardware change, but that information is incorporated into operating procedures and training.

MR. BANERJEE: Thank you.

MR. WAMSER: You're welcome.

MR. LEITCH: When you -- this is an MG set, controls the speed of your recirc. pumps? It's not a valve?

MR. NICHOLS: That's correct.

MR. LEITCH: This is an MG set plant.

With the hydraulic coupling fully engaged, do you have the capability to increase the speed of the generator by 1.8 or 2 percent, whatever the number was that's mentioned?

MR. NICHOLS: That's correct, because we're licensed to run up at 107 percent core flow. We have proven our ability to operate that unit at higher speed.

MR. LEITCH: But my question is is -- does that speed exceed the motor speed or is it equal to or less than a motor speed?

MR. NICHOLS: It's less than.

MR. LEITCH: Can you get that much speed out of the generator?

MR. NICHOLS: Yes, we can.

MR. LEITCH: Yeah, okay.

MR. NICHOLS: The second slide shows those modifications required not to actually achieve the uprate, but rather as a result of plant operations at uprate condition, including flow effects, environmental effects and system pressure changes.

MEMBER WALLIS: Now again, I read the words about steam dryer strengthen about one inch plates and so on. I haven't a clue what this meant. Will we at some time see a picture or have an explanation of why --

CHAIRMAN DENNING: We're going to do that next meeting.

MEMBER WALLIS: We're going to do that at the next meeting?

CHAIRMAN DENNING: yes.

MEMBER WALLIS: Okay, because I couldn't understand what had happened just by reading the description.

MR. NICHOLS: We have a detailed presentation on the analysis and modification.

There are several additional aspects of the Vermont Yankee extended power uprate compared to previously presented uprate. This application represents the first total use of the approved constant pressure power uprate licensing topical report, also referred to as CLTR. This approach took the lessons learned from the prior topical reports, referred to as ELTR1 and ELTR2 and by maintaining constant reactor pressure, simplified the required analyses and the uprate as a whole.

I would note that elements of the CLTR were previously used in the Brunswick and Clinton power uprate applications.

The grid stability study was being

performed at the time of the regional blackout in August of 2003. The study incorporated the knowledge learned from that event.

I would note, by the way, that the regional event had no impact on Vermont Yankee and most of the State of Vermont as a whole.

As part of the power uprate application, and in line with the proposed revisions to Regulatory Guide 1.82, Entergy has provided a first use of a risk-informed approach to containment overpressure.

MEMBER WALLIS: These changes to that Reg. Guide are in draft form so far?

MR. NICHOLS: It's a proposed revision in draft form, that's correct.

MEMBER WALLIS: Right. So we have to bear in mind that they haven't yet gone to the mature stage.

MR. NICHOLS: That's correct. Our application is in line with Regulatory Guide 182 rev. 3, but also provided an additional risk-informed approach.

As noted, the NRC is currently in the process of the review of that.

There are several additional aspects of the Vermont Yankee extended power uprate compared to previously presented uprates. This application represents the first total use of the Approval Constant Pressure Power Uprate Licensing Topical Report also referred to as CLTR. This approach took the lessons learned from the prior topical reports referred to ELTR-1 and ELTR-2. By maintaining constant reactor pressure simplified the required analyses and the uprate as a whole. I would note that elements of the CLTR were previously used in the Brunswick and Clinton Power Uprate applications.

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MEMBER WALLIS: Proposed. Right. So you

have to be clear in mind that they haven't yet gone to the mature stage yet.

MR. NICHOLS: That's correct. Our application isn't in line with Regulatory Guide 182 Rev. 3 but also provided an additional risk informed approach.

As noted, the NRC is currently in the process of the review of that regulatory guide. The analysis showed that the deterministic approach contained extremely large conservatism and that in a realistic case no credit for containment over-pressure would be needed.

The risk analysis performed demonstrated that the change in core damage frequency resulting from the crediting of containment over-pressure is very small, less than 1×10^{-6}. As part of the agenda for this meeting, we will have a detailed discussion on this topic tomorrow.

Lastly as Mr. Thayer noted, most of their modifications to support the uprate were installed during the refuel outage in the spring of 2004. The effected systems and components have performed very well since that time including initial plant start-up and baseline power ascension testing, normal plant operations throughout the cycle and during the two automatic plant shutdowns that Mr. Thayer noted.

MEMBER KRESS: I want to ask you a question because you mentioned the Delta CDF and risk informed tests that conform with the Reg Guide 174. Did you also look at the potential for late containment failure?

MR. NICHOLS: Pardon me, sir?

MEMBER KRESS: Did you also look at the change in late containment failure? Since this is a late containment issue.

MR. NICHOLS: I would like to ask Mr. Hobbs to address that.

MR. HOBBS: In our presentation tomorrow, we'll be talking about the assumptions relative to probability of containment failure and some of the different causes of containment failure included operator error, included a preexisting containment condition or failure of containment penetration. So any one of those except for maybe the preexisting could be categorized as a late containment failure.

MEMBER KRESS: I'll look forward to it.

MR. THADANI: Could I follow up on this a little bit? Looking at 20 percent power uprate, did you look at the Atlas sequences where you would get into unstable behavior when the pumps trip which would certainly challenge fuel? The issue would be fuel performance and also you would have less time for operators to take actions and you will have greater energy in the containment. You'll get much larger delta D from bulk to LOCA temperature effects. Did you look at those factors and convince yourself that the risk increase was pretty small?

MR. HOBBS: We did look at those factors. First, we analyzed the at-watts event with instability. That was one of the at-watts events that were analyzed. We also took into account the decrease in operator response time for the at-watts event in our PSA analysis.

And finally we also looked at the impact on containment integrity and containment performance as a result of the at-watts events. Relative to the effect on containment overall, it turns out that the large break LOCA analysis bounds the at-watts event for power uprate. But we do factor into account the decreased operator response time.

MR. THADANI: I think the temperature limit was not bounded by LOCA but that's something we can look into. But how about the fuel itself? How does the fuel perform under these neutrons? Do you really understand? Where can I find documentation that says that fuel performance is well understood?

MR. HOBBS: Michael Dick from GE, can you help me about the at-watts stability analysis relative to fuel performance? Is that bounded by another at-watts event that's more limiting?

MR. DICK: No, I believe that there's two questions. One is Mr. Hobbs' statement is true is that we did look with at-watts with core instability. But as far as in some documentation that he can be provided separately, I believe it's already on the docket. I think we should defer and provide that as separate information. It's a pretty long complicated subject though.

MEMBER KRESS: Ashok. What aspect of fuel performance are you concerned about? Is it cladding behavior?

MR. THADANI: Yes, temperature effects basically.

MEMBER KRESS: That could lead to the distortion of the cladding.

MR. THADANI: Yes, potential for distortion.

MR. DICK: Right. This is Michael Dick. It's just this one aspect though with at-losses that we've consistently shown that peak cladding temperatures are well below 1500 degrees during an at-watts events. Once again, it's very much bounded by the DBA LOCA.

MEMBER WALLIS: Then at-watts is one of the events which is significantly changed as a result of power uprate. Many other things are not changed that much. We're not going to go into that at this meeting I take it. But significantly changed in various ways, are we going to go into that at the end of the month? I think I would like to have a real discussion of what has changed about Atlas.

CHAIRMAN DENNING: I think Station Blackout, we'd like to look at that in some detail too.

MR. NICHOLS: We'll certainly take that note and be prepared to make a presentation on both those topics.

MR. BANERJEE: At the meeting at the end of the month, perhaps GE could also tell us what tools they've used to look at Atlas and if I recall, this is a very difficult stability analysis and the last time I saw some results the cords were not converging. So perhaps GE could clarify how it has done that.

MR. NICHOLS: We'll absolutely take that.

MEMBER LEITCH: General Electric has

several different approaches to how to prevent entering regions of reactor instability. Which of those methods are used at the watt?

MR. NICHOLS: Vermont Yankee is referred to an Option 1-D plant Core Y.

MEMBER LEITCH: Would you tell us what that means?

MR. NICHOLS: Michael Dick, could you explain the differences between the different thermohydraulic options.

MR. DICK: Michael Dick with GE again. Yes, the stability 1-D option is for a plant with BY that has core orificing is such that regional mode oscillations are not considered likely, i.e. all the oscillations are core wide and so it is a detectant-suppressed solution. The suppression is caused by the APRM flow bias scram and what is calculated as far as for each cycle there's what's called an exclusion region. It's an area in the power of the flow map where operation is not permitted.

And then as a predecessor to this exclusion region, I believe we have a backup slide on this, I don't know if you have it, it's called a buffer region which is five percent expansion of that cycle specific calculated exclusion region which gives early information to the operator that they could possibly enter in that region.

MEMBER LEITCH: So then it's an operating procedure to manually scram the reactor in that situation approaching that region.

MR. DICK: I'm not an operator. So I'm not going to answer that.

MR. WAMSER: Chris Wamser, Operations Manager. The operating procedure is relative to entry into the exclusion buffer region. We don't go there intentionally but if plant events drive us there as previously mentioned, we take a detectant-suppressed approach which is for an event that puts us in that region we would monitor the appropriate indication and average power monitors and LPRMs and we would insert control rods to exit that region or increase core flow to exit that region.

We do have clear direction and training that if oscillations are seen the expectation is to scram the reactor, manually shut down the reactor. If a specific event, a dual recirc pump trip, were to occur, we have clear direction to manually scram the reactor for that event.

MEMBER LEITCH: Okay. Thank you.

MR. NICHOLS: As part of the license for

the power uprate, there are three proposed license conditions related to actions proposed by or agreed to by Entergy. These stipulations provide additional margins for result in additional testing and monitoring to validate Entergy's analysis results. I would note that each of these areas is the subject of a detailed presentations at either this meeting or the subsequent meeting in Rockville.

The first license condition applied an adder to the safety limit minimum critical power ratio calculated for each operating cycle. During the review of the Vermont Yankee extended power uprate, the NRC staff raised questions related to the uncertainties in GE's nuclear analysis method. This increase in safety limit minimum critical power ratio provides additional conservatism to bound the uncertainties used in those analyses.

The second licensee condition documents additional testing and monitoring of the steam dryer during power ascension and commits the full dryer inspection in accordance with the GE Service Information Letter in each of the next three refueling outages.

And the third license condition relates to validation testing of the condensate and feedwater system under pump trip condition.

MEMBER LEITCH: We're going to talk more about that later.

MR. NICHOLS: We'll talk more about the condensate and feedwater today and the others later. That's correct. The Vermont Yankee extended power uprate has been performed in accordance with the NRC approved constant pressure power uprate licensing topical report and has incorporated the lessons learned from project efforts within the fleet and within the industry and all operating experience with extended power uprate. No exceptions to the licensing topical report were required.

MEMBER SIEBER: No exceptions?

MR. NICHOLS: No exceptions to the CLTR were taken.

MEMBER SIEBER: Okay. One of the things in the topical is a requirement for large transient testing. You're not taking exception to that.

MR. NICHOLS: The requirement in the SER for the large transient testing is that the plant perform a station-specific evaluation.

MEMBER SIEBER: We'll discuss that later.

MR. NICHOLS: And that's what we've done. So it's not an exception.

MEMBER LEITCH: About a year ago, we heard a presentation from the DWR Owners Group about extended power uprate issues that have occurred and although the steam dryer issues have been well publicized, there were a number of other issues that the industry experienced related to extended power uprate conditions.

These included things like cracks in main steam drain lines, pressure switch vibrations. I would say in general they were due to vibrations and attachments to the main steam piping system and so forth. I know you've certainly considered dryers and we'll talk about dryers later. But have you thought about these other perhaps more minor issues but nonetheless significant ones that have been associated with EPU?

MR. NICHOLS: That's an excellent point and precisely to those point, Vermont Yankee increased our modification scope in those areas and I'll mention a few of those. The main steam drain line sockelettes that you referred to that were cracked, we reperformed the weld on those and increased the size of those to address that flow and do vibration concern. We replaced the feedwater isokinetic probes that caused issues at another station. We altered our approach to isophase cooling improvements based on the experience of another station. And we also installed flexible hoses on the level control valves to the replacement done as part of the feedwater heater project again based on industry experience.

MEMBER LEITCH: Thank you.

MR. NICHOLS: The Vermont Yankee extended power uprate is clearly a plant-wide, comprehensive effort that exemplifies the Entergy nuclear philosophy of safety and quality, then production. Maintaining personnel in nuclear safety is paramount and is achieved by maintaining adequate safety margins through analysis and if necessary, plant modification.

The focus of the site and the company on this project through the dedicated team assembled, the self assessment, the vendor audit and the management support insured a quality effort. Finally, the goal to maintain Vermont Yankee's long history of reliable operations has been the focus of the significant amount of plant modification and modernization that I noted here.

The evaluations performed demonstrate that the plant maintains adequate safety margins and the extended power uprate --

MEMBER WALLIS: Can you explain to me what you mean by "maintain margins"? Do you mean that your numbers you calculate are less than some limit or do you mean that the difference between the numbers and the limit have stayed the same?

MR. NICHOLS: The changes in those are very small.

MEMBER WALLIS: I'm just looking at it at-worse. Your pressure that you get at an at-worse is increased by 115, 100 something PSI. It's gotten much closer to the ASME limit. But you reduced the margins significantly and you could say that because it's still below the ASME limit you've maintain the margin. I don't know what you mean by "maintain margin."

MR. NICHOLS: In that case, by maintaining below the ASME limit and by installing --

MEMBER WALLIS: So maintaining margin you haven't kept the difference from the limit. You just haven't cross the limit. That's what you mean by maintain margin.

MR. NICHOLS: That's correct.

MEMBER WALLIS: Because margin means different things to different people. So what you really mean is you've found safety systems that are still below some limit which is set by regulation or by industry or by something. It's still below some technical limit.

MR. NICHOLS: That is correct, sir.

MEMBER WALLIS: That's rather a better definition than maintaining your margin. The margin is the space away from a limit to many people rather than not getting there.

MR. NICHOLS: I appreciate that.

MEMBER LEITCH: I had a similar question about the peak cladding temperature. There's an indication that the peak cladding temperature is increased by more than 50 degrees but it doesn't say how much it was increased and it does say that the peak cladding temperature now is like 1960 degrees if I'm remembering the numbers correct which is still well away from 2200 degrees.

But I was just wondering. Some of that margin, if that's how we're defining margin, has escaped us and I was just wondering how much the peak cladding temperature because it says it's more than 50 degrees. But I was just wondering how much more.

MR. NICHOLS: Michael, do you have that number off the top of your head?

MR. DICK: It's Michael Dick with GE. The licensing basis peak cladding temperature increased from 1910 per EPU to 1960 at EPU conditions.

MEMBER LEITCH: Okay. So it was just about 50 degrees.

MR. DICK: Yes sir.

MEMBER LEITCH: The phraseology "more than 50 degrees" I think there's some criteria that there's a reporting limit --

MR. DICK: 10 CFR 40.46.

MEMBER LEITCH: I thought it was much more than 50 and you were --

MR. DICK: You're right but that existing calculated increase was within the licensing amendment. So it wouldn't be considered with an error reporting.

MEMBER LEITCH: Thank you.

MEMBER WALLIS: This gets to the sublimit too. I mean when you say not very significant, you have to look into how the risk was evaluated. If the risk is dependent on the margin which is the space to a limit, then it has changed. But if the risk is defined as, if it gets risky when you cross the limit, then you say it hasn't changed.

If I have a limit of 1,000 on something and I'm now at 800, I have a margin of 200. If I go up to 999, one might say the risk is increased. But if you still say the risk only depends on crossing

1,000, you say it hasn't increased. So it depends very much on how you evaluate this change in risk and I'm not quite sure how that is done because I don't understand how you do it and I probably never will. It's not my field.

CHAIRMAN DENNING: I think you know that PRA just does not examine that change in risk.

MEMBER WALLIS: I think PRA does not examine that change.

MEMBER SIEBER: It doesn't look at margin.

MEMBER KRESS: I presume that by not a risk of significant change that what is meant is that delta CDF and delta LRF hasn't changed very much and --

CHAIRMAN DENNING: And it's calculated by PRA.

MEMBER KRESS: And it's calculated by PRA. That's what the bullet means.

MR. NICHOLS: That is correct.

MEMBER KRESS: My question might be about that. Did you do a Level 3 PRA?

MR. NICHOLS: I would like to ask Vince Andersen from Erin Engineering to address that.

MR. ANDERSEN: Vince Andersen, Erin Engineering. No Level 3. Reg Guide 1174 isn't the level for --

MEMBER KRESS: We recognize that. We know that it's not required.

MR. ANDERSEN: Yes. So no Level 3.

MEMBER KRESS: What about elements of Level 2?

MR. ANDERSEN: LRF.

MEMBER KRESS: And that's as far as you went was LRF.

MR. ANDERSEN: Yes. As you know, most risk applications in our industry are core damage frequency and large early release. Then our industry isn't performing Level 3 PRAs for most banks. I don't think it would change the conclusion. If anything, it would just be a more detailed, rigorous analysis of those issues.

MEMBER KRESS: Thank you.

CHAIRMAN DENNING: We do have a couple of minutes if we have any more questions.

MEMBER BONACA: I have just one comment. I think the problem is to combine plant safety system maintains margin and not any risk significant change. I think the top bullet refers to an deterministic way of defining margin. For example, if you do not exceed ASME limit you have maintained margin because the limit typically is intended to represent that margin. The variation below are considered no change. Risk significant implies an evaluation down to PRA which really treats margin in a very different way.

MR. NICHOLS: That's right. Those are complimentary.

MEMBER BONACA: So referring to that slide, I think if you kept them separate you would be out of trouble. If you put them together, you get a problem.

MR. NICHOLS: I understand that.

CHAIRMAN DENNING: Okay. What we're going to do is we're going to take a break now 'till 10:30 a.m. but we're going to use that clock on the wall there because it gives me about four more minutes. So according to that clock, we're going to start back at 10:30 a.m. Off the record.

(Whereupon, the foregoing matter went off the record at 10:09 a.m. and went back on the record at 10:26 a.m.)

CHAIRMAN DENNING: On the record. Let's see. There are a few members of the public that are here now. I want to say just a few things before we start up again and that is that today we expect to go to 7:00 p.m. That was a little bit of a change from earlier and tomorrow we're going to go until 5:30 p.m. and then I also wanted to point out that there had been some confusion as to when our ACRS meeting was going to be and that will be on December 7th not December 8th as was reported in some areas. I just wanted to make sure members of the public were aware of those slight modifications.

Now we're ready to start up again. And I think Mr. Nichols from Entergy will do the next presentation.

MR. NICHOLS: Thank you, Mr. Chairman. The next presentation topic is The Power Ascension Program and Related Testing Associated with the Implementation of the Power Uprate for Vermont Yankee. I would like to acknowledge Mr. Daniel Yasi of Stone Webster Engineering who's here at the table with me.

The test plan for the Vermont Yankee extended power uprate is effectively a continuation of the testing done as part of original plant startup. Additional testing requirements come from Section 14.2.1 of the Standard Review Plan which is entitled "Generic Guidelines for Extended Power Uprate Testing Programs." It provides the guidance for evaluating tests performed during original startup and the need to perform those at higher power levels, evaluating new tests based on changes to plant equipment or plant operations and elements for the justification and for the elimination of proposed tests.

Certain test criteria are also detailed in the constant pressure power uprate licensing topical report. Those include technical specification testing including the IRM to APM overlap region, baseline testing requirements from 90 to 100 percent of the current license thermal power. The topical report provides a five percent limit on power increases. It details control tests of the feedwater or reactor level control system and pressure control system and validation of various plant set points.

As I noted earlier, Section 14.2.1 of the Standard Review Plan provides the guidance for justifying the elimination of proposed tests including large transient tests. Entergy has provided a plant-specific justification to the staff which I'll describe in a few minutes.

Following the spring 2004 refuel outage when the majority of the power uprate modifications were installed, testing was performed at power levels up to 100 percent of the current license thermal power. No issues were noted and the plant response to the changes was noted as being very stable. In addition as previously mentioned, the equipment and systems performed as expected during two load reject automatic plant shutdowns that occurred for unrelated reasons during the operating cycle.

The actual power ascension will be accomplished in a very controlled method with small incremental and approximately one to two percent power changes over the course of a day with a five percent change plateau. Monitoring will occur during various points during the day and at the five percent plateau. This power level will be held for approximately 96 hours to allow for steam dryer monitoring and evaluation.

Some of the elements of the monitoring at each power level will include steam dryer monitoring to include data from the strained gauges on the main steam lines, moisture carryover and the monitoring of indicative plant parameters. Piping system monitoring will include both remote monitoring of accelerometers in accessible areas during power operation and walkdowns in the accessible areas.

MEMBER WALLIS: Now when you do this you have some criteria that you lay out ahead of time so that if you start to see certain things you've figured out what your response is going to be or do you just wait until you see something before you decide what to do?

MR. NICHOLS: No. We have acceptance criteria in the testing.

MEMBER WALLIS: So you have some very clear criteria that you go through certain things and if there are above something that you've set ahead of time, you back off or something. You have some decision criteria and you have the actual actions you will take all laid out ahead of time.

MR. NICHOLS: That's correct. For example for the steam dryer, we have criteria that would have a stop dissension or reduced power level.

MEMBER SIEBER: So really what you're measuring there in the steam dryer is its performance as opposed to things like are you generating patique (PH) stresses that would through time cause the dryer material to crack or something like that. Is that the case or not?

MR. NICHOLS: Actually, Vermont Yankee has developed an acoustic circuit methodology. To use the strain gauges, we have 32 strain gauges installed at eight locations.

MEMBER SIEBER: Where are the locations?

MR. NICHOLS: There's one location on each main steam line approximately ten feet from the reactor nozzle and another one approximately 40 feet from the reactor nozzle on each main steam line.

MEMBER SIEBER: So you aren't really measuring the dryer. You're measuring the mechanical response of the whole plant to detect that there's some kind of vibration going on that may come from the dryer or may come from someplace else. Right?

MR. NICHOLS: We're actually using it to monitor the stress and strain on the piping created by the fluid system inside the piping and that creates the feedback load onto the steam dryer. We have a very detailed presentation on the methodology. It's benchmarking in how we use it to determine the load on the dryer.

MEMBER SIEBER: You're going to present that to us?

MR. NICHOLS: Yes, that will be presented at the second session of the meeting.

CHAIRMAN DENNING: What about moisture carryover? What's the significance of that? I know that's one of the things you monitor for that. What would that be indicative of?

MR. NICHOLS: Moisture carryover as relates to the steam dryer?

CHAIRMAN DENNING: Yes.

MR. NICHOLS: It would be indicative of a large crack developing, an opening that allowed bypass steam to flow that wasn't going through the dryer banks.

MEMBER WALLIS: It would be quite a large change in the steam dryer if you have significant moisture carryover. It would mean that something had broken or some flow path had opened up or something significant that happened. It really wouldn't show cracks. It would show that something actually moved.

MR. NICHOLS: That's actually correct and we have gone to the other methods to provide better detection.

MEMBER SIEBER: Yes, the issue is that sooner or later you're really going to mess up the turbine.

MR. NICHOLS: If moisture carryover were allowed to exceed certain levels for an extended period.

MEMBER SIEBER: It will wear the pipes. You'll get erosion, corrosion, all kinds of things over time.

MEMBER BONACA: Are you going to instrument piping also after startup? Are you going to maintain some instrumentation there to see if you have vibrations at set limitations?

MR. NICHOLS: We have a detailed piping monitoring on both main steam feed or those systems that have flow changes that are installed today that have the baseline data and then we'll be monitoring all the way through power ascension 120 percent power.

MEMBER BONACA: What about beyond power ascension?

MR. NICHOLS: Then we can solve for the complete operating cycle.

MEMBER BONACA: Are you going to show us this information? Is it part of the detail of what you're going to instrument?

MR. NICHOLS: We have a very detailed map on the steam dryer and the associated piping.

MEMBER BONACA: You'll bring this to the next meeting.

MR. NICHOLS: That is correct.

MEMBER SIEBER: Do you plan to modify or alter your application? I take it you use check works for erosion/corrosion monitoring. Do you plan to alter your samples or do more or what have you because the opportunity for erosion/corrosion will increase with the power uprate?

MR. NICHOLS: That's correct and we have taken not only the change from the power uprate analysis but also the inspections in the most recent refueling outage and are incorporating those as a further change along with the changes by the modifications where we continued our installation of FAC-resistant materials.

MEMBER SIEBER: I would point out that experience shows that not only do you get a faster rate but the locations can change because the turbulent areas will move with increasing steam flow.

MR. NICHOLS: That is correct.

MEMBER SIEBER: Okay. So you're aware of that.

MR. NICHOLS: Yes sir.

MEMBER SIEBER: Okay.

MEMBER RANSOM: Do you feel by monitoring the accelerations on the piping system that you can pick up vibrations of the dryer components? If parts of the dryer are vibrating, they were be transmitted through the system then.

MR. NICHOLS: Actually what it is is that the steam fluid and the feedback through that is creating the load back on the dryer.

MEMBER RANSOM: Right. You get fluid

induced forces that can cause the dryer components to vibrate.

MR. NICHOLS: To vibrate. So in using that load on the dryer and monitoring that we use that into our finite element model for the steam dryer to determine the stresses on it.

MEMBER RANSOM: Are you measuring the loads on the dryer?

MR. NICHOLS: No, we're measuring the strain in the piping outside.

MEMBER RANSOM: Right.

MR. NICHOLS: And through the acoustic circuit model projecting that onto the dryer.

MEMBER RANSOM: And it is an instrumentation problem, I guess, to put anything inside the reactor.

MR. NICHOLS: That's correct. In addition, walkdowns will be performed by plant operators and plant engineers familiar with system operation to detect any changes in the operation of those systems. As was mentioned, special tests will be performed at prescribed plateaus.

At current licensed thermal power, Vermont Yankee unlike most operating boiling water reactors has a standby feedwater pump. As part of the power uprate, we will now run that third feedwater pump. Therefore, similar to most BWRs, at power uprate conditions a trip of a feedwater pump or the trip of a condensate pump resulting in feedwater pump trip will initiate an automatic reduction in plant power caused by decreasing recirculation system flow.

MEMBER SIEBER: So you will no longer have a standby pump.

MR. NICHOLS: For the feedwater system, that is correct.

MEMBER SIEBER: Okay.

MR. NICHOLS: This is done for plant trip avoidance reasons and not for safety systems. This is a new feature. At Vermont Yankee, Entergy has agreed to the following testing and analysis regimes. Upon achieving 120 percent power, Entergy will trip a condensate pump to validate our analysis that no total loss of feedwater flow occurs. The analysis for this event shows significant margin to the low pressure trip of the feedwater pumps based on the system flow and resistance calculation.

Based on the results of that test, analysis or additional testing of a feedwater pump trip will be performed to validate our analysis that no plant shutdown occurs from the trip of a feedwater pump. The prior test will provide additional plant operating data at uprate conditions that may provide valid benchmarking of the feedwater trip calculation. If sufficient data is not available from the existing test data and analysis, then the feedwater pump trip test will also be performed.

MEMBER WALLIS: So when the feedwater pump trips, then you just back off on power.

MR. NICHOLS: That occurs automatically in what's referred to as a recirc runback.

MEMBER WALLIS: I wasn't sure what a recirc runback was.

MR. NICHOLS: The recirculation motor generator is set to reduce the pump speed to reduce recirculation flow which reduces power.

MEMBER SIEBER: Actually it's a natural phenomenon for the reactor to cut back a little bit because the core flow is going down.

MR. THADANI: What sort of other changes do you have to make to the control system to be able to stay online if you have a condensate pump trip?

MR. NICHOLS: The analysis of the pump trip, we inserted the recirc runback. That's a modification for us. We made that and also the automatic tripping of one of the feedwater pumps off any condensate pump trip is a new logic change.

MEMBER SIEBER: That preserves FTSH (PH) margin.

MR. NICHOLS: Correct to the suction pressure trip.

MR. THADANI: Main feed pump runback, are you inserting rods also?

MR. NICHOLS: No.

CHAIRMAN DENNING: In a normal operation if this happens, you then are allowed to operate indefinitely at the reduced power or is there a tech spec limit as to how long you can be in that mode?

MR. NICHOLS: No, it's not in any exclusionary order.

CHAIRMAN DENNING: So you could operate in that mode until the end of the cycle if you wanted to.

MR. NICHOLS: For example if the feedwater pump tripped and we reduced power, it would similar to today's operation.

MEMBER SIEBER: Yes, you go back to the original licensed power and just keep sailing along.

MR. NICHOLS: And today if we lose a condensate pump, I believe you operate in the 80 percent power range.

CHAIRMAN DENNING: With those changes to

the control system.

MEMBER LEITCH: So this test, you're running along at the new EPU 100 percent power and you trip a condensate pump and what you would expect to see then is recirc runback. Would you expect to see one of the reactor feed pump trip?

MR. NICHOLS: Actually, that's the logic change we made that we automatically tripped. On any condensate pump trip, we tripped the B or bravado feedwater pump.

MEMBER LEITCH: Okay. So you automatically trip one.

MR. NICHOLS: That's correct and insert that recirc runback.

MEMBER LEITCH: Okay. So now if you're not able to ride out that transient, I assume this is like no manual operator action. You just watch and see what happens in the first minute or so. Say the plant trips. Then what is the commitment there? Do you have to retune the speed of the recirc runback until this is successful or just what is the commitment?

MR. NICHOLS: The license condition related to the condensate pump trip is that no total loss of feedwater occurred so that upon the tripping of that condensate pump and the subsequent feedwater pump trip that suction pressure condition as Mr. Sieber noted do not get to a position that they trip the other two feedwater pumps so we would have what's referred to as a loss of feedwater.

MEMBER LEITCH: But if it's not as expected, you have to retune and reperform the test. Is that it?

MR. NICHOLS: That's correct. We would reperform, reanalyze and discuss that with the staff.

MEMBER LEITCH: Okay.

MEMBER SIEBER: This control action is not a safety feature. It's a reliability feature. And what you're ultimately trying to do is to avoid an anticipated transient.

MR. THADANI: But it did crack safety. It's called nonsafety related but it impacts safety.

MEMBER SIEBER: It has some risk factors.

MR. THADANI: If the feed pump doesn't trip, what happens? You have to look at it.

MEMBER SIEBER: It will trip sooner or later.

MR. THADANI: But I'm saying if the feed pump doesn't trip, you have a sequence of events. So it does have an impact on safety. It's just not called safety related.

MEMBER SIEBER: The problem of letting things happen all by themselves without a direct control action is they all may trip and then you have a bigger problem than you had before. It's prudent that they puts these circuits in.

MR. NICHOLS: This slide shows what are termed the large transient tests in the standard review plan. As I said previously, the standard review plan also provides the criteria for an evaluation used to justify the elimination of these tests.

The justification should include consideration of elements of the following features, previous operating experience, introduction of new phenomena or interactions, conformance with analytical models, operator familiarity or procedure changes, larger reduction for anticipated operational occurrences, guidance and vendor topical reports and risk implications.

There is significant operating experience for boiling water reactors both in the United States and Europe that has both demonstrated that there is no significant change in plant response to a transient at uprate conditions especially when there is no change in reactor pressure. These tests and events also validated the modeling tools used to analyze these events.

MEMBER SIEBER: Let me ask a question. If I increase the steam flow through a stop valve by 20 percent, in other words 20 percent more momentum, and then you close that valve, do you think the forces on the valve and piping would go up?

MR. NICHOLS: I believe they do and we performed that analysis.

MEMBER SIEBER: Let me ask an additional question then. When you exert perhaps 20 percent more force on the piping in the valve, what about its hangers and supporters? Are you going to rip them out of the wall? Or you're going to loosen up the hilties (PH)?

This is really what you're testing. You aren't testing operator response. You aren't testing whether the valve will close or not or how the reactor will respond. You're really looking at whether the plant's going to stay together or not.

MR. NICHOLS: In reference to your stop valve closure, we did perform an analysis of that. I would like to ask Mr. Yasi to address that.

MEMBER SIEBER: An analysis is different

than a test.

MR. YASI: Yes. We did a stop valve closure test. It bounds the MSID closure test. I'm sorry, analysis.

MEMBER SIEBER: It's the same.

MR. YASI: Yes.

MEMBER SIEBER: I'm thinking the same valve, MSID.

MR. YASI: And the stop valves close much quicker. So we analyzed closure of the stop valves and demonstrated with a dynamic analysis that the loads are acceptable.

MEMBER SIEBER: Provided that the hangers and the supports and all the hilties that fasten as to the concrete walls and everything are as they were in 1971? 1974? That would be the assumption. Right?

MR. YASI: Potentially but we also did do a walkdown with the pipe support people. They did walkdown the critical supports in the plant.

MEMBER SIEBER: But that doesn't mean anything if you don't do the test. Right? You walk down after the test to see if there's any damage done.

MR. YASI: Well, that's one purpose of the walkdown, Jack, obviously.

MEMBER SIEBER: Sooner or later, you're

going to do it at large transient test. You just don't know when. Right?

MEMBER WALLIS: That's not called a test though.

MEMBER SIEBER: It has the same result except you don't have instrumentation and nobody watching.

CHAIRMAN DENNING: Now you do individually check the MSIVs though. Right? You close MSIVs independently as part of a test. I mean not all of them.

MEMBER SIEBER: Each one.

MR. NICHOLS: You're doing a surveillance.

CHAIRMAN DENNING: You're doing a surveillance while the plant's operating. True?

MEMBER SIEBER: I think you have to reduce power to that.

MR. NICHOLS: Mr. Wamser.

MR. WAMSER: We do the similar testing on MSIVs and turbine stop valves. We test all those valves routinely, quarterly, online during the operating cycle. So the test you're alluding to for main steam isolation valves we do similar testing for turbine stop valves.

MEMBER SIEBER: You don't do that at full power. Right? Do you reduce power?

MR. WAMSER: We perform main steam isolation valve testing at reduced power. The turbine stop valve testing we can currently perform at full power. It does close one valve at a time. So it's not exactly to your point.

MEMBER SIEBER: Yes, that doesn't count as far as satisfying my concern.

MEMBER WALLIS: How quickly do they close, MSIVs?

MEMBER SIEBER: A couple seconds.

MEMBER WALLIS: A couple of seconds. That's fairly long. It's not instantaneous, this momentum we're talking about.

MEMBER SIEBER: The throttle --

MR. WAMSER: The main steam isolation valve time is three to five seconds.

MEMBER WALLIS: And that's not so bad. The stop valve is much quicker so that these sudden forces are much bigger from that than the MSIV.

MR. McGUIRE: Bill McGuire, the General Manager of Plant Operations. The difference between MSIV closure, main steam isolation valve closure and the stop valve closure is that the pressure control system on the stop valve closure will accommodate bypass valve closure to allow the steam flow to go directly to the condenser.

MEMBER WALLIS: So it's even less of thunk.

MR. McGUIRE: That's correct.

CHAIRMAN DENNING: I don't think we're going to let you off that slide quite that easily. The question is on plants that have had the upgrades. There are examples of cases. Obviously some of them have tripped offline and what's the experience of that been? Do you have that information?

MR. NICHOLS: Yes, and we provided that in our application. Some of the plants actually performed testing, the Leibstadt plant in Switzerland and several plants have experienced at various levels of uprate plant trips. It's not matching the analysis because the analysis has additional assumption in it such as no bypass capability or no position switch scram on the MSIVs but have had events and those events are what are referred to as confirming that there is not a significant change compared to current license thermal power and also validate the modeling tools. So those plants have occurred at uprate conditions.

CHAIRMAN DENNING: And that's in one of

the license amendments.

MR. NICHOLS: It's in various license amendments and also referenced in the safety evaluation report by the staff. We can provide certainly more information on all of those tests and events.

MEMBER RANSOM: You used the term analysis. Is that a structural dynamic analysis or a thermal hydraulic analysis of the system?

MR. NICHOLS: Depending on the event both. As Mr. Yasi referred to a dynamic structural analysis, we also model the plant dynamic thermal hydraulically.

MR. BANERJEE: Do any of your tests actually explore the stability boundaries which come out of this thing of GE? Presumably GE has an analysis which repeat to your simulator and it's been blessed by an RCO or whatever. But do any of these tests actually look at what those boundaries are?

MR. NICHOLS: I don't believe that any of the tests for this extended power uprate evaluate that performance.

MR. BANERJEE: Have they been tested on elsewhere to look at these analyses like you referred to Leibstadt which I guess is not a GE plant?

MR. NICHOLS: I can't answer that. If GE

has an answer.

MR. DICK: Yes. This is Michael Dick with GE. Actually the KKM plant in Switzerland also. Now they because of the way the Swiss regulations work typically every cycle go in and actually delve into their exclusion region in order to validate operation and I don't really have the details but I believe it's really plant operation in the U.S. is really not to do that, that type of testing.

MR. BANERJEE: But that's an ABB plant, isn't it?

MR. DICK: No, it's a GEBWR.

MR. BANERJEE: So what do they use?

MR. DICK: KKM actually has GE-14 fuel. Leibstadt is actually using I believe another fuel. But General Electric does provide the fuel to KKM.

MEMBER LEITCH: I'd like to get back to the MSIVs for a minute. MSIVs are unusual in that they have a high and a low speed limit. It's three to five seconds. They can't close too fast and they can't close too slow. There's a tight window in which they have to close. The tech specs are unchanged then in that regard by the EPU. They're still three to five seconds.

MR. NICHOLS: That's correct.

MEMBER LEITCH: So I guess the question is will the valves still close in three to five seconds. That's a normal surveillance test. So I would assume that you would do that surveillance test to assure that they still close in three to five seconds.

MR. NICHOLS: That's correct, both during plant outages when we maintain the valves and during the quarterly surveillance that Mr. Wamser referred to.

CHAIRMAN DENNING: But that surveillance is done at the reduced flow?

MR. NICHOLS: Typically for the main steam isolation valve it's done at reduced flow to insure that the remaining three lines can carry the steam flow.

MEMBER LEITCH: Yes, but I think the question is under the higher flow will you be able to meet the timing.

MEMBER SIEBER: It depends on the manufacturer of the valve. In the control systems, they're set to determine how fast the valve meets in the dynamics.

MR. NICHOLS: There are adjustments you can make in that regard.

MEMBER SIEBER: The flow through the valve is less of a factor than the control system typically is. It has pretty powerful control.

MEMBER LEITCH: My question basically is won't we not close those valves at full flow to confirm that they really close in three to five seconds?

MEMBER SIEBER: Yes.

MEMBER LEITCH: And if not, appropriately adjust them.

MEMBER SIEBER: That's a quarterly test or something.

MEMBER LEITCH: Well, it's not at full flow and it's not an upgraded flow.

MEMBER SIEBER: That's true.

MR. DICK: This is Michael Dick with GE. We specifically had a question from the staff concerning that issue during the NRC review of the license amendment and the response we provided from GE is actually the MSIV type that VY has. It actually has a self compensating hydraulic damper installed in that.

MEMBER SIEBER: Right.

MR. DICK: And so realistically the increase in steam flow actually causes an adjustment in the springs internally and so there really is very little change and I would talk about --

MEMBER SIEBER: I would expect that.

MR. DICK: And I can't quantify it exactly but I think it's on the order of fractions of second that the change could increase in steam flow of 22 percent at EPU conditions.

MEMBER WALLIS: I have a question about the similarity between this plant and other plants. Other plants may have almost exactly the same steam dryers. But GE doesn't design the piping systems. So the main steam line could be quite different in a different plant. And if the main steam line actually as a organ pipe is exciting the dryers, then what is the experience in Dresden, Quad Cities or whatever or just the whole lot, may not apply quite to you because your steam line is different? If the steam line is the thing which is exciting the oscillation acoustically, you may have some unique situation here where this organ pipe is set off at some flow rate which didn't set it off in any other plant.

MR. NICHOLS: And we'll certainly go into that in much more detail at a later meeting. But that's why we have the strain gauges installed on our system and not relying on that performance. But also look at, it's really those penetrations that come off the main steam lines, those so-called organ pipes, and we looked at ours, their size and their flow dynamic to say what would excite them and we have details of that.

MEMBER WALLIS: Those make a difference too. It's like when you take your fingers off the flute. You play different notes. Everything is coupled together.

MEMBER SIEBER: You're going to go into that tomorrow.

MR. NICHOLS: No, that's at the latter meeting on the 29th and 30th.

CHAIRMAN DENNING: Let me ask another question on the plant challenge. Obviously, there is a plant challenge if you do one of these large transient tests. Is that the primary consideration? What's the primary consideration that nobody wants to do the large transient tests? Is it just that you have to go back down and start all over again and come up? Or if you really are concerned that you might be putting another cycle on the system? What's the logic?

MR. NICHOLS: What we found is it's unnecessary to perform the test because the test again, what I'd like to make a point, the test that we perform at Vermont Yankee is far more benign than what the analysis is for. For example, the stop valve closure test for the turbine trip assumes that there's no bypass capacity. At Vermont Yankee, we have one of the largest capacities in the industry and you will have approximately 85 percent of full uprate power in bypass capacity for steam.

Similarly for the main steam isolation valve closure test, the required analysis assumes that the position switch trip does not work and that the plant shutdown occurs on the flux scram which is a backup scram and that again, can't be done in a test within the license.

MEMBER SIEBER: It's a fact.

MR. NICHOLS: So therefore the test would actually not be anywhere near the severity of the analysis result.

MEMBER SIEBER: It's a fact, however, that if you trip the turbine throttles as opposed to MSIVs, the turbine throttles trip in about a second roughly and when they trip, you have no bypass flow at that time. So there's the force and there's the transient and then the bypass is open. But there is an instant of a second or two when you get this big pulse. So to say that you have bypass flow that will compensate for the rapid closure of the turbine throttle valves is not quite correct in my mind. Do you have a different view of that?

MR. McGUIRE: Again, Bill McGuire, General Manager of Plant Operations. The main turbine stop valves are designed so that as soon as the stop valves come off of their full open position, it sends an immediate signal to the reactor protection system to insert all the control rods fully. So you get automatic plant shutdown as soon as the stop valves start going shut.

MEMBER SIEBER: You get a scram. Okay.

MR. McGUIRE: And if the pressure in the pipe were to exceed the capacity of the pressure control system the reactor pressure vessel is suited with pressure relief valves. And our experience is that they do not relieve. The pressure is relieved through the automatic pressure control of the bypass valves.

MEMBER SIEBER: Right, and that's the way all these plants work. On the other hand, the throttle valves are faster than rod insertion and the throttle valves are faster than the bypass valves. Correct?

MR. McGUIRE: That's correct.

MEMBER SIEBER: And so the transient is there and none of these other things work fast enough to overcome that and the reason is you don't want to wreck the turbine. If you don't immediately close the throttle valves when you have that kind of a problem, the turbine will overspeed and you will do all kind of damage.

So there's logic as to why the plant is the way it is. The question is what is the timing of all these things that happen and generally speaking architecture engineers and NSS integral suppliers take all this into account. It's just that I'm curious as to how they did it and why they did it and I'm also interested in having the record clear as to what really happens as opposed to saying all these things happen. Don't worry about it.

MR. THAYER: Just I'd like to offer the committee a personal experience. It's a qualitative experience but it's relevant because it's the sequence that you just described. I talked about an automatic shutdown that occurred in July of 2005. I happened to be sitting in Mr. McGuire's office when that 100 percent load reject occurred which is on the turbine end of the turbine building.

I heard the turbine stop and control

valves close, heard the turbine bypass valves open and we were immediately aware that the plant had tripped and from a qualitative standpoint it was very mild. There was no banging. There was no loud noises.

So the sequence that Mr. McGuire just described in practice happened at this plant six months ago and it was the word benign has been used before, and that's the word I would use. You could hear the steam rushing through the steam bypass valves but there was no loud bang or no --

MEMBER SIEBER: From my office, I've had similar experiences. I've also had them right from the turbine pedestal and there's a difference. But we'll discuss this at some other time. How loud was it, who cares.

MR. CARUSO: If you lose offsite power such as a lightning strike, how long does the condenser stay available through the circulated water system? How long is the condenser available?

MR. NICHOLS: We lose it.

MR. CARUSO: So what would happen to the steam lines and the steam in the steam lines?

MEMBER SIEBER: Atmospheric.

MR. CARUSO: They just end up dumping.

MEMBER SIEBER: You just have atmospheric.

ASME codes said you have to have safety valves. That's what happens. Condenser vacuum decays pretty rapidly when circulating water flow goes away and the risk there is overheating the low pressure section of the turbine because you're moving a lot of air around now and there's no steam cooling and steam does cool. But the safety valve's open.

CHAIRMAN DENNING: I think you can move on. If we have a chance.

MEMBER WALLIS: I just wanted to answer your question. You asked why is this reluctance to do it. I've heard that it's unnecessary. Well, that's one reason and you just have another open line and there's another challenge. This word "challenge" I thought was brought up to say you're doing this thing which could damage something. We don't want to do it. But apparently it's not a challenge to anything. So maybe the word challenge is inappropriate. It's unnecessary benign event.

MEMBER SIEBER: I think Dr. Denning stated correctly is that you put another cycle on the plant.

MEMBER WALLIS: Is that it? You use -

MEMBER SIEBER: And for a plant that is older than brand new, you count the cycles and you don't want to put too many cycles on the piping and the vessel.

MEMBER WALLIS: It's the up and the down in the pressure and temperature that you're worried about. That's the challenge. It's not an immediate challenge. It's the long term challenge. You've added another cycle.

MEMBER SIEBER: And you disturb the system operations and a few other things.

CHAIRMAN DENNING: Some systems have to operate that were not operating before.

MEMBER SIEBER: Yes, and system operations which is your customers and the grid and all that have to make change too. Other plants have to make changes to make up for the lost energy.

CHAIRMAN DENNING: But we get a chance to query the staff on all this anyway. So I think we can move on now.

MEMBER SIEBER: Yes, we can beat that to death some other day.

MR. NICHOLS: In conclusion, Vermont Yankee extended power uprate power ascension and test program includes a slow ascension in power with discreet steps and hold points. The appropriate tests have been selected and the monitoring will be performed to provide validation of the performance of modified systems and components and to validate key analyses, inputs and results.

MEMBER WALLIS: So when these dryers have problems at other stations, how long did it take after the power uprate before they happened? If you're just going to hold for four days, is this going to be long enough to know if anything really happened?

MEMBER SIEBER: No.

MR. NICHOLS: That timeframe is for us to perform our evaluation of the results of the testing.

MEMBER WALLIS: Are you assuming that your instrumentation will tell you something in that timeframe?

MR. NICHOLS: Exactly.

MEMBER WALLIS: But it won't really test whether the crack is growing rapidly or not.

MR. NICHOLS: But our analysis will show us that we remain below levels that could start the development of a crack.

MEMBER WALLIS: Now these events that happened at other plants took some time to develop, didn't they?

MR. NICHOLS: Some period of time.

MEMBER WALLIS: More than four days.

MR. NICHOLS: That's correct.

MEMBER WALLIS: Probably months or something.

MR. NICHOLS: In that range.

MEMBER WALLIS: I don't remember.

MR. NICHOLS: In the range of a month to months.

CHAIRMAN DENNING: Any other questions?

MEMBER LEITCH: Is the 96 hours enough time to finish the collection and analysis of the data? In other words, as a prerequisite to moving the next five percent incremental is there some sort of review of the data that you've collected at the current -

MR. NICHOLS: Absolutely. In addition to the review of the data, the analysis of it which would included vendors if necessary. We also have constraints placed on the power ascension that each level must go back for review before we go to the next level and actually requests permission of the General Manager of Plant Operations to go to the next step.

MEMBER LEITCH: Is the Plant Operations Review Committee or the Offsite Safety Review Committee involved in that decision or recommendation to proceed?

MR. NICHOLS: Depending on the results of the tests, in addition we will be providing the results of the steam dryer to the NRC for their review as part of the license condition.

MEMBER LEITCH: But what about your internal review though? In other words, do you internally say it looks okay and we can go to the next five percent? What's the decision making process in that? Is the Plant Operations Review Committee or the Offsite Safety Review Committee involved in those decisions?

MR. NICHOLS: I'd actually like to ask -- I don't have the exact answer to that. I know it's not the Offsite Review Committee. They are required to approve the initial test plan.

MEMBER LEITCH: The plan, yes.

MR. NICHOLS: But the actual individual results, I think it depends on the results. I would have to clarify that for you.

CHAIRMAN DENNING: You can come back to that if there's nobody that wants to answer now.

MR. NICHOLS: I would like to ask Mr. Dreyfuss. He has the answer.

MR. DREYFUSS: John Dreyfuss, Director of Engineering. We will use our Onsite Safety Review Committee at each five percent plateau to review the results of the testing performed within that window of that plateau. Then we submit after we have satisfied ourselves that data to the NRC for the 96 hour hold period at which time they do their review of that information.

MR. HOBBS: For the steam dryer.

MR. DREYFUSS: For the steam dryer is correct. Thank you.

CHAIRMAN DENNING: Okay. Let's now hear from the staff then. Thank you.

MR. PETTIS: Good morning. My name is Robert Pettis. I'm a Senior Reactor Engineer in the Plant Support Branch which is within the Office of Nuclear Reactor Regulation.

Just a little background, the Plant Support Branch is the branch that's responsible within the staff for the review and coordination of the EPU application. We elicit the support from the secondary review branches which were discussed a little earlier and which provide input to the safety evaluation report and the secondary review branches provide us input to insure that the structure, systems and components will perform satisfactorily in service in their area of review.

As stated previously, we provide or

perform our review in accordance with the Standard Review Plan, the SRP 14.2.1 that contains the guidance to the staff in order to prepare a comprehensive safety evaluation of the EPU application. The SRP is part of the staff's review standard for power uprates which was mentioned earlier which is Review Standard 001.

Within the Review Standard, the EPU test program as stated should include sufficient documentation to demonstrate that structure, systems and components will satisfactorily perform at the requested power level. The staff guidance considers the original power ascension test program, the EPU related modifications with respect to making its safety determination.

The staff guidance acknowledges that licensees may propose alternative approaches to testing with adequate justification. It's Section 3(c) in the Standard Review Plan that basically was discussed a few minutes earlier in which there are some factors that are listed there, operating experience, risk margin analysis, that licensees can in fact review to see if they can justify an approach that would not require the performance of the large transient test. This supplemental guidance is provided in the SRP and is used by the staff for their review.

The large transient testing that was discussed a few minutes ago, basically they were talking about main steam valve and generator load reject. Just as a point of history, there are many large transient tests that were performed within the original plant design at least for VY back in the '70s.

But the MSIV and the generator load reject, those were two tests that were originally called out by General Electric in the ELTR-1 and ELTR-2 documents. It was because those two tests were called out in the document and they were a proposed test back in that timeframe. They somewhat took on a category bowl all by themselves. So again, there are many other tests that could be considered large transient tests and we happen to focus on those two in particular.

MEMBER SIEBER: It's my recollection that General Electric did not withdraw its recommendations for those tests in topicals. Right?

MR. PETTIS: If I can recall back in the early CPPU days when the staff was reviewing the CPPU applications or methodology, the original ELTR-1 had those tests as part of the power ascension test program. To my knowledge, I don't know if it physically was ever removed. I think there was discussion between GE and the staff with respect to based on operating history in the 1995-1998 timeframe with the KKL and the KKM plants and industry experience that GE had at that time that there was no need to reperform those particular tests.

Applications that came into the staff pretty much incorporated that information because they were basically all BWRs that were coming in for review. So I don't think there's a formal document that basically removes the requirements. However, the staff in its approval of the CPPU topical report does have mention in there that we did not grant blanket approval across the board for licensees to eliminate large transient testing. They had to come in on a plant-specific basis and we would judge the merits of that basis.

MEMBER SIEBER: It would seem that matters would be much simpler if General Electric believed that these tests were unnecessary that they would revise their document to so state that and then we wouldn't even have to talk about it perhaps.

MR. PETTIS: Perhaps. Right.

MEMBER SIEBER: Yes, that doesn't require an answer from you.

MEMBER LEITCH: So the tripping of the condensate pump and the reactor feed pump do not qualify as a "large transient test."

MR. PETTIS: I have Steve Jones from Plant Systems Branch who will be doing the plant systems presentation and the reason the two of us are up here is because both of our areas have overlap with plant systems being one of the secondary branches.

MEMBER LEITCH: But my question is just a semantic one.

MR. PETTIS: Yes. Exactly.

MEMBER LEITCH: I'm saying when we're talking about the issue with large transient tests we're primarily talking about tests which would result in a tripping of the plant.

MR. PETTIS: Yes. The reason that I wanted to just carve those two tests away from everything else that we've been discussing is the fact that they originally started in the GE document as large transient tests and through history, they have taken on a life of their own when in fact the large transient tests are nothing more than other power ascension tests that licensee perform back in the original start-up days.

MEMBER LEITCH: I had one other question. It seemed to me I read in the SER that at Vermont some large transient test had been performed at the 75 percent plateau, originally I'm speaking about, but the original intention was to perform them again at 100 percent. But for some reason, they were either not performed or the data was not submitted to the NRC. Could you refresh my mind on that?

MR. PETTIS: Yes. Basically what that was is at least I wasn't involved back in the '70s but from what I can --

MEMBER LEITCH: I'm just trying to recall what the SER said.

MR. PETTIS: Yes, the SER basically restated information that we had from the licensee that most of these tests, the power ascension tests that were required at plant start-up, all followed Reg Guide 168 requirements and the intentions were to perform these tests at 100 percent power, not all but most of the high level power ascension tests. I believe in the case of Vermont Yankee back in the '72 timeframe in reaching or in ramping up to the 100 percent level one of the tests and I'm not exactly sure which one it was had to be suspended at about 72 percent power. I believe the reason had to do with fuel hydriting issues.

There's a requirement I believe in the FSAR that basically talks about the performance of these tests and that a report would be sent into the staff. All I can say in many cases the staff has given relief to plants that they did not have to reperform some of these tests back in the early days at the full 100 percent.

MEMBER LEITCH: So are we then taking the position that subsequent operating experience has basically negated the need for those tests?

MR. PETTIS: Yes. The submittal from the licensee has a lot more supplemental information and historical information that would not require going back and reperforming that test. But I believe it was an FSAR requirement to submit a report to the staff and I think it was within one year of the test. Again, I think it's common knowledge that many plants have been given waivers so to speak in the past for not completing the 100 percent level. This one falls pretty much in the same category.

We did not use that particular one as any means of making our safety conclusion with respect to the elimination of those tests. We ask most licensees under the SRP to submit the original tests that were performed when the plant was constructed and in most cases, we review those tests just to see what the test was, what the test was trying to achieve and then we look at tests that are basically performed at the 80 percent level which is more representative of operation at 120 percent, the key being you would have a much more meaningful test at 80 percent power than you would at 20 or 30 or 40 percent. But the SRP relies a lot on operating experience and other information that the licensees can submit in support of justification for not doing the test.

MEMBER LEITCH: So let me paraphrase then that although the last formal start-up test program, the tests were performed at a maximum power level of 72 percent of the original license power level. That's the last document it tests. But subsequent years of experience including those two trips that Mr. Thayer described earlier and several others I'm sure have in effect demonstrated the ability of the plant to withstand the transient.

MR. PETTIS: Yes. I would probably go back and look at the '72 tests as more an administrative issue with respect to VY compliance with sending the start-up test report to the NRC although that's just my opinion. I wasn't involved in it back then.

MEMBER LEITCH: Okay.

CHAIRMAN DENNING: I'm still interested in this cost benefit tradeoff that you do here in terms of whether to allow exemption from those tests or whether not to and what you perceive the downside in safety is of the tests versus the potential benefit of performing the tests and indeed whether there's any circumstance for a power uprate where you would say I have to have a large transient test.

Can you give me a little more feeling as to that tradeoff there? Do you see that going through an extra trip as being a significant safety concern that you would say I don't want to do that and I don't have enough positive on the side of performing the test? Does that sound logical?

MR. PETTIS: I guess there are two sides to that. There's probably the plant side that is looking at the tests and for the explanations that we just saw a few minutes ago, talks about challenges to the plant and challenges to the safety systems and so forth and so on and I'm sure there are other components of why you wouldn't want to do certain tests.

Of course, there are time factors and expense and what have you and it sounds like there's an analysis bounding event that basically precludes the need for actually doing the test. You might check a few hangers loose or pull some hilties out of the wall.

I think in the staff's opinion when the secondary review branches all look at the application and look at the elimination or the proposed elimination of those tests, there may only be six or so of those secondary review branches that that elimination may affect their input into the safety evaluation. We have discussions all the time on the elimination proposal. The staff's general conclusion is based on the operating experience, based on the information that was previously presented by GE based on the staff's previous review of the CPPU topical reports and based on the history of 13 or so EPUs, we've gained a certain threshold, I guess, of sensitivity to requiring that these tests be performed.

MEMBER BONACA: I would like to ask a question regarding those 13 EPUs. First of all, all we have seen is not large transient tests have been performed. Is there an experience at all that events have happened and if confirmed, then it was good decisions?

MR. PETTIS: The licensee -- Go ahead, Steve.

MEMBER BONACA: Because ultimately experience will show whether or not the decisions were correct.

MR. JONES: This is Steve Jones, Acting Chief of Balance of Plant Section. In part, I did want to address the boundary between a stretch power uprate and the extended power uprate. It's more or less an arbitrary one that was founded in a large degree in our anticipation that extended power uprates would involve significant plant modifications.

For the most part, we have seen those extent of modifications with the plants that have come in to-date and in the large extent, it's the justification why we're not looking for more large transient testing and we're only seeing for instance in the case of VY and I'll get to that in my presentation a little bit later. But the scope of modification is really fairly limited and the existing operating experience does provide some information about how the plant performs or will perform.

MEMBER BONACA: I was referring to other

plants which have gone to EPU which did not perform tests and ultimately there will some scram and some load reject and then that would test not only the plant but test their decisions of recommending that the tests should not be done. So I wonder if we have gathered any experience about that yet.

MR. JONES: I have one operational experience piece of information in my presentation if you don't mind waiting until I get to that.

MEMBER BONACA: Okay. I think that's an important thing to look at. At some point a life experience will tell us whether or not we're correct in waiving those requirements.

MR. PETTIS: Actually in the safety evaluation, I believe there are some references in there to some actual operating history. Previously, the licensee had mentioned about their particular pressure transients that took place, one in 2004 but they have submitted a well documented package of other testing and other plant transients that the plant has gone through.

The VY plant is similar in nature to the Hatch Plant, BWR-4 with a Mark 1 containment which we previously approved back a few years ago. Hatch has had some operating experience and has documented this in LERs to the agency. So I guess in 2005 we have probably about a ten or so years worth of historical information that discusses plants that have either had EPUs or have had pressure transient type occurrences and through analysis primarily there's a justification made on the part of the licensees that it correlates well through the 120 percent power range.

I guess one thing to keep in mind too is that most plants are going to have these at some time in their life. They're analyzed usually in Chapter 14 of the FSAR and one could say if that's going to happen maybe we should go ahead and just do them anyway. I just want to caution people to think that just because it's a good thing to do it doesn't necessarily mean that one wants to do it, challenge the plant, go through the extra cost and when one is done, compare it to analytical results that may have already predetermined that the results were satisfactory.

The Reg Guide 168 for original power ascension testing, that's a requirement for new plants. That does not have any bearing on uprated plants. I think when that document was generated back in the '60s probably nobody ever envisioned that there would be plants operating beyond 100 percent power.

So the reason we came up with the SRP to try to get some guidance was really a direct result from the ACRS so that we could have an analogous document similar to what we have in license renewal.

CHAIRMAN DENNING: We're ready to move on.

MR. BANERJEE: I have a question.

CHAIRMAN DENNING: Certainly.

MR. PETTIS: Yes.

MR. BANERJEE: We heard from GE that the Swiss require that in these tests you delve into the stability boundaries whereas we don't. What was the logic for us not asking that it should be done?

MR. PETTIS: That's a question that's way above my head with respect to stability boundaries. All I can tell you is that the information that has been developed since the early '90s with respect to the CPPU and the ELTR-1 and -2 from a power uprate large transient testing issue they have used the results of those plants to further support the fact that operating experience dictates that we feel there is no need to reperform them. With respect to your particular question which is much more technical, I'm not capable of really providing a response to that.

MR. BANERJEE: Well, then do we have experience with any of the EPU approved plans of actually going to these regions?

MR. PETTIS: We have plants out there now that are operating at some other than 100 percent power. Hatch 2, I believe -- Well, no. That was pre-EPU. Hatch 2 had a generator load reject at 100 percent power. I want to say -- I was just thinking back.

CHAIRMAN DENNING: Perhaps we can bring this up at the next meeting and stress that. Let's move on.

MR. PETTIS: Okay. So we just talked a little bit about the large transient tests and they were part of the original test program. The staff has previously accepted justifications for not performing large transient tests which included the licensee test program will monitor important plant parameters, tech spec surveillance and post mods will perform capability of the modified components, operating history at other light water reactors and large transient tests were not needed for code analysis or benchmarking purposes.

With respect to VY, the staff had requested additional information to support the licensee's basis for not performing the large transient tests. The licensee's response for not performing the test was consistent with some of the previous applications that we've received and basically identified factors like again operating experiences, including their own plant specific operating experience, analysis of potential unexpected system interactions, effect and design margin, limited scope of EPU mods, the balance of plant systems.

Steve will discuss more of the impact of that, but most of the EPUs or probably all of the EPUs that we see in order to achieve the EPU, the modifications are basically balance the plant type modifications and don't really result for the most part in any extensive modification made to the plant.

The analyses results bound operational transients and conformance to the previous NRC staff approved GE licensing topical report which we've had a discussion over the years of providing a small discussion to ACRS on.

In summary, the SRP, the 14.2.1 was developed to allow staff guidance and to allow for a licensee justification for performing power ascension tests. And again, large transient tests are basically a subset of the power ascension testing regime. Thirteen domestic have implemented staff-approved EPUs and staff has considered previous plant operating experience and the limited scope of EPU mods.

The conclusion from the staff that's reached in the SE is that the proposed EPU test program with testing required by the license condition for the condensate and feedwater system which was discussed a few minutes ago and which Steve Jones will discuss in his presentation on balance of plant satisfies the guidance in the SRP. That's all I have.

CHAIRMAN DENNING: Thank you.

MR. JONES: Good morning. My name is Steve Jones. I am the Senior Reactor Systems Engineer and the Acting Chief of the Balance of Plant Section in the Office of Nuclear Reactor Regulation. I just wanted to discuss the staff's review of the power uprate related modifications to the plant that affected important-to-safety systems.

The staff focused its review on modifications likely to effect the integrative response of the plant to anticipated operational occurrences. In addition to set point changes, the staff focused on physical modifications effecting important-to-safety systems such as feed pump load suction pressure trip logic, the recirculation runback on a feed pump trip and modifications to the main turbine rotor and control systems. For the main turbine, that focus was largely on protection from postulated turbine missile generation and so it doesn't really have a great impact on a test program.

In addition to the physical modifications, Entergy has proposed various changes to the plant operation including operation of three main feed pumps instead of two operating at full power. However they continue to operate with three condensate pumps in operation at full power. Also the EPU has associated with it a necessary increase in the feedwater and steam flow rates at full power.

MEMBER LEITCH: The sequential tripping of the reactor feed pumps on the low suction pressure, is that just at falling suction pressures or is there a time delay built into that?

MR. JONES: Right. The change to the trip logic involves reducing all the set points and installing a time delay feature at, I believe, it was 98 psiA. I'm not sure if it's psiA or psiG but at that level there would be a varying time delay for each pump. All pumps would likely see the same suction pressure. However one pump would trip after 15 and then 30 and 45 seconds.

MEMBER LEITCH: So presumably the adjustment of that time delay could be determined by the tasks that are going to be performed.

MR. JONES: I guess their focus wasn't really on that time delay feature. We did believe that the time delays were long after the last stabilization. However there was a low, low suction pressure trip at 92 psiA, so slightly lower, that had no sequential time delay feature associated with it. So it would potentially result in --

MEMBER LEITCH: Some at certain low pressure, all the pumps trip.

MR. JONES: Right. All the pumps would trip and the concern, I'll discuss the basis for looking for that test a little bit later.

MEMBER LEITCH: And then similarly the recirc runback, it seems to me that it's not a discrete thing. I mean there's some tunings there, is there not, how fast it runs back, how far it runs back?

MR. JONES: Yes.

MEMBER LEITCH: And those things will be established during this condensate pump trip test and heat pump trip test. Is that right?

MR. JONES: Certainly these tests will allow the effectiveness of that modification to be assessed. We have somewhat less concern with, I guess, the outcome of that recirculation runback. I guess when I'm talking about important-to-safety I'm looking at systems that help meet the general design criteria and as far as whether or not the plant trips, that doesn't really.

MEMBER LEITCH: I guess I'm still a little confused by this. Is the requirement that the plant not trip on loss of the condensate problem?

MR. JONES: No.

MEMBER LEITCH: Is there any such requirement? I mean that's the expectation, the way we would hope to have the system tuned.

MR. JONES: That's Entergy's design. The license condition is on a trip of a condensate pump that at least one main feed pump remain operating to provide continued core cooling from the normal system, to provide defense-in-depth so that every condensate pump trip doesn't cause the safety relief valves to actuate, HPCI to start up.

MEMBER LEITCH: Okay.

MEMBER BONACA: Although these are the requirements if they cause a trip, there would be significant change from the regional licensing of the plant. Right? Because it was designed to have a standby pump and not have a trip and it was a condition. Now you rely on a safety system. So I understand that it may not be a significant safety issue but I think the attempt, the runback, it serves a purpose of maintaining the same kind of approach whereby a trip is not acquired.

MR. JONES: Certainly. The runback will help maintain the turbine as a heat -

MEMBER BONACA: That's right.

MR. JONES: Entergy's plant power ascension test program included as they discussed the measured approach to fully PU power level with plateaus for stabilization and demonstration of normal control system performance during those various five percent increment changes in power and also included installation of an additional monitoring instrumentation.

MEMBER LEITCH: You're asking for a 96 hour hold for your review of that data now.

MR. JONES: No. That is Entergy's proposed hold time. We have nothing I'm aware of in the safety evaluation that addresses 96 hours. That I believe has more of a relationship to the steam dryer.

MEMBER LEITCH: Okay. We'll talk about the steam dryer later.

MR. JONES: Right. However the staff noted there was no licensee proposed transient testing at all. The last one, the Waterford EPU, did involve a 10 percent loadage action test. The staff identified a need for a license condition for transient testing and we'll discuss the details of that a little bit later.

As Bob mentioned, we do look at operating experience and other factors in assessing the need for large transient testing or other transient testing. Industry experience has been favorable with proposed CPU transient response. Generally, the response has been predictable and adequate margins to appropriate safety or limits have been observed in those transients.

The staff has noted one exception. That was the Dresden Unit 3 trip from full power where the vessel subsequently overfilled and allowed water to spill down in their high pressure coolant injection pump steam line. The design of Dresden is a little bit unusual with respect to that steam line in that it's lower than the main steam line and the HPCI pump steam supply taps directly off the reactor vessel rather than coming off the steam line as it does at Vermont Yankee.

MEMBER SIEBER: Do you recall exactly or approximately when the Dresden event occurred?

MR. JONES: I believe it was May 2003.

MEMBER SIEBER: Okay. Thank you.

MR. JONES: I should get into the cause. The cause of that was that the licensee reported that they didn't adequately consider the effect of having the increased upstream pressure from main feed pumps operating as opposed to their previous two main feed pumps at full power similar to Vermont Yankee. So that increased pressure without changing the position of the feedwater regulating valve allowed more water to enter the vessel in the time right after the trip.

MEMBER SIEBER: Filled it up.

MR. JONES: The staff's review of the proposed Vermont Yankee test program considered the plant specific operating experience, applicable industry operating experience and analytical evaluations of plant response and safety margins as described in Section 14.2.1 of the Standard Review Plan. The load rejection that the plant experienced in 2004 and the licensee described in one of their supplements to their license amendment request satisfied many of the objectives of a large transient test of Vermont Yankee in that it was initiated from

80 percent of the post uprate power level or 100 percent of the current license thermal power level and many of the EP mods and all of the mods I discussed as important to safety had been implemented at that time.

Also what we specifically had asked Entergy to address was the vessel overflow of that of Dresden. They provided an analysis and other information indicating that they maintain a significant margin to vessel overfill, part of that provided by the higher location of the vessel of the high pressure coolant injection steam line.

As mentioned earlier, the plant retained a substantial turbine bypass capability and also safety related systems performance had been modeled in the safety analyses and maintained some margin to applicable safety limits.

CHAIRMAN DENNING: Talk to us just a second about the reduction in bypass capability now. I gather you had concluded that it really even though it was 100 percent at the current level, now it's at reduced level.

MR. JONES: Right.

CHAIRMAN DENNING: Tell me again why it is that that doesn't represent a decrease in safety.

MR. JONES: I guess 100 percent bypass

capability is more an economic issue, maintaining the plant operating at essentially full power without the turbine running. What we're looking for in terms of our staff review is that the turbine bypass provide defense-in-depth for residual heat removal capability. So anything above ten or so percent bypass capability would be adequate in terms of safety.

Then also to some extent we're looking at the pressure transient that occurs following a plant trip, but again, that still on the order of 10 or so percent bypass capability is adequate. Here as the licensee indicated, they retained about 85 percent at the uprate power.

As I mentioned earlier, the staff was concerned about the lack of any proposed transient testing at Vermont Yankee and particularly with the respect to the modifications to the condensate and feedwater systems and the interaction between those systems following the loss of a condensate pump. As we've discussed earlier, the staff included a common low-low suction pressure trip for all main feed pumps that would not have a time delay and operating with three main feed pumps in service placed that condition outside the range of previous operating experience at VY. Therefore, the staff decided to add a transient testing license condition for a trip of a main condensate pump to verify that normal feedwater would be maintained following the trip.

MEMBER LEITCH: Is there a turbine driven reactor feed pump for this plant?

MR. JONES: Motor driven.

MEMBER LEITCH: Motor driven. Thank you.

MR. JONES: That does provide, I guess, safety benefit in that they are somewhat more easily recovered.

MEMBER LEITCH: Yes.

MR. JONES: Subsequent to discussing the license condition with Entergy, the licensee had identified a calculational error in the way that the feed pump suction pressure was predicted following the loss of a condensate pump. It had to do with how the recirculation runback was modeled and that effect on reactor pressure reduced available margins and as a result of that identification, Entergy proposed adding an additional modification that was discussed earlier regarding a direct trip of the B main feed pump on the trip of a main condensate pump when all three main feed pumps are running. It doesn't occur in other conditions.

The condensate pump trip test will test

proper integrated response of many of the control systems at the plant including the recirculation runback, feedwater level control systems, reactor pressure control and the feed pump, hopefully actually not the feed pump suction pressure trip logic with the exception of the direct trip of the B main feed pump. The design outcome of this transient is continued operation at reduced power.

The safety benefit in demonstrating a proper transient response of those systems and maintenance of the normal heat removal function for defense-in-depth, the staff believes justifies the operational impact of the test.

In conclusion, the limited scope of testing for the power ascension testing is supported by industry operating experience, Vermont Yankee specific operating experience, maintenance of the acceptable safety margins and the limited scope of modifications that were implemented at Vermont Yankee to support the power uprate. The license condition specifically transient testing of the feedwater and condensate system is supported because the physical modifications effect that interaction directly and the interaction could occur outside the bounds of current operating experience. That concludes my presentation.

CHAIRMAN DENNING: Questions? I think lunch is there and we will -- For sure, no other questions? We will now take a break until 1:00 p.m. and at that point, we will hear from the public. Off the record.

(Whereupon, at 11:53 a.m., the above-entitled matter recessed to reconvene at 1:00 p.m. the same day.)

MR. MULLIGAN: Hi, I'm Mike Mulligan. And I drive to a lot of New England cities. I'm going tonight as a matter of fact. I'm going to Brooklyn. I've been all around New York and Maine. I was in Maine this last weekend. All through Vermont and New Hampshire. I've seen millions of people. I've seen a lot of these big cities and from the nighttime, I've seen the sprinkling lights and stuff like that. As I said, I've seen especially millions of people.

And we have one hectic of a responsibility. When you start looking at all the electricity, we have to provide for the public. We also have a lot of people that are poor and are middle class and they're suffering terribly. Energy prices are skyrocketing and incomes are stagnant and stuff like that. There's a big certain about being able to afford electricity.

We have problems with natural gas and supplying electricity this winter. So a lot of times, you sit back and you say what's going on with the management of our country. What's going on with the management of our grid? How come our politicians can't work for us and come up with a lucid idea of what's in front of us and organize the people and the country in order to be able to take care of our concerns and stuff like that.

It's a big problem and to sit there on the NRC. I've talked a lot about we should look at our mistakes of the past instead of blaming it on over regulation. Senator Frist today or yesterday talked about blaming the troubles with the industry on over regulation. I said you ought to look at ourselves and how we drove the industry in such a terrible direction.

If you think about if we didn't have some of these big accidents, didn't lose the public trust and stuff, the way I look at it we would have had an industry today that we would have gotten rid of a lot of our old plants. We would have probably in the early years around the TMI time we would have probably slowed the industry down. Our politicians would have had to put their foot down and they would have had to say we have to maintain some standards and they might have had to slow down the industry quite a bit. But the outcome would have been we would have by now gotten rid of a lot of these old plants. The average age would have been a lot less today. They're quite old nowadays and stuff like that.

You start looking around. The roads, the electric grid and stuff like that, you start looking around and all that stuff is about at their end. They're obsolete and stuff like that. So that's my big concern which is as far as the country, we don't seem to be able to think about the future and just to sit there and have the most modern components and we have a lot of bright people, a lot of educated people and we just don't seem to be able to, somebody doesn't have the vision of being able to express a beautiful future for us.

It bothers me a lot that we don't think about all the children and the families and the mothers and the kids. We can't somehow politic out a better future for all of us. I think we're coming down to a time where we really have to figure that out. We really have to do that.

You look at energy in front of us. That's a big problem and I really hope you guys use the best of what you have in your heads in order to help us out. Thank you.

CHAIRMAN DENNING: Thank you. Nancy First.

MS. FIRST: Hi. My name is Nancy First. I live in Northampton. That's 31 miles from here. It's in the red zone. I live in the red zone. That's 31 miles from here as the crow flies. And I call you friends because that's the name that Quakers call each other.

I was led to be here by my friend, also a Quaker, Nancy Nelkin, who will speaking after me. And my intention is to say this thoughtfully and lovingly. Do any of you live within the danger zone of this plant? Do any of you live within the danger zone of any plant?

MEMBER WALLIS: How big do you define zone living?

MS. FIRST: Say, 100 miles.

CHAIRMAN DENNING: Yes. I don't think anybody in this panel would necessarily think that 100 miles was the danger zone.

MS. FIRST: What do you call it? What would you call it?

CHAIRMAN DENNING: Ten. I would consider

ten to be the danger zone.

CHAIRMAN DENNING: I'd say that that's true of Chernobyl too.

MS. FIRST: The water is another thing and the way the storage happens. If you live within the danger zone as you define it, then you may be understanding the concerns of the people in this room. And if you cannot understand this concern, then I ask you to resign. Thank you.

CHAIRMAN DENNING: Did you say that Nancy Nelson was going to speak? I missed that. It was a name that wasn't on our list.

MS. NELKIN: It's Nelkin.

CHAIRMAN DENNING: Nelkin?

MS. NELKIN: Nelkin.

CHAIRMAN DENNING: In any event if you going to speak, why don't you come up now and then you can introduce yourself?

MS. NELKIN: Hi. I'm Nancy Nelkin. I'm here from the Northampton area. I'm also a Quaker and I think that the ten mile radius is a mistake. I don't think that's nearly enough to consider effects of a serious nuclear accident. I don't know what you're considering when you say ten miles radius. Can you actually clarify that?

CHAIRMAN DENNING: I'm not sure we want to get into the details of that. Let me just say that I think all of the members of the advisory committee that are here recognize how sincerely concerned that you are and I think that we understand that what faces us is a very important decision and how much it affects the people here particularly their perception. It particularly brings it to us when we see mothers appear before us as they did today and stated their concerns. So with regards to do we understand the concern that you have, I think we do.

MS. NELKIN: Okay. I'm not a scientist. I feel like you are scientists and you understand the technical aspects of this. There's certainly a question of has this experiment ever made any sense knowing how long radioactive half-lives are and the nuclear active waste that we have in our environment as a result of nuclear power. I don't think nuclear power is nearly the only answer. I think if we try to railroad nuclear power as being the answer we're just not thinking creatively.

We have a quote in the paper recently saying that there's no actual need for another 20 percent, for this nuclear reactor to go up another 20 percent. That's a big question to me. Why are we doing this? Just because it's convenient for Entergy who their corporate offices aren't here.

I think that the people in the area -- I feel like the public concerns have not been taken very seriously. There was an inspection by five engineers. I believe three of them were NRC engineers that evaluated only one percent of Vermont Yankee's safety significant components. It had eight violations.

I don't see how you can uprate 20 percent and not do a more thorough investigation than that. I also feel that it needs to be an independent investigation. We have a real feeling that the fox is in the henhouse and that our public concerns are not being taken seriously by the people who are making decisions. I think it's a good idea for there to be radiation monitors all around the area because I don't think that Entergy has been straightforward with all the information.

About a year ago, taking this from an Associated Press article, there was a report, calculations cited in a recent federal report saying it would take 21 minutes for the technicians to shut down the reactor and if the plant's request to boost power by 20 percent is approved, 21.3 minutes for the much-feared core exposure to occur. That's a margin of 18 seconds. Eighteen seconds margin of error.

I mean we're talking about human beings. We're talking about equipment that can malfunction. Somebody said in defense of it at a meeting I went they've increased it by a couple minutes. Well, a couple minutes isn't enough. We need to be reassured that there will be safety in the event of a serious accident and I just feel like there is such a belief that science can solve everything or there is a sense of invulnerability that Chernobyl like things can't happen here.

I don't feel like the public's need for safety is being taken seriously. I guess that's where I'm going. That's not our only option. I understand that there's a plant in Colorado that has been redesigned to work on other kinds of fuel and not nuclear fuel and I just think that we haven't begun to put the energy into developing other alternatives and we need to do that. I guess the bottom line is we're counting on you guys to make the right decision and to protect the public safety. I thank you for listening.

CHAIRMAN DENNING: Ischa Williams please.

MR. WILLIAMS: Hi. I just got here. I wasn't here when you introduced yourselves. Is there one of you who's in charge?

CHAIRMAN DENNING: Yes, I'm in charge.

MR. WILLIAMS: Okay. Richard Denning.

CHAIRMAN DENNING: Denning. Right.

MR. WILLIAMS: My name is Ischa Williams. I live with the ten mile zone around Vermont Yankee. I have a question for you, Mr. Denning or for any members of your panel which is is it true that if you took all the money that Rapar (PH) has now spent on Vermont Yankee and spent it on energy conservation instead that we would save more electricity than Vermont Yankee generates and create more jobs and by energy conservation measures, I mean things like more efficient light bulbs, refrigerators, other appliances, better insulation, so on.

CHAIRMAN DENNING: Let me do just what a politician would do on Sunday in getting a question like that and that is to say that I'll answer the question I want to answer which is that our job here is to look at the safety of what's being done. That's our whole job. We're not involved in anything to do with economics or things like that. What our charter is to provide an independent assessment of will this uprate lead to safe condition for the people that live in the vicinity of the plant.

MR. WILLIAMS: In light of the fact that

energy conservation like more efficient light bulbs I don't think pose any real significant risk to large numbers of people in terms of their safety and yet Vermont Yankee, I think everybody agrees that there is some risk to large numbers of people's health and safety. If what I said is true and there are numerous studies that show that, then why isn't that relevant to your calculations?

CHAIRMAN DENNING: I'm going to break a rule that I shouldn't break and that is get involved with the discussions here, but every source of energy has risks associated with it. There have been a number of studies that show what those risks are. If you look at coal, you look at any source, solar, wind, any source, there are risks associated with it. Nuclear also has risks.

I understand your particular concerns because your risks aren't shared broadly across a broad area like others are. But all forms of energy have risk and the evidences that nuclear is one of the smallest sources of risk.

MR. WILLIAMS: Thank you.

MEMBER WALLIS: Conservation also has risk. If you're going to be climbing over your house, putting windows on and so on, then there are various accidents which can happen there too. So nothing is really without some risk. But we need to know what that risk is if we're going to make evaluations.

MR. WILLIAMS: I'm sorry. I didn't catch your name.

MEMBER WALLIS: It's fallen off the table. I don't know myself.

CHAIRMAN DENNING: It's fallen off the table. Dr. Graham Wallis who happens to be the head of the overall advisory committee.

MR. WILLIAMS: Thank you.

MEMBER WALLIS: Now I know who I am.

CHAIRMAN DENNING: The next is Elizabeth Wood.

MS. WOOD: Hello. Thank you all for coming here today. I can very brief. I live nearby and I just want to add one more voice to all the people who have been saying please don't take any additional risks with our safety. We would like you to deny the power uprate. Thank you.

CHAIRMAN DENNING: Thank you. Fred Bacon.

MR. BACON: I'm Fred Bacon from Williamsville, Vermont and that's about 15 miles from the power plant. I'm old enough to remember when the nuclear industry started and the promises were cheap energy, so cheap that it wouldn't even be needed. That turned out not to be true. At that same time, no one explained about the waste.

Now many, many years later, we still have all of this toxic waste and we don't know what to do with it and it's not like it's a new problem. It's a very old problem. I think it's really terrible to have an industry that just creates this toxic waste that will be left forever it seems like.

So I have many concerns but my greatest one is the fact that we have all this toxic waste and I don't know how I can explain to my children or grandchildren why we're permitting this to go on. It seems like insane to be creating all this terrible waste and then saying let's operate it by 20 percent more and produce even more waste. A terrible thing I thing. I know it just boggles my mind. It doesn't make any sense at all. Thank you.

CHAIRMAN DENNING: Bill Congleton.

MR. CONGLETON: Hi. Thanks for coming out. Look around the room. We have the windows covered. How many lights are on in here? We pay 12 cents a kilowatt hour for electricity and that's cheap. I can take my circular saw and cut about a mile long 2" X 4" for 10 cents. So I think electricity is pretty cheap and I think what we have in America is a problem of people using too much electricity or too much energy in general.

I'm not a good public speaker. Let me see if I have the deal straight here. Vermont Yankee made a deal with the people of Vermont presumably with representation of people downwind in Massachusetts and New Hampshire back when the plant was built. Now Entergy wants to increase the amount of energy produced. My deep belief is that we don't need more electricity. We need to use less electricity. This is an example of the kind of use of energy in America. We waste it. We need less electricity.

Entergy wants to increase the plant's productivity, increase the amount of nuclear waste to store in their parking lots. And what do the people who live around here get in return? Nothing. Thank you.

CHAIRMAN DENNING: Glenn Letourneu, Jr.

MR. LETOURNEU: Good afternoon. I had originally planned a speech to give to you folks when I got here this afternoon. But after being here for about a half an hour, 45 minutes, maybe an hour, I'm not sure exactly how long I've been here, it occurred to me that I don't think you're really listening.

Now for what that's worth what I mean by that is earlier I'm not exactly which one of your gentlemen but one of you said, I believe it was the gentleman back there came up. You don't care about the economics of things. All you care about is the safety.

Well, all the people in this room who don't work for Vermont Yankee, we're not nuclear engineers. We're not physicists. I couldn't build a house. I don't even know algebra. Most of these people are not qualified to make these decisions.

What you're hearing from these people is emotions and that has nothing to do with safety. So if you're telling me that the only thing you're listening to is safety related things, then you're not listening to everything that these people are saying. All you're listening to are the Entergy people in this room because those are the only people whose opinions you really care about. At least that's what I'm hearing.

Now correct me if I'm wrong, but that's what I'm hearing. If that's the case, then this whole meeting is a farce and there's no point. So you can tell me all you want that there are inherent dangers with other types of energy and I'll agree with you, yes. Coal creates a lot of really nasty stuff, a lot of particulate matter, a lot of nitrous oxides and all kinds of other chemicals that I don't know the symbols for or any of those things.

But that stuff isn't going to still kill me if I walk near it in 100,000 years, not that I'll be here but if I would be here. It just makes no sense. We have enough lethal radioactive waste not 20 miles from here to kill everyone in this state, maybe everyone in New England. And you want to approve 20 percent more because everyone in this room isn't qualified to give you counters to safety approvals.

No one in here who is going to come up here and speak today is going to be able to say that safety is wrong. Maybe this guy here could because I know he has some nuclear experience. But I can't and about half the other people in this room can't. So I think you're making it awful unfair for people in here by your assumptions.

I guess the last things I'd like to say, I think that when this gets approval because I believe it will and when the plant blows up because I think it will, the ten miles that you think is safe is going sneak right up on you because I think you'll find that 100 miles even is going to be a little bit too close to be living next to that plant. Thank you.

CHAIRMAN DENNING: Is there anybody out there at the moment who has not had a chance to speak that would now like to speak? How many? A couple out there? I think we're thinking of taking a break. We have another issue and that is it is our intent to stay here until 7:30 p.m. and if we run out of speakers, we'll probably go into intermittent breaks is my guess.

PARTICIPANT: You found just two hands over here.

CHAIRMAN DENNING: I only saw two. How many are there right now? Two?

PARTICIPANT: But over here.

CHAIRMAN DENNING: Yes. I think we ought to take those two right now. So I was just checking to see how many more were out there right now. What we'll do is we'll probably -- If more show up, we'll probably go to five before we take our next break. So let's take -- How did you want to do this? Sign up or just them?

PARTICIPANT: Take the first person.

CHAIRMAN DENNING: Okay. The first person that raised their hand if they remember who it was or somebody come up.

MS. NESEL: I'll come up.

CHAIRMAN DENNING: Come on up. Come on down and definitely introduce yourself so that the courter can know who you are and I think you want to get your mike down a little bit lower too.

MS. NESEL: I'm Hattie Nesel from Massachusetts and I want to give a map to the committee that I'm part of a citizens awareness network and one of our people made this particular map with Vermont Yankee in the middle. I'm with in about 25 miles range downwind in Ethel, Massachusetts.

I consider myself a downwinder. I'm sure the high cancer rates, thyroid rates and other physical and mental conditions that are abundant in my area are attributable to Vermont Yankee, the water, the air, etc. So I wanted to give this.

There's another piece that we're conducting a survey of strontium-90 in children's teeth. So we're asking people in our area to give us children's teeth as they fall out and we're testing to determine in a more scientific way what we already know about radiation.

I have done a fair amount of reading and this book is chilling. If anybody on these committees hasn't read this book, I think you're remiss in your responsibility. It's called Chernobyl. It was written in 1996. Have any of you read this book?

CHAIRMAN DENNING: Who is the author of that?

MS. NESTEL: This is called the Permanent People's Tribune. It's the International Medical Commission on Chernobyl and there were hearings in Vienna, Austria in April 1996. It's called Chernobyl: Environment Health and Human Rights Implications and the ISVN is 3-00-001534-5. This talks about the lies and the deceptions that surrounded the true consequences of the aftermath of Chernobyl.

There's no reason that Vermont Yankee is not going to be a Chernobyl. There's no reason that we're going to be safe from Vermont Yankee. There's nothing that guarantees us that the radioactive materials, strontium-90, all the different emissions that are coming out of that plant on a daily basis, aren't going to effect us on a very severe term whether it's a terrorist attack, whether it's a human error, whatever it is.

The safety is really an issue. It's a public safety issue and this bears witness to the victims and gives them a long-awaited acknowledgment of their pain and suffering and that is really what we're talking about, very severe pain and suffering. We don't need all these lights. It's true. We really don't. We need to learn to live with the consequences of environmental responsibility and you people have a responsibility to assure us of that.

This is another resource that everybody on this committee should be aware of and should read. Dr. Helen Cauldecott, The Nuclear Danger. You're making a face, sir, but I think that this is a very serious responsible reference. There is no safe radiation.

The last one I want to recommend is Hiroshima in America by Robert J. Lifton, a very credible book, over 300 pages long. Robert J. Lifton is a very credible analyst of particularly nuclear issues and he talks about how the United States population was kept in secret about the development of the Hiroshima bomb and the aftermath of the Hiroshima bomb and we don't want these secrets. We don't want these secrets. We don't want these myths of safety.

I think that there is no real rationale explanation for what's going on down there. To even think about uprating, it's ludicrous, completely ludicrous and irresponsible. I think that most of us in this room are well-read about these dangers and that's why we've taken the time to be here. You can't just keep fooling everybody all the time.

It's like yeah, there were no WMDs and how many people are dead because of no WMDs. Here, there, everywhere, people are suffering for a war that was a lie. We don't want to blown up by the lies of Vermont Yankee. Greed is compelling this uprate and that's all. That's all there is to it.

There is a new work out by Public Citizens talking about these nuclear dangers and it's all here, talking about the possibility of terrorist attacks. I drive up along the New Hampshire side and come over the bridge and see Vermont Yankee. At night, there is nothing else lit up for I don't know how many miles. I drive on a completely isolated road that has no protection at all. There's no guarding for Vermont Yankee. There is none.

You can throw a stone across the river. You can hear people talking that work at Vermont Yankee. Where is the protection? Where is it? That place is not able to be protected. Impossible. Is there anybody here who thinks that Vermont Yankee can be protected against a terrorist attack? There are no airplanes in the air. If terrorist could hit the Pentagon which is supposedly guarded to the nth degree, here in Vermont there is nothing that protects Vermont Yankee. Nothing. You can swim across the river. There is no protection for people.

So this discussion is where is it? Where is the serious discussion that we should be having about energy and terrorism and rubber-stamping Vermont Yankee won't do it. People are now back to getting arrested there. Seven women, seven mothers, have already been there. Another seven are coming and it's going to keep going.

But meanwhile, we have children with all kinds of Down's Syndromes. The front cover of this book has a beautiful child with no legs. That's what it's about. That's reality. Thank you.

CHAIRMAN DENNING: We have at least one more speaker out there that wanted to speak. Please come up now.

MS. RUSSELL: Hi, everybody. My name is Lynn Russell and I want to thank you guys for coming also. I'm going to trust that you really are listening to us or else you wouldn't be here. I really hope this is not a show-and-tell kind of game. This is important.

I live within the ten mile danger zone that the committee has identified. I live there with my daughter and my granddaughter who's three. I want to see my granddaughter grow up. Doctors have told us, scientists have told us, that we cannot determine who is going to get sick living in a radiation zone and we who live near a nuclear power plant live within a radiation zone. But they can tell us how many people will get cancer and how many people will and do get leukemia. It's happening.

I want to ask you guys if you drive an automobile that's 30 years old. One. Two. And how many times do you have it inspected for safety? How often do you have it to the mechanic? One time. Once a year?

Is the nuclear power plant inspected once a year for safety? What I heard was that safety inspection was done that covered one percent of safety concerns. I'm appalled to learn that, absolutely appalled.

I drive a used pickup truck. I bought it last summer. It's a 1992 Dodge but it only had 58,000 miles on it. So I thought it was basically a new car. It had just gotten broken in. I had new brakes put on the front. I had a new muffler put on. It was in good shape. Last week, I found out that the wheel cylinder in the rear wheels was leaking fluid into the wheel and all over the brake pads.

MEMBER WALLIS: You don't have a resident inspector in your car. Vermont Yankee has a resident inspector who is there all the time.

MS. RUSSELL: Yes, and what I understand is there are lots of cracks, there are lots of concerns and for a safety inspection to happen that covers only one percent of the safety concerns in a nuclear power plant, I'm appalled.

You're right. I don't have. I am the safety inspector of my car. I chose not to drive that car until the brakes were fixed. What I'm hearing is that Entergy is choosing to go ahead and drive the 30 year old car without fixing the brakes and without checking the rest of the safety systems in the vehicle. The nuclear power plant is a much more dangerous vehicle, a much more dangerous entity than my car.

My car could kill me, could kill my neighbors in a small crash. A crash of that nuclear power plant is going to kill lots and lots of people. I do believe that the danger zone goes well beyond a 100 miles. But for you all to sit here and tell me, ten miles is the danger zone is appalling that you're willing to risk my life, the life of my granddaughter and the grandchildren of all these people in this community for the sake of the almighty dollar is again appalling to me.

It's appalling to me to read that the administration in this state would accept a bribe of $20 million from Entergy to clean up Lake Champlain or whatever that deal was to go ahead and uprate this nuclear power plant that is unsafe. That's appalling. It's appalling.

I want to say shame on Entergy for running an operation that's unsafe, for not going ahead and giving all their documentation, all the information to the NRC that they requested. We just recently had a woman who was suggested to be a Supreme Court Judge unable to follow through and fill out forms and give information. She had to withdraw her nomination. If Entergy cannot give the information requested to the NRC, I don't trust them with a wit. I figure they're trying to hide something.

I want to say shame on the NRC for even considering an uprate of this nuclear power plant that is so old and obviously has not been inspected for safety, has certainly not passed any safety inspection. If eight violations in the one percent were found, what does that extrapolate out to?

Eighty-eight hundred, I don't know. My math isn't good. But it's enough to be concerned that this nuclear power plant isn't going to last.

We are all now living with background radiation that was not present in 1950 before these nuclear power plants were built. The radiation came from all of the exhaust from these power plants as well as the accidents, the meltdown at Three Mile Island, Chernobyl. The radiation didn't stay in Russia from Chernobyl. The radiation didn't stay in Pennsylvania from Three Mile Island. We're all living with it now.

And I have to say shame on the guys who were responsible for just signing off. "Oh, well, it's okay." I don't think it's okay. I don't think it's okay and I will ask you please, I don't care how many times you've signed off on it before, if the NRC is paying you guys to advise them, I wonder if you're going to say to them, "No, Joe. Don't do it" because it's your bread and butter. But I'm really asking you to stand up and do the right thing even though it might mean your job.

I want to say shame on all of you, all of you, who were responsible whether it's this committee or the NRC or Entergy or the government. Shame on all of us who put the dollar ahead of the sacredness of life and that's what this is about. Somebody wants to make a lot of money and at the same time, I have to think they want to wipe out the people of New England because that's what's going to happen. We will become endangered species, endangered people.

If you look at the rates of reproductive anomalies and children born with no legs or people having miscarriages or unable to conceive in the areas close to nuclear power plants, you'll find that it's way beyond the norm, whatever that is, in community where they live with a nuclear power plant. I'm all for nuclear energy if it's safe and at this point, gentlemen, nuclear energy is not safe.

So I ask you to please deny this uprate. Please keep us safe. Allow our grandchildren to grow up. Thanks for hearing me.

CHAIRMAN DENNING: Thank you. Emily Payton. Yes, you're up.

MS. PAYTON: Hi. I'm here tonight but I really rather be at my own work and I spent a lot of my time over the years, probably not as much as everybody, trying to show you that the people of Vermont want to be nuclear free and I'm here because you are barring our right to be nuclear free. I don't feel like you've come here with an open mind. I just really want to tell you what I think of you as people because I really think you are all just stupid.

I'm sorry. I'm not an insulting type of person but you have insulted us with your pretense of nuclear power as a viable solution for anything. It's a curse and there are people who have died in this community already because of it. Do you know what that makes you as part and parcel of this? That makes you part of a murderous industry.

Every day from now on when you put on your socks in the morning, I'd like you to think about the people who have suffered cancers and leukemias. Every morning when you put on your underwear, think of these people and what you have done to permit and promote a situation where people are suffering because of nuclear power.

Our resources have been squandered in nuclear power. We could have spent billions on renewal, on things, conservation and you're part of that. You're a bigger part than I am. I'm done.

MR. KELLY: Thank you very much, sir. My name is Justin Kelly. I'm from Northfield, Massachusetts. I'm kind of new to the area. I've lived here my whole life. Went to college. Moved back here. Came back from Boston. And really became familiar with these topics that we're discussing today in the past five days. Sonny Miller of the Trap Rock P Center has enlightened me to the reality in which I'm living in and in those five days just looking from the safety point of view that you speak of, not looking at the economics.

I studied economics in college. I could probably do some studies on that. But all I've had the chance to do was look at that safety. In those five days, I've been able to make the conclusion that it's too difficult to increase that power and put all these brilliant, beautiful people, brilliant, beautiful trees and being and whatever else may exist at harm's way.

If I can do that in five days, I hope that you've taken more than five days, probably a total of 24 hours. I've done research on this and I hope if you really listen to what these people are saying, then you'll be able to come to the conclusion that I have and if you aren't, then you didn't listen to them. That's pretty much all I wanted to say.

I also just want to say thank you to Trap Rock and the New England Coalition for putting out this literature. I hope you guys read it. My sister just bought a house in Northfield, just down the street from us, and this was done about a month ago and I just had a baby goddaughter born and this was the first idea of fatherhood or having something to live for that I've ever had in my life. I'm not a father or grandfather like some of you guys but I don't want to add this to the plate to have to tell her when she can comprehend that you guys made a decision to put her life in harm's way by increasing the production of a power plant that is just painfully obvious not ready to have this increase. So that's all I have, but thank you and please make the right decision.

CHAIRMAN DENNING: I'd like to Greenaugh Nowakeski. Is Greenaugh Nowakeski here?

MS. NOWAKESKI: You did quite well with my name. Greenaugh Nowakeski.

CHAIRMAN DENNING: Sorry.

MS. NOWAKESKI: No, that's quite all right. It's not an easy one. Gentlemen, public, I likewise spend a good deal of time reading, educating myself and speaking to the public about the issue of nuclear power which concerns me. And a lot of times I hear people say, they don't want to hear what we have to say. They're not interested.

Now why is that? Why as a regulatory commission whose function is to protect the public does the public feel on protected? Why do they think that? Perhaps it's because you hold meetings during work hours. Perhaps it's because there's no sign out on the Quality Inn saying "Come and talk to the NRC. We want to hear what we have to say." When the stamp collectors come, they put the sign up. Why didn't you ask them to make sure that people who don't read the newspaper or didn't get a piece of paper from me why didn't you put a sign out there?

Now some of us go to your website. Right? Title 10, Code of Federal Regulations, Section 2.206 refers to procedures for improving or imposing requirements or modifications, suspensions, revocations of license or for imposing civil penalties. I see a nod of agreement. This is a regulation some of you are familiar with. Good. We're on the same page.

But why is it then that in the Part B of that section, .206, that any person can propose a concern. That whenever the public requests something to modify, suspend or revoke a license or for any other action, why is it that when the public makes a request that 98 percent of the time it's denied, not even considered. You just get a little letter back. Right?

Now I can imagine that some of those requests are not well researched or well presented. But 98 percent of them, do you think the public has nothing better to do? Really. We live in a nation that holds leisure time and recreation at a very high cost and this, gentlemen, is not high on my list of fun things to do. Why is it in the same section of your regulations that whenever a nuclear power plants applies that 98 percent of the time these requests are requested? Something seems a little skewed there.

I want to discuss another issue which has to do with employee protection. I've never been to the nuclear power plant. I would be not a good person to say I think there's something wrong with your plant. I can read stuff but that's second hand. I think employees, people who are in the plant, who are pushing the buttons, maintaining equipment, leading monitors, watching things over a period of time, aren't they the best people to point out there's a little problem, there's a big problem?

Why is it that in Section 50.7 under Employee Protection which prohibits retaliation on whistleblowers that over and over again an employee who brings to the attention of his or her manager that there's a problem almost in all cases soon they will lose their job or other actions which make it very dangerous for that person's well-being? Now mind you. Most people really need their jobs. They really do. They have a lot of responsibilities to meet and perhaps you're in the same boat. Employees should receive adequate protection.

I say to you I echo much of what I've heard so far. I haven't been here a long time. I'm very concerned that the Nuclear Regulatory Commission does a good job. Your website has great banners, public involvement. There's even a cute little section that says "Schools and teachers, yeah." Right?

But when it comes right down to our safety, I don't think you're doing your job and I don't mean any disrespect. But I mean that very sincerely. And pretty soon, we're not going to leave it in your hands. We're not going to say the government will take care of us. We trust the government. I think your grace period is soon over. The public is getting smarter. The public is getting informed.

And the public knows that the NRC and

other regulatory commissions not to just pick on you guys is really kind of a revolving door for industry. All right. I won't modify what I'm saying. Gentlemen, I don't see any women here. So I can say gentlemen. Think about it when you put on your underwear and put on your socks. Radiation has not safe level of exposure. The National Academy of Sciences has finally published this. Many scientists have known this over the years. There's no safe level.

When the previous woman said now there's background radiation that there wasn't before and you guys go, "Oh, no. That's not right. There's always been background radiation." Well, yes. There has always been background radiation but now it is higher. It is measurably higher. Even children who are not born within a 10 or 15 or 50 mile range of nuclear power plants and not just human children, plant, animal, etc., are exposed to a higher level of radiation all of which in many myriad ways have a dangerous effect. There is no safe level of radiation.

My last point is do not take advantage of the fact that you are regulating an industry whose toxic waste is invisible, does not taste like anything, does not smell. We could all be being irradiated right now and we wouldn't know it because you cannot see it, hear it, touch it or smell it. You can only measure it with special equipment and the public easily, all of us, would rather forget about things that aren't visibly dangerous to our face.

If I threw something at somebody, they would recoil. But we can't respond to radiation that way. Don't take advantage of us. Think of me. Think of us when you put on your briefs tomorrow morning.

CHAIRMAN DENNING: Thank you. We are now going to take a 15 minute break. Off the record.

(Whereupon, the foregoing matter went off the record at 4:59 p.m. and went back on the record at 5:16 p.m.)

CHAIRMAN DENNING: On the record. We do have another speaker who was ready to speak. So if everyone would sit down please. The next speaker is Kevin O'Donnell. Is Mr. O'Donnell here?

MR. O'DONNELL: Are there ten speakers?

CHAIRMAN DENNING: No, we're down to one.

MR. O'DONNELL: So how much time do I have, an hour?

CHAIRMAN DENNING: Five minutes. No.

MR. O'DONNELL: I'm Kevin O'Donnell. I

live in Dumerston. I'm a math teacher, not a public speaker. So please bear with me. I'm also shocked that I walked in here and was able to sign in and be the first one to speak. So I'm not fully prepared.

My wife and I moved to Dumerston about 20 years ago. We knowingly moved within the magic ten mile radius of Vermont Yankee. In fact, we're at about the 9.8 mile mark and on the shore of a lake which the other shore is two-tenths of a mile away. So we're good. We can canoe across there in four minutes flat. That's our evacuation plan.

I've been okay with that plan for all this time knowing or thinking that the NRC and the people who have chosen to decommission nuclear power plants over the course of 30 years and so one knew what they were doing and that a silly evacuation plan, a bad evacuation plan, would probably be okay and we'd probably get away with it.

Now there's talk of the uprate. There is talk of an extension of time. As a math teacher, I do know that if you take something that's working at capacity and you add 20 percent to it, you more than add 20 percent to the risk factor. You might add 100 percent to the risk factor. So I'm a little bit nervous.

If you can imagine we have acquired two sheep and six chickens that complicates my evacuation plan considerably. But this pales in comparison to what's going on at the high school. We had an evacuation plan that as it became more likely that Vermont Yankee was going to get its uprate or go through that request the teachers started pushing for our administration and the powers to be to actually practice our evacuation plan.

The first year that we got assurances that we would try the evacuation practice plan, it didn't happen because the manager of Laidlaw had a long term illness. So we couldn't do the evacuation practice. I would like you to think about that. Another year came by and when we tried to practice, there was a miscommunication and not all the buses that were to come from distant lands came to pick the students up and we had to send some students back into the school, off the buses, so the rest of the students could practice boarding buses as if that was what needed to be practiced. We did that.

The third year, and we could only afford to practice this once a year. You never do it twice. The third year came around and there was an intention to do the practice evacuation in May of the year. May came around and Vermont Yankee had another sort of drill going on in May. So we couldn't do the evaluation practice.

Another year we tried. I think one of the four times, it snowed somewhere in New Hampshire. Therefore, buses were two hours late and that one was called a great success. So we have a problem with the school's evaluation plan. It's ludicrous.

I'd like you to picture myself, my wife, two sheep and six chickens in a canoe when you think about the high school's evacuation plan. It hinges on good people coming from outside the ten mile danger zone into the danger zone to sit and wait for people to board buses so they can take us away.

If Vermont Yankee wants to do the uprate, they ought to set up to the line and put together money for a real workable evacuation plan. It could be buses on site with drivers on site so that nobody has to come into the area. Everybody is just headed out. It could be adding two lanes going north on Highway 91 to get out here. It's an expense but it might be in fact the true cost of nuclear power.

You might ask for a railcar with one engineer and 30 cars to get us all out of there in a real fast, reasonable way. It is unreasonable to expect that people from outside the danger zone are going to come into a nuclear danger zone to evacuate others. And you're going to leave students stranded. Our children.

I would just like you to think about that evacuation plan and not let this uprate go without something reasonable. What's happening is we're asking our public officials to put together an evacuation plan on a shoestring budget and it's not workable. Thank you.

MEMBER WALLIS: I found that very helpful because we do consider evacuation plans and it's very good to get input from people like you who are on the spot and see what happens in reality when one tries to practice this. That's very helpful. Thank you.

MR. O'DONNELL: Thank you.

CHAIRMAN DENNING: I see there are some new people that have come into the room. Is there anyone right now that would like to speak that has not had the opportunity? If not, we're going to get into a very boring mode here where we're going to go into little suspensions of time. So yes. We have a volunteer. Make sure you give your name.

MR. LEPKOFF: My name is Jessie Lepkoff. I live in Marlborough, Vermont. I'm a father with two children and it's hard to believe that you look out among these beautiful hills with beautiful streams and a beautiful place to live that we're sitting on top of something so potentially dangerous and one of the things that is so important about Vermont is the beauty of the land and the fact that people want to come here to live and to visit. If this goes forward, we're increasing the dangers of an accident. People are going to leave. It will become a wasteland. I'm dead set against nuclear power. I think it's just too costly. The byproducts and the radiation, I'm voting no as a citizen.

CHAIRMAN DENNING: Is there anyone else who would like to talk at this time? Yes, in the back. Before you start, let me also mention again that tomorrow there will be a session in the afternoon for public speaking and that also on December 7th, there will on the 29th and 30th in Rockville is another session of this group that has an open meeting. But of course, it's a little more difficult being Rockville.

MS. NOWAKESKI: Rockville?

CHAIRMAN DENNING: Rockville, Maryland.

MS. NOWAKESKI: Oh, of course.

CHAIRMAN DENNING: And also then the full committee meeting is on December 7th and I wanted to point out that there was apparently in something, a publication, indicating that it would be December 8th. So if there's any intent to have someone come to that meeting, please know that it's December 7th, again at NRC Headquarters in Rockville, Maryland. You can now go ahead and introduce yourself.

MS. ERNST: Yes. My name is Kathy Ernst and I came with no intention to speak. So I have no prepared comments. But I have been a resident of West Brattleboro for the past 21 years. I moved from a community on Long Island four miles from a nuclear power plant in Shoreham Waiting River. So I experienced a community in turmoil there.

But I have a question. As an mathematics educator who worked for the Department of Education last summer as a national consultant, I'm very much aware as I work in schools of the testing that we expose our children and our schools to. My question for all of you is why do we not subject the nuclear power plant to the ultimate test in independent outside safety inspection when we put our children and schools throughout the nation under such scrutiny for issues in which life and death matters are not at stake. Why in the world do we not even consider testing the potential safety of this nuclear power plant before proceeding forward with the plans that we have here or that we don't have but that others have for us? That's all that I have to say. That's my question.

CHAIRMAN DENNING: Thank you. Do you want to go again?

MS. MILLER: Yes.

CHAIRMAN DENNING: Again let me just --

MS. MILLER: This portion, remember I said I had some questions for you and I forgot to ask them.

CHAIRMAN DENNING: Yes. I forgot to tell you that we probably aren't going to really answer them because that isn't the mode that we're in. We're in a gathering information mode.

MS. MILLER: But since the public isn't here yet for the evening session really.

CHAIRMAN DENNING: Yes.

MS. MILLER: There might just be a little opportunity that -- I'm not on the mike.

CHAIRMAN DENNING: Yes, you are. Introduce yourself again for the recorder please.

MS. MILLER: Okay.

MEMBER WALLIS: But we can't tell you why the NRC does something. I don't really think that we are in that position.

CHAIRMAN DENNING: You can pose your questions.

MS. MILLER: Great. I understand you might not be able to answer them.

CHAIRMAN DENNING: And again, state your name for the reporter please.

MS. MILLER: Yes. My name is Sunny Miller. I live and work at Trap Rock Peace Center in Dearfield, Massachusetts. When I spoke before, I thought that I would end with some questions and ask for your answers. The first one that I have is since I believe everyone in the room agrees that we do not and can never have a 100 percent certainty that there will be no meltdown, since we all agree on that, I wonder please if you could describe, a few of you, a plausible human failure that could result in a catastrophic failure. I would assume that at the Vernon reactor the workers have been practicing avoiding those human errors and so they're very well aware of that. I just want to know whether the Advisory Committee on Reactor Safeguards is also highly aware of the human failures that could result in a meltdown.

MEMBER WALLIS: I think we might be

restricted there. I think it would be very inappropriate for us to tell the world how to cause a disaster.

MS. MILLER: I'm not asking that.

MEMBER WALLIS: That's what you're asking really.

MS. MILLER: That's from outside.

MEMBER WALLIS: You're asking how a human being could cause a disaster in a nuclear plant.

MS. MILLER: No, no.

MEMBER WALLIS: I don't think we want to tell the world that.

MS. MILLER: That might relate to an outsider who you wouldn't want to talk about --

MEMBER WALLIS: The insider might be just as bad as the outsider. I don't think we want to tell anybody how to deliberately cause a disaster in a nuclear plant. We would be in great trouble if we did that.

CHAIRMAN DENNING: Right. I agree. I think that you should know though that using these methods of probabilistic risk assessment which is very pervasive in the way we regulate nuclear power plants, we go in great detail into what are all the various ways that things can go wrong and those we study in great detail. Of course, human error is a major participant in that. I guess the thing we can tell you is that we do that. The plant has its own probabilistic risk assessment. The Nuclear Regulatory Commission has its own version of the probabilistic risk assessment which it compares against the one that the plant uses to assure itself that they really have considered all these error pathways and have proper procedures and that type of thing.

MS. MILLER: I'm disappointed because I think that the community would feel assured that the operators and the regulators are on the same page with us in recognizing how important avoiding human failure would be. If no one will discuss it with us, what assurance do we have? I think that rather it would be helpful if we confirmed publicly that the New Year's Day is a risky day, that when people are having family stress and depression that those are important risks that need special attention.

And I have the feeling that the women in the audience are more sensitive to these kinds of issues than the men. So I especially bring them up. I think the guys and I suspect the guys at the reactor do the stoic thing of masking how they really feel and masking what's really going on and pretending to be quite competent all the time because you're supposed to be on days that they aren't feeling fully competent. As a woman, I'm not expected to hide my emotions and pretend to always be capable and professional.

MEMBER WALLIS: One of the things that we consider and I can tell you, you can look at the transcript, that sometimes we give the NRC a very hard time in our questioning about how they treat human failure.

MS. MILLER: So where can we look that up?

MEMBER WALLIS: I can't give you an example. I don't think it would be appropriate to do that.

MS. MILLER: Well, then I'll ask some very technical questions that don't relate to human beings so much. I saw on your website, the NRC website, that the four problems understood to be difficulties especially during uprates are corrosion, vibration, cracking and overpressure.

Corrosion, I heard from a Clamshell Alliance person who is moved on to civic responsibilities and is not much active these days that a biological organism was found to add substantially to problems of corrosion but that the

NRC failed to address this organism because it was a plant and their regulations related to animals not plants.

I would like to know more about corrosion. I would like to know more about vibration. I would like to know about the failure of the cladding when the higher temperatures of the operations of the reactor in some sudden stoppage of the cooling mechanism. Exactly how would the cladding failure? What would it look like? Could you just explain the technical problem not caused by any human beings, just so we have a picture? So you understand we're not here with just worries based on nothing. But we interested in what you know.

CHAIRMAN DENNING: We can't get into these things. They are highly technical issues that we're dealing with. Tomorrow you'll hear more about the overpressure and what the credit is that the plant wants to take for the containment overpressure. You'll get some feeling for what that issue is there. We're going to be going into these other issues, the vibrations related to the steam dryers in our meetings on the 29th and 30th and you could have the transcripts of those things.

For one thing, we're here really to get

information from you. It's not really our responsibility to really try to tell you or try to explain all the technical issues that are behind the deliberations that we have to go through.

MS. MILLER: Is there a forum in which it is appropriate?

MEMBER WALLIS: Something like corrosion has been studied by hundreds of scientists and engineers over many years and it's monitored in reactors very frequently. But it's a whole long story. It would take days to explain it all. There is a tremendous and technical basis on which decisions are made. They're not just made randomly. They're based on a lot of study, a lot of inspection, a lot of calculation and we try to satisfy ourselves that this basis of experience is adequate.

MS. MILLER: So it sounds to me as though the technical considerations are masked for the public since you've explained no avenue for us to access your deliberation.

CHAIRMAN DENNING: No, you can have access to all of our deliberations. They are all going to be in the open record. This record that's being kept here will be kept for our deliberations on the 29th and 30th and then again on the 7th. So you have in front of you what was presented to us and what our critical review of that is and we're going to be critical in our review. There's no question about that. So you do have the opportunity.

MEMBER WALLIS: Every word we say is on the internet and the documents that we read, I think you can get them from the government.

MEMBER BONACA: And every discussion we will have on this issue and our deliberation is public.

MS. MILLER: We haven't all the time that I've been here all afternoon we've heard no website mentioned. So maybe that would be a simple answer about directing us to these technical questions on corrosion, vibration, cracking and overpressure. Do I simply go to your NRC website and goggle it?

CHAIRMAN DENNING: Before you run off, let me just see. How do they get access to the transcript?

PARTICIPANT: Can't hear you.

CHAIRMAN DENNING: I'm sorry. I was asking how to get to transcripts.

MR. CARUSO: The transcripts are available online at the ACRS website and I don't know offhand how to navigate through it to get there but if you type in ACRS transcripts in the search engine it will come up with the ACRS transcripts.

MEMBER SIEBER: Yes. A simple way to do it is to get to the master page, go to Electronic Reading Room. It will ask you what kind of documents do you want and it will be Commission documents, ACRS and so forth. Go to ACRS and it will come up with a list of meetings. You have to know what meeting you're talking about and it will give you the agenda if the meeting hasn't occurred or the transcript if it has.

MEMBER BONACA: It's important that you understand also in part in unwillingness to speak up is that we are gathering information here. As we come closer to December, you'll find that the minutes of our meetings are much more informative because then we can begin to express our own views from the gathering information we get. And I don't think we are ready yet to communicate even among ourselves and certainly not to the public because we haven't come even close to debating what is the fundamental elements of the decisions.

So if you stay all night and you follow the meeting at the end of November, and particularly the full meeting where everybody is there and then the issue is fully open. I mean the issues will be very clear and the debate will be very clear.

MR. CARUSO: I have to correct one thing that they've said so far. The meeting on the 29th and 30th some parts of that we'll discuss proprietary information and those will not be open to the public because there are some parts of the analysis methods related to the steam dryers and related to the GE fuel that are proprietary.

MS. MILLER: I'm a little concerned that the real information that you have as experts is accessible to us only very close to the point of your decision. So we won't have any opportunity to comment following. We essentially are left in the dark.

MEMBER BONACA: This is a concern that we have ourselves actually because we have a concern that we've been pressed with this information at the last minute and it's hard for us go from the subcommittee to the final decision. We may not have a final decision come December. I don't know.

MS. MILLER: Thank you.

MEMBER WALLIS: But we're not only working on Vermont Yankee. We are working on about 40 or 50 different things a year.

MS. MILLER: Oh, my.

MEMBER WALLIS: So you can understand the difficulty we have too.

MS. MILLER: I'm sorry to hear that.

MEMBER SIEBER: Yeah, me too.

CHAIRMAN DENNING: Thank you again. Is there anybody else? Yes. In the back, let's take the person in the back. I'm sorry. I do now have a list. Let's see. We already had Kevin O'Donnell. Dick Brigham.

MR. BRIGHAM: Here or there?

CHAIRMAN DENNING: You have your option. Either there or here.

MR. BRIGHAM: Here would be better. So my name is Dick Brigham. I'm a Vermonter. I'm speaking for myself, my family and hundreds of people who can't be here and I could name them if necessary. I have a great amount of respect for all of your abilities and the tremendous amount of time and effort you put into these things.

I think that what we are talking about is not necessarily energy. What we're doing is we're talking about money here. You are paid and there's no shortage of energy in this room or anywhere else. So what we're really talking about is uprating for making money and I think that's an important thing to mention. I think that that's a sick way of producing rad waste is to make money on it.

One thing is for sure. If uprate goes through, we're going to produce more rad waste. None of us want more rad waste. It seems an easy conclusion that maybe we could just not produce more rad waste if none of us want it. So far, we don't have a very good use for it but terrorists do of course.

I just want to ask all of you here if you would go out and buy an old car. The analogy has been used a lot before. But are you going to go out and buy an old car and spend a lot of money or drive it around all the time? I really doubt very much if you would.

MEMBER WALLIS: It depends on the age. It may well be that the reactor at 30 is like a car at two years old in terms of how much it's deteriorated to put it in some perspective here.

MR. BRIGHAM: Yes.

MEMBER WALLIS: You keep talking about buses and cars and so on but you have to look at the details of what has actually deteriorated, what has been replaced and so on. This was looked into very carefully.

MR. BRIGHAM: I think that's great and I appreciate you looking at it very carefully. But the end result is that we'll be producing more rad waste which we have a terrible problem to deal with and we all know that of course. We really want the waste taken care of and we don't want anymore waste produced. In the long run what I want, what my family wants and what hundreds of people want is to not have a nuclear power plant in Vermont.

Once again, it's tremendous to look at the plant to see how worn out it is or not. That isn't in the long run going to save or solve our energy problems nor is it going to make things better in the long run. But it is going to make money if there's a uprate for people. I really appreciate the chance to speak and I wish you great disluck in your finding what's eroded at the plant and we ask you collectively to shut the plant down and to not give an uprate. Thanks again.

CHAIRMAN DENNING: Thank you. Julia Bonafine, I think, is next.

MS. BONAFINE: Good evening. My name is Julia Bonafine and I'm from Shrewsbury, Vermont. I'm a kindergarten and first grade teacher there. I'm concerned about the safety of Vermont Yankee. I'm concerned about the future of what we're leaving for our children. I'm not ten miles from plant but it does concern me that that's who the evacuation is for, for people living ten miles from the plant. That doesn't make me feel safe even in Shrewsbury.

I'm also concerned about forcing a 30-year-old plant to perform things that it was not intended to perform. I'm wondering how often this is done throughout the country. I don't know but I'm hoping that the people of Vermont aren't being used as guinea pigs.

As a teacher, I respect science. But I've also seen with this issue and other issues the way we go to these hearings and it seems like nobody's listening. It makes me wonder what the scientists come up. Where is their information coming from which makes me wonder who's paying the scientists to come up with this information? I hope that you don't feel forced to make a decision in December if you're not ready. Thank you.

CHAIRMAN DENNING: Thank you. Crispin Boulter. Will you restate your name because I'm not sure it's written right here?

MR. BOULTER: Yes. My name is Crispin Boulter. I live in Jamaica, Vermont. I'd basically just like to say that I think an independent assessment of the situation is very much called for. And I'd also just like to mention that this past fall when Hurricane Katrina and the other hurricane struck the Gulf Coast I remember listening to that story on the radio and thinking a lot about it at the time and just thinking how thankful I am to live in Vermont where it's just relatively stable. We don't have earthquakes, no hurricanes. It seems like a pretty good place.

Then awhile back, a week or two ago I think, I saw a picture in Time magazine. It was a big centerfold and it said the slowest evacuation in U.S. history and had cars bumper to bumper. For some reason just seeing that picture, it just struck home to me. This is what it's going to look like when we're all trying to get out of the way of Vermont Yankee. Thank you.

CHAIRMAN DENNING: Thank you. I think Kevin O'Donnell wanted to talk again. He's not there.

MR. O'DONNELL: (Inaudible.)

CHAIRMAN DENNING: But you may. Please come forward.

MR. MURPHY: Actually, my name is Shawn Murphy and I would just like to reiterate a little bit what Kevin said and that is about the evacuation plan. It was something I didn't address when I first spoke and the plan has been in operation for almost 33 years and I don't know how familiar the panel is with our specific geography in this region. But we have the Connecticut River coming north/south and then the West River coming in also from the north and the confluence is right downtown in Brattleboro. So from Brattleboro, all the school children are supposed to go to Bells Falls in the event of an emergency. There's the Interstate 91 which has obviously two lanes going north, then two lanes coming south and the Veterans Bridge which is on Route 5.

So in actual fact, we have available northbound which is where the evacuation plan is planned to take all the school children and all the kids, basically the whole town of Brattleboro and Gilford and anybody south basically has three lanes of traffic to go. Somebody mentioned before earlier tonight that there have been rather serious accidents on the interstate and Brattleboro because of the confluence of the Connecticut and the West becomes a gridlock area.

Basically one night I was coming south on the interstate from Putney from work and I saw an accident ahead and it took me three hours to get through Brattleboro. So it's happened in my experience of being here in Brattleboro either three or four or maybe even five times. Even if we took both lanes of the interstate and took them north, it's a big issue.

If you look at a map, especially a topographical map, you can see immediately this would be a very difficult place. There's no way to go east because that also goes across a very small bridge going over to New Hampshire. Going south, you have the interstate and Route 5. So topographically, it's a very tight area. So I would appreciate your consideration to the evacuation plan and to the fact that it's been 33 years and we really don't have a viable plan. That's a long time in the making and it's a concern to me. Thank you very much.

CHAIRMAN DENNING: Thank you. Is there anyone else in the audience that would like to make a presentation? Yes, far back.

MR. SNYDER: Hi. My name is Doug Snyder and I live actually across the river in West Chesterfield but I lived in Brattleboro for two years and then I've been in New Hampshire for two years. I just started reading up a bit on this in the last couple days. So I'm not completely on top.

But I would say that I've done social accountability assessments for corporations in the past and it would seem that for me looking at some of the history that even just based on the experience that the main reactor had with an independent assessment and given the concerns of the citizens in the community and in the surrounding area that to maintain or to support or to encourage just the community's confidence level that in addition to your assessment obviously, I work with engineers every day so I'm confident in the analytical skills of engineers but in the process it would seem that in addition an independent assessment would help the process. That's all. Thank you very much.

CHAIRMAN DENNING: Thank you. Yes. You.

MR. SHADIS: Thank you. I'm going to make this brief. My name is Raymond Shadis. I work for the New England Coalition and live comfortably 200 miles down wind of Vermont Yankee. I had asked Ralph Caruso earlier to change the time at which I was scheduled to speak. We had to go and collect our expert, Dr. Hoppenfeld (PH) who will be addressing you tomorrow.

I would really appreciate the opportunity tomorrow or down at headquarters in your upcoming meetings to address you on the question of the team engineering inspection that was done at Vermont Yankee in comparison between it and the independent engineering assessment that was requested by Liebermont (PH) Public Service Board and my own particular area of expertise. I don't know if there's a living human being that has seen as many aspects of it as I have but of the independent safety assessment, the team diagnostic evaluation that was done at Maine Yankee in 1996. I was there for that.

In fact our organization locally had begun to look at aging issues and operational issues at the Vermont Yankee Nuclear Power Station, excuse me, at Maine Yankee Nuclear Power Station at a time when it was advertised as a world class plant and the executives of that plant were quite sanguine about the prospects of relicensing. The plant had as you recall received a ten percent power uprate which is extraordinary for a PWR and of course, they did it under circumstances which later turned out to be problematic.

In any case, we were there at the beginning of that. We had, local citizens had, begun to petition our governor to request a global examination, nuts and bolts examination, safety examination and an economic analysis, that is a risk/benefit analysis, of the Maine Yankee atomic power station. And of course, being a political creature, he was reluctant to do that until it became apparent that the uprate was received under suspect terms.

At the same time, the debacle at Millstone had taken place. Millstone Nuclear Power Station, you may recall from that era, made the front page of the national weekly magazines. The whistleblowers including Mr. Paul Blanche who's here tonight brought forward issues at Millstone for which the NRC apologized. Chairman Shirley Jackson was on the cover of national magazines saying we dropped the ball. We won't do it again.

As it happened, the governor of Maine asked NRC to perform some kind of safety assessment that would show the people of Maine that Maine Yankee was a safe plant. And Chairman Jackson needed an opportunity to show the world that the NRC oversight program was effective. Maine Yankee had, after all, received the very highest SELP scores, SELP scores in higher than those of Vermont Yankee that's for sure and here this problem had emerged.

Those two converging lines of interest, the governor wanting to get the citizenry office back and Shirley Jackson, I think, wanting to restore to some degree the reputation of the NRC, it resulted in Chairman Jackson ordering a special diagnostic evaluation team to go through the Maine Yankee plant. That was the beginning of the end for the old regime of nuclear reactor oversight.

I was privileged in the year 2000 to serve on the NRC's initial implementation evaluation panel for the new reactor oversight process and I was very much interested to hear NRC management say that that new reactor oversight process all really began with lessons learned at Maine Yankee. The problem is however that some lessons were learned and some lessons were set aside, buried.

My concern in reviewing the reactor oversight process was that design basis issues were no longer pursued with the same vigor that they appeared to have been pursued before. It was the habit of NRC to issue annually a list of emerging design basis issues. I think NUREG 1275 was issued about 1998 or 1999. I think that was the last addition of NRC gathering together the design basis issues and publishing them, trying to figure out which ones may have had safety implications, which ones didn't and tried to look at some degree of cause.

I raised this issue with the NRC Commissioners. By the way, this initial implementation panel was a Federal Advisory Committee Act panel, FACA panel, in which people are actually supposed to have some expertise. I'm not sure why I was on it except that I did know a little something about the ISA.

I was chosen by that group to present to the Commission on the results of our evaluation. When I raised the issue of design basis with the Commission in July of 2001 I had four of the five Commissioners gather around me after the meeting and assured me that design basis questions had been largely resolved. They were referring to the results of Chairman Jackson's Confirmatory Action Letter of 1996 in which she basically directed the plants to get their design basis together.

I was struck later that year. Entergy took ownership of the Indian Point plants and promptly $200 million trying to straighten design basis issues at those plants. The indicator for me for what it's worth is that design basis issues have not been resolved. Rather than to resolve them, the industries made a token effort to square away their FSARs, to square away the question of whether or not the plant is in conformance with their design basis and has moved on. But those issues emerged. They continue to emerge.

At Vermont Yankee shortly after Entergy took over the plant, they filed a licensee event report explaining that a protective feature of one of their pumps was inoperable. Five days later, they filed a report retracting the first event report because their pumps did not have such a safety feature. There's a question of whether or not they were at all familiar with their plant design.

The question of the physical integrity of this plant comes through this also because I think part of design basis is managing the aging mechanisms of the plant of continuing maintenance to make sure that the components of the plant are still in accord with design basis and we had these two instances that were raised earlier today by the Vermont Yankee folks that were talking to you of the two scrams, 2004 and 2005.

Both of them strike me as a result of deferred maintenance. The first one 2004, with the electrical ducts, the industry had put out warnings 14 years earlier. Vermont Yankee had acknowledged them at that time. They had acknowledged them three or four years before this incident and they acknowledged them during that outage but gosh, they didn't have time to take care of that duct because they were busy doing uprate related work. That outage in their documentation, their own managers' manual, they called four outages in one because they had a rotor to refurbish, they had a major amount of work to do throughout the plant in addition to doing the refueling itself. The upshot of it was that one of those events that challenges the safety systems occurred.

The event of 2005, the insulator that failed was vintage 1971 when we have no information with respect to what maintenance was or inspection was on that system. So I guess finally my point on this is that coupled with the findings of the team engineering inspection, eight findings in examining only 45 items and actions is a large percentage of findings given the small number of items examined.

Given that, we have every indicator that this plant is not in tiptop condition. It is not a plant that conforms to its design basis. We heard earlier today that the incident of avoiding the full transient tests on licensing. They went to 70 something percent. There were issues with hydriting the fuel and the test was set aside never to be picked up again.

So when people ask for an independent safety assessment here, they are taking the precautionary approach. Earlier today, I think Dr. Wallis had a question for one of the Vermont Yankee folks and the response was something to the effect of "Oh, those calculations were very conservative. What we have now is we've applied our PRAs and we're doing that probabilistic risk assessment."

Those were very conservative. I thought it makes conservative sound like a bad word which is something new since the era of Ronald Reagan certainly. I thought conservative was a good word and I thought conservation was something that was promised to the people when these reactors were first deployed. Yes, we're going to build it three times stronger than it needs to be. That's the way we build things. Built tough American style.

I think that coupled with the other promises that were made really constitutes a social contract and I don't know how you fill in the technical details in the interstices of this. But the forerunners of this panel and of the NRC staff told the people of Vermont and of every other reactor community that the reactors would have multiple efficient barriers, defense-in-depth, that each safety system would stand independent of every other safety system, a line of principles upon which they were built and what we see right now is the not-too-gradual erosion of every single one of those.

As much as I am able to advise New England Coalition and advocate for them, it is in the vein of that I guess first off is to say the next nuclear accident is not going to be an accident, it is going to be an inevitability. I don't know that there is a single person that is cognizant of the issues involved that can say there will not be another accident. In fact, maybe that's why the industry and the Nuclear Regulatory Commission are so anxious penciling away the potential consequences of accidents.

People don't know which set of numbers the agency has put out to believe. NUREG 1738 is a document that I worked on. That's called the least liked NUREG in NRC's collection. That's the one on accident risk at spent fuel pools and decommissioning plants. NUREG 1738 in turn quotes a lot of other consequence documents for a spent pool fuel fire which is not something you guys are going to be concerned about tonight.

But for a spent pool fuel fire, there is a table included in that document that says 500 miles, latent fatalities, 25,000 for a spent fuel fire and from the reference plant which I think was Millstone I, it says this assumes 95 percent evacuation. We now have the industry including Vermont Yankee, touting the idea that we need only one or two or at most five mile evacuation zone.

Those of us that have been trying to follow this we find it difficult to give any credence to an agency that gives and takes of our concerns. The Regovin Commission, 20 mile evacuation zone. So which is it that we're to fasten on? Our problem is that I think, I'm not speaking for the people here but it's part of what I have to tell them, we cannot rely on the contract that is made by the nuclear industry and by the regulators because it is ever sifting sands.

Now one last point I would like to make, there are two actually, number one is I would very much like to present to you in an orderly coherent fashion on the difference between ISA, IEA and whatever the other one is IOU. I would like to be able to come to your committee and present on that. I notice that on the agenda tomorrow you have Mr. Dreyfuss of Vermont Yankee sitting at the table. He's not a speaker from the public relegated to the after hours but you have him sitting at the table to present on this question of whether or not the team engineering inspection equals the Vermont Public Service Board's order for an independent engineering assessment and obviously the prejudiced bias is there. We know from that who you want to hear from. I'd like you to change that. I'd like you to hear another point.

I guess the final quick point and this is a matter of process and procedure. The NRC staff in accordance with their goals of enhancing public confidence in the agency scheduled an informational meeting for the public here in Vermont back on March 31, 2004 to explain to them about the uprate process. As only NRC could do it when they're trying to increase public confidence, they manage to enrage everybody by scheduling that meeting piggyback on an annual assessment meeting so that when people arrived at 6:00 p.m. prompt at a little local elementary school in a very hot, stuffy cafeteria and packed in there, they had to sit through a half hour of Vermont

Yankee show-and-tell. It was like an infomercial. Yes, we have a lovely plant. Don't you agree, Bill? Of course, Sam. It's a terrific plant.

We went through that for about a half an hour. Then came the annual assessment meeting and we went through the slides and etc. Then enough people packed into the room so that the meeting had to moved and we moved it to a nearby gymnasium. Then there was more NRC presentation although it was sort of on the order of this is a new review standard. See how thick it is. We have to answer all the questions in there. Diplomacy is not their strong suite.

The first person from the public who got to speak that evening of the general public got to speak at 9:20 p.m. There were 650 people there and I think NRC staff was lucky to escape unscathed.

Now when we had the team engineering inspection, was it Wayne Lanning? Is that his name? Yes, Wayne Lanning was master of ceremonies for that production and he promised people then as did the people of the NRC team on March 31st that there would be another meeting before the uprate process was concluded and that NRC staff, not this colloquium of intelligencia but NRC staff would come and have a meeting with the people of Vermont when they further down the road in the process and explain to them what they had been looking at, how the process was going and where they intended to go with it.

Instead of doing that, instead of doing what they promised the people of Vermont so that they could exchange on a human level, I mean we had people here that are expressing things that are not particularly wonkish. They're not super technical. It's just their own concerns. Instead of doing that, NRC staff scheduled this meeting. I think it's their revenge not only on the people of Vermont for showing them disrespect the last time around but perhaps on you gentlemen for criticizing their work.

CHAIRMAN DENNING: Mr. Shadis, I need to --

MR. SHADIS: I'm going to sit down in one second. So thank you very much.

CHAIRMAN DENNING: I need to make a correction though. This meeting was not scheduled by the NRC staff. This meeting was scheduled by the ACRS.

MR. SHADIS: Rick Ennis who is the project manager of Vermont Yankee told me directly that the NRC staff considered this to be the promised meeting.

CHAIRMAN DENNING: If they considered it, that's their opinion. But this meeting was not scheduled by the NRC staff. This meeting was scheduled by the ACRS under the provisions of the Federal Advisory Committee Act. It is not an NRC staff meeting.

MR. SHADIS: I'm glad, sir, to hear you repudiate the NRC staff because they lied to me and they lied to the public of Vermont and if they could get away with it, they would call this their public meeting and in fact, I really think that's pretty much the way it was advertised, their public meeting to hear the concerns of the people of Vermont and give them an update on the uprate process.

I think that maybe we need to get some parts of this clear and straight. I know that Vermont's congressional team has been looking very hard at this whole issue and I know that they were very concerned that this meeting was scheduled in such a way as to limit participation of people by not having evening hours. That's been amended but without notice. So there are many people out there that might have come had they had notice.

So I think that what I would like to propose here is going forward that we get all this straighten out. We find out what the promise was and whether or not NRC staff was representing that this meeting was the promised meeting or if we can anticipate having the public meeting that was promised. That's it.

I truly mean no offense to this committee but this is the situation we find ourselves in. A lot of the issues that are raised here are really policy issues. They really are more in the way of cultural issues and safety culture or nuclear culture, however you want to slice it. But they are more cultural issues and I think this committee has to be applauded for trying to work along through it. But I know that's not your particular reason that this committee was convened. Thank you very much.

CHAIRMAN DENNING: Do we have any additional speakers? Let's go with the guy behind you. Yes.

MR. SHAFFORD: My name is Brian Shafford and I'm a resident of Brattleboro and I would just like to summarize what I've been hearing from the public here and that is two things, fear and distrust. And I think that a 20 percent uprate hike is going to exacerbate both of those.

CHAIRMAN DENNING: Thank you. Do you want to go again?

MR. SIMONSON: My name is Cole Simonson again. Thank you for being here and hearing us. I've taken a bit of opportunity during the breaks to speak to a few of you folks, a couple of you folks, anyway and one of my questions was to reiterate something earlier in my talk and to explore that with you folks of if Maine had better scores from the NRC than Vermont Yankee does and yet when it did get an independent safety assessment it turned up all kinds of issues that resulted in it actually closing down, then wouldn't that just make sense, wouldn't that set a precedent, to suggest that an independent safety assessment has the potential to uncover serious issues? It's happened in the past. Shouldn't it be done here given that you're talking about one of the oldest plants in the nation going for an unprecedented 20 percent increase in its power output?

The answer that I got from you folks it would seem is that you're not allowed to consider data or experience from other nuclear plants? Is that accurate that you can only consider data from Vermont Yankee?

CHAIRMAN DENNING: No. We definitely consider data from other plants particularly as they are similar to Vermont Yankee. We certainly take that into consideration.

MR. SIMONSON: So then isn't it true that if an independent safety assessment for a plant that had higher scores than Vermont Yankee turned up all kinds of issues, doesn't that make sense that that sets a precedent or that would suggest the possibility that an independent safety assessment here could turn up serious issues and that therefore it just makes reasonable sense that we would want to uncover those issues? All of us have a vested interest in uncovering those issues and seeing if there are any before recommending an uprate of one percent or five percent or 20 percent? No response.

MEMBER WALLIS: Like we said, it's a very interesting point. I think that it's something that we could consider. But I can't say yes or no.

PARTICIPANT: We can't hear you, sir.

CHAIRMAN DENNING: Yes.

MEMBER WALLIS: I say thank you for raising that point. I think it's a very interesting one and we ought to consider it.

MR. SIMONSON: Okay. Then the other question that I had of you, sir, Mr. Ralph Caruso, I believe was if 62 cracks were just discovered that perhaps may have been there for 20 years, wouldn't that suggest again that an independent safety assessment could potentially, perhaps would be likely, to turn up other things that have been perhaps sitting there getting worse and worse perhaps for years and years? If 62 cracks have been discovered potentially after 20 years, then it just seems reasonable to me that an independent safety assessment will tell us hopefully if there are other issues that we should know, other things that could impact safety for people in this area and you responded to me that you're not a metallurgist. Therefore, you don't know.

Sorry. But I'm not a metallurgist. But it seems to me that any idiot and I don't mean to be inflammatory, that any idiot could draw the correlation that if 62 cracks have been there for all these years potentially that an independent safety assessment is called for to see what else is there. Doesn't that make sense?

CHAIRMAN DENNING: There's no question that we will be looking carefully at this question of 62 cracks and what is the implication of were they there earlier or is it just there.

MR. SIMONSON: That's not what I'm asking.

CHAIRMAN DENNING: But I understand. I was going to move on to his question.

MR. SIMONSON: Okay.

CHAIRMAN DENNING: As part of that process, we'll be trying to determine what's the root cause of that. Why is it that they were there? Obviously as far as the steam dryer issue itself is concerned, we have to understand it. We also have to understand the root cause as to whether that indicates that is there some common cause or something in our review process that would have meant we should have identified that. We certainly will be looking at that type of thing.

Now whether that leads us to say we have to have another independent review because for us, the NRC's detailed review is an independent review and our work is independent of that review. So you're asking wouldn't another independent review show up something and maybe it's worth doing and maybe it isn't. I think we have to look at that carefully. It's just another piece of data that we bring in and it certainly has been helpful for us to hear about the Maine Yankee experience and we'll certainly look at that and see if we think that there is an transition, an extension, of that that would be of value to us if we think that there's something missing there.

I was really unaware, I've only been on

this committee for a year now, of the Maine Yankee independent review as you call it and certainly we have to look at that. It is important that you've brought that to us. But going beyond that, we're not in the position of saying we need to have another independent review.

MR. SIMONSON: But you are in the position of recommending that to the NRC. Is that correct?

CHAIRMAN DENNING: No, we are in the position of looking at it further and it has been helpful that you've brought this to our attention.

MR. SIMONSON: So is that not accurate that you folks can make recommendations?

CHAIRMAN DENNING: We can make recommendations certainly.

MR. SIMONSON: If you chose to, would you be able to make a recommendation for an independent safety assessment to the NRC?

CHAIRMAN DENNING: If we chose to, we could. If we felt that it was necessary that there were value in it, that there was something seriously missing, certainly we could do that and would do that.

MR. SIMONSON: So given that we have track records, we have what seems like an obvious precedent to me that the Maine Yankee assessment, the Rowe assessment, turned up some many issues that the plant ended up shutting down, doesn't it just by logical extension make sense that if you do not do an independent assessment here with this 20 percent uprate which obviously increases danger that you're putting blinders on for something that could be catastrophic?

CHAIRMAN DENNING: No, we don't know enough at this point to make a decision.

MR. SIMONSON: We don't know. So therefore, why not get an independent safety assessment to find out what we don't know?

CHAIRMAN DENNING: Like I said, we haven't look at the case of Maine Yankee well enough to understand whether we feel there's something there that provides the kind of precedent you're saying that ought to be carried over at least as far as I'm concerned. I can't speak for the other ACRS members.

MR. SIMONSON: And I'll just point out that --

MEMBER WALLIS: Isn't it tomorrow we have a discussion about the steam dryer?

CHAIRMAN DENNING: No.

MEMBER WALLIS: Don't we?

CHAIRMAN DENNING: No. That's it.

Tomorrow is the overpressure.

MEMBER WALLIS: It's the overpressure. So we don't have it. I'm sorry.

MEMBER SIEBER: No.

MR. SIMONSON: So I'll point out that if we were all sitting here in this room talking mathematics then you would perhaps have clearer proofs of things. You could 2 + 2 = 4 unequivocally perhaps. What I'm saying to you is that you have two very solid examples in recent history of two independent safety assessments that have turned up all kinds of issues that people did not know was there before.

You're talking about our public safety. That what you folks are charged with protecting. Here is an opportunity to make sure that our safety in place, is being covered. It seems to me that the 2 + 2 = 4 here is very obviously that an independent safety assessment is called for because of the history of those other two plants. It just seems obvious.

CHAIRMAN DENNING: Thank you. And I think it's valuable input but we can't go beyond that statement.

MR. SIMONSON: Okay. I appreciate it. Thank you.

CHAIRMAN DENNING: Yes. In the back.

MR. ALLARD: (Inaudible.)

CHAIRMAN DENNING: Wait. If you make a comment, you have to come up front to make it because it's on the transcript.

MR. ALLARD: What that gentleman just said is the whole ballgame and you guys are not getting it. Please recognize what we're trying to say to you.

MEMBER WALLIS: We recognize very well what you're saying to us.

MR. ALLARD: And you're in denial.

MEMBER WALLIS: We're not. We are waiting to consider it. We are not at this meeting going to make any decisions about anything.

MR. ALLARD: Yes. Well, we've been down this road and all of these meetings are in vain. I'm sorry. But that is the history of what we're dealing with here. And incidently, Mr. Shadis brought up a good point. Don't try to tangle with a Vermonter when the music ain't playing because that's what happened in the Vernon school and that was one agonizing meeting and there was no benefit that came out of that for anyone and that should never happen again. They were lucky they weren't assaulted.

CHAIRMAN DENNING: I don't know what happened there. All I can say is that today I think people have been extremely, carefully and have been very helpful.

MR. ALLARD: And we do appreciate your decorum. Only we feel we're talking to the walls. I'm sorry. Our lives are on the line here, our jobs, our homes. Everything we know is on the line and we get platitudes. Please, please you're our last resort. Thank you.

CHAIRMAN DENNING: Yes. In the back.

MS. PETERSON: Hi. My name is Holly Peterson. I live on South Main Street in Brattleboro and I can actually see Vermont Yankee from my house. I would like to thank you first of all for listening to our comments tonight. I didn't plan to come and speak. So I appreciate your patience with that.

From what I understand, there's no reason no to do additional safety assessments. From everything I've heard about this, I don't see how we can be too safe in this situation. I think that we need everything to go right with Vermont Yankee at all times in order for all of us in this room to be safe and we only need to have one thing go wrong for it to go very badly wrong.

So I think that all of us in this room want the same thing. We want to feel as if we are being as safe as possible and having as much information as possible for all the decisions that do affect our lives so deeply. So I would like to encourage you very much to do as much safety assessment including this independent safety assessment as possible and to recommend as much as without your power to do all of the things to protect all our lives and homes as the gentleman just stated. So thank you very much for listening and we appreciate that. We hope that you'll take our lives into account.

CHAIRMAN DENNING: Has anyone else come in that would like to speak? In the back

MR. MILLER: You know my name now. Sunny Miller. I'm thinking that because the evening hours haven't been announced, you're not seeing the people. I wonder if you would willing or the staff would be willing to call the radio stations this evening and make sure to get on the news on morning radio and late night news at the Brattleboro stations that you are going to hold evening hours tomorrow night.

CHAIRMAN DENNING: We really can't hold evening hours tomorrow night because we have another subcommittee meeting on Thursday in Rockville and it's all announced and we can't. I realize that it was unfortunate that we didn't announce these evening hours. But I just don't think there's anything we can do about it now.

PARTICIPANT: (Inaudible.)

CHAIRMAN DENNING: Just until 5:30 p.m.

MEMBER BONACA: 5:30 p.m.

MR. SIMONSON: Just a heads-up. I don't know what can be done about this but I heard from NEC yesterday that, day before yesterday, that both nights would be going until 7:30 p.m. So that has been publicized some places. I'm not sure what will happen with people showing up after work tomorrow.

CHAIRMAN DENNING: Thank you. There was somebody in the back that I think was going to talk. Yes.

MS. JOHANSON: Hi. My name is Brigette Johnson. I live in Geoffrey, New Hampshire. I'd actually brought three letters, one from myself and two from friends who one lives in Troy, New Hampshire, and the other lives in Peterboro, New Hampshire. My friend in Troy lives within the evacuation zone of Vermont Yankee and my father lives five minutes away from him and I live five minutes away from him.

I have a little bit of experience working with the NRC. Years ago, it was suggested that we put a high level nuclear waste dump in Hillsboro and Henniker. Theoretically, it was supposed that the granite would be strong enough and solid enough to hold the nuclear waste. We had a very difficult time convincing people that this was scientifically not valid or healthy or a reasonable option. Eventually they did see it our way and moved somewhere else.

My friend has gone to our car to pick up those letters. I would like to give them to you. But I'm here tonight because I'm not convinced that the NRC or even the management of Vermont Yankee is acting in our best interests.

I know that we are having an energy crisis in this country at this time. The price of oil is sky-high. I'm an economist. I know we need energy to thrive and to have a healthy society and the rest of the world needs it too. We have not yet solved the problem of nuclear waste.

Vermont Yankee is a case that scares me. I was hearing on the radio that there have been terrorist threats made against Seabrook, specifically by Iran, and that those threats are known to have been postponed until following the election in November 2004. As far as I know, those threats are possibly still out there.

Seabrook because of activists' efforts was built to a standard that it can resist a terrorist attack much better than something like Vermont Yankee can. Vermont Yankee is aging. It is falling apart. It is supposed to be decommissioned and instead they are asking for an increase in the output and that scares me.

I don't believe that the inspections that have been done are thorough. I know what I've read was something on the order of eight percent of the required inspections had been done and even that little amount had turned up faults and deficiencies. So if you just take those numbers and extrapolate them out, if you complete those inspections even according to the minimum that the NRC would require, you're bound to turn up more problems.

The plant is weak. No matter how well it is run, it cannot stand up to a terrorist attack. We live here. There are a lot of people who live here, now far more that lived here than when the plant was built. I'm on the conservation commission in Jaffey, New Hampshire. We're looking at demographics and population increases. We are no longer classified as a rural area. We are now a suburban area. Brattleboro is certainly not rural. We are in the middle of big population here and that plant is scheduled to be closed and it shouldn't be scheduled to have its power output increased.

I have a personal experience with terrorists' threats recently. In the office where I work, one Monday morning, I had numerous calls from different long distance phone companies and our phone system had been hacked into over the weekend. We found that we had over the course of two and a half days about $20,000 in illegal phone calls to the Middle East, specifically the countries that we're watching for terrorism. I turned these records over to the FBI and the New Hampshire State Police and they are interested.

Interestingly enough what we found mixed in with our phone records was that these same people were making calls within the United States and I've been hearing more and more reports from people who are living here that there are terrorists alive and well in this area. Boston is a known target. They seem to be in every small city surrounding Boston.

They're here and we cannot leave it to our government or somebody to take care of us in the event of an emergency whether it's a natural disaster, whether it's because the power supplies to Vermont

Yankee is cut off and we can't control the reaction anymore, whether it's an intentional attack, whether it's an accident, whether it's a breakdown, a malfunction or release, whatever it is. Terrorism is a reality. We have to live with it. We have to deal with it. We cannot keep such a vulnerable target in our midst. Thank you.

CHAIRMAN DENNING: Is there anybody else that would like to speak at this point. Do you want to take a five minute break? It's our plan to go to 7:30 p.m. Why don't we take a five minute break right now and then we'll see if anybody else shows or in case anybody else has something else they'd like to say. So five minute break. Off the record.

(Whereupon, the foregoing matter went off the record at 6:46 p.m. and went back on the record at 6:54 p.m.)

CHAIRMAN DENNING: We're back on the record. If you'll all be seated please. We do have at least one more speaker. Phyllis Mandel please. Is Phyllis Mandel here at the moment? Hi.

MS. MANDELL: Hello. Talk into this.

CHAIRMAN DENNING: Yes, and you can pull it down a little bit.

MS. MANDELL: Okay. Well, I'm Phyllis

Mandel. I have a home in Brattleboro and a home in Williamsville and I'm so lucky to have a home in Williamsville because radiation won't come there according to your maps. So nobody issued me a pill. Now my daughter who lives in my house in Brattleboro, she has the pill.

I don't mean to be this -- It's just it's so absurd. Radiation will be spewed all over if we do have a problem. There's just no boundaries. So I don't know. The other thing I think is that once you issue a pill, then you're acknowledging that we have a problem here. And this year 2005 that we're even contemplating allowing this to happen to any segment of the population, it's just so outrageous.

Now I've been following in *The Reformer* the very successful evacuation. Everybody is so happy you've made a successful evacuation, your trial evacuation. Well, it was just so absurd. People successfully got to the reception center. Now a reception center, you mean an evacuation center.

Now once we got to the reception center, then what? How soon would we be able to return to our homes and our farms? How soon? At the reception center, will you have clothes for us? Will we be able to shower? And will you be able to put us up for the month? Years? Decades? Until our homes are safe enough to return to?

Please don't bother with evacuation plans that aren't going to mean anything. Are you trying to dupe for us? We're not fools. Was the hospital evacuated successfully? Or all the nursery schools? The plant should be shut down but at the very least, it should not be pumped up. I for one would be willing to pay for more electricity. I would be willing to do without electricity, anything with electricity.

Just don't threaten us. I feel like I'm living under a terrible threat and nothing you do, your pills don't help and your evacuation plans are nonsense. So please have a little more consideration for our intelligence. That's all. Thanks.

CHAIRMAN DENNING: Is there anyone else that would like to speak? Yes.

MR. BLUE: Gentlemen, my name is Don Blue. I'm an engineer, specifically a power generation and transmission engineer. Nuclear power is the only medium that I have not used in the generation of electricity. However, I've worked with all of the peripheral systems during my career and prior to that as a young boy who was interested in machinery.

It amazes me that you all are going to trying and bring more power out an old system like that. I'm sure that all of you when your cars begin to evidence rattles and groans instead of cranking an extra 20 miles an hour, bringing them down to the shop and beefing the engine up for more performance without paying attention to the other systems in the automobile. I believe you probably trade them in for new automobiles or newer automobiles.

I don't like to think about the nuclear industry. I realize that we are dependent on that for a great percentage of our power but it terrifies me when I think about it. I hadn't planned on being here tonight. I bumped into a friend who was coming up and just wanted to take the opportunity to remind you that machines were born to fail.

I've never seen a system yet that wasn't going to fail eventually and then when you tack on the error chain onto that, the sequence of events that leads to a catastrophe, you have one link in the chain and an error, a sequence of events, that leads to a catastrophe gains momentum at every step. The nuclear industry is not immune from that as various incidents around the world have proven.

I believe being an engineer in this

country we'll probably avoid a disaster more by luck than anything else. I see the responses to this in public and it scares me. Where there is smoke, there is fire usually and I've seen of it. I just left a huge power company over issues like this, not related to nuclear, but was tired of being the guy standing up there just generating fluff to make people happy when I had nothing to work with.

So I just want to remind you guys when you're thinking of a nuclear power plant out there, think of the car sitting out in the yard. Think of how many people are hurt every year because of unexpected mechanical failures. We're dealing with a huge, very complicated machine here. Every component is liable to failure at any time for a number of different reasons. Maybe before you go to sleep at night, just think about it if you're reflecting on it. That's all.

CHAIRMAN DENNING: Thank you.

MR. BLUE: Thank you.

CHAIRMAN DENNING: And is there anyone else who would like to speak? Yes.

MS. HOUSE: I'm Elizabeth House and I'm just a citizen in town. I feel as though we are looking at a machine that's in front of us that needs repair. I've read the papers twice, three, four times, every time with a new mind, many times today. I've been here all day.

We're talking about intake valves that are corroded and we're talking about some cooling fan that has one inch to four inch cracks that Entergy wasn't publishing to us as a problem. The newspaper published to us as something that had been observed and that we should be able to talk about.

If you had a scratch on your car, you would take care of it. You're using a nuclear power reactor. It needs to be restored to the highest standards that we can afford, if it requires that we draw down federal cash to cover the bill of the best shoe glue that goes going to seal up those cracks, whatever it is of the science that I am buying, that I know.

Half of me is willing to turn on 15 watts at night and call it the whole bill aside from the refrigerator. The other half knows that I go out in the day and I buy a newspaper and it's not falling out of the trees. It's generated with electricity.

If we want to shift out of a panic which is what we feel when we look at both the machine as the nuclear reactor and the reactor waste that we're ready to store it, we've been working on this for 30 years, and it gives everyone of us the shakes to think about moving it because we don't know if we can do that without dying every time. It's an issue of security to be able to transport something safety without it being electromagnetically super charged while we're transporting it to a safer place for storage. Honestly, I don't think that the water shed with mud is a safe place for trying to store nuclear waste.

I'm electing and I've heard about Yucca for 30 years. If that's stuck, maybe we're trying to build another Yucca. But what we're talking about is safety right here at home and a machine that needs repaired gets repaired. Of course, I feel guilty because I'm surrounded by moving cars and I don't have one myself. So there is that supply and demand thing about being part of this huge use of electricity every day.

We need to move forward in hydroelectric. It was nice to hear the former speaker on generators. I remember holding a generator when I was a kid and thinking it had something to do with generating electricity and that's as far as I've gotten with that chapter.

There are places, the study of electrical generation is important, and if you're going to be an investor in GE or whatever, Entergy is a high priced stock, you're looking for dividends and how is this going to pay out but you're going to pay your bills. But if you can't afford, this community can't afford to pay higher electric bills. What we're producing is papers and maple syrup.

Personally, I'm a representative, the rummage after you've built it all and it comes through the rummage places and I save a lot of it. It took a lot of energy to make. Sometime new takes a lot of energy plus being up late at night. What gives you a good feeling being under good warm lights and watching television or listening to music or anything that's electrically generated or shutting it all off which is sometimes hard to do. Shutting it all off and just enjoying a book. That's the big decision if you want to shut it all off. You can try to live off the grid by living in a cabin.

Keeping the reactor safe is imperative to keeping the cabin safe, too. So like it or not, I think that we need to find the best technology for assessing and correcting all of our little problems so that we don't give ourselves such panic and contributing to our ability to biohazard suit ourselves for every time we have to move tailings from cleaning out the 18 month cycle that we have.

We haven't stopped using electricity. Just not using our own little reactor because we're afraid of it is a sign of incompetence or a sign of an inability to put into a legislative statement that we don't want nuclear power in this state. That's something you can vote for, but it's also something that is what you have to voice as the way you want to go.

If you want to go with no nuclear power, you can find the owner to shut the machine off. If you want to go with no electricity, you can live in the woods. Moving forward into hydroelectricity is something you have to think about and something you have to do and something you have to devote your resources to.

It's a transference out of what we thought was great shakes. We thought nuclear phenomenally excellent in getting to a city and I can't imagine it's not running on nuclear. They're piping it all in from Buffalo. But if it's that point where you have to do the work yourself because this generation has just done this one reactor and this is 520 megawatts and upstream is Bells Falls. It's only 48 now. In our mathematics, are we using even more than that in this state because I haven't been doing the billing? Using electricity eventually comes down on you to take care of what you've done and that's what the nuclear tailings are all about.

Managing to have safe management of nuclear tailings, I don't know if that's something that we can hire out of Defense or out of the Department of Energy. I think that the managing of the tailings hasn't been a secure feeling about that. Personally, I'm a common mind and I just think smaller packages with more plastic science buffering to contain the vibration until you get it from Point A to Point B. Buying a better idea, putting the worst idea on leisure cards and sending them into vacationland. It's a collective mind that comes to a sound sense of security and it has something to do with money but it really has more to do with nuclear waste management and containment and transferring out of the radioactive content of your environment into a buffered experience and a hydroelectric generation. That's what I have to say.

CHAIRMAN DENNING: Thank you. Next is Carol Crompton. You didn't know you were going to be that quick. You could make Joe go first.

MS. CROMPTON: Hi, I'm Carol Crompton. I live in Brattleboro and I would really like you to reconsider and to strongly consider not allowing the uprate and getting an independent organization to look into anything. I'm really concerned about evacuation procedures here. I've worked in day care and in schools for most of my life in this area and there aren't enough buses. There aren't enough seats on the buses for the kids who live here to get out. No matter what they try to say that there is, but there aren't. They double bus. So nobody's going to come from Swanzee. Thank you.

CHAIRMAN DENNING: Thank you. Joe, are you ready?

MR. CROMPTON: Just quickly. The question of whether there should be an independent --

CHAIRMAN DENNING: Please identify yourself. I'm Joe Crompton.

MR. CROMPTON: I'm Joe Crompton, Brattleboro. Whether there should be an independent review of the question of the uprate, I think, is a no-brainer. That's my whole statement. I think it's essential that there be an independent review. Thank you.

CHAIRMAN DENNING: Thank you. We're getting down to the last 15 minutes and if anybody -- We have one definitely in the back left corner.

MR. BOTKIN: Danny Botkin from Gill, Massachusetts. Thank you for being here to listen to our comments. I'm not scientist. I'm a goat farmer. I grow organic goat milk. As you know 20 years ago, organic was a fad. People were on the fringes. Nowadays, organic food, organic milk, organic products are considered essential. All of us know somebody who's had the experience of cancer in their family. My own mom died at 58. She was healthy. She ate low cholesterol. She had no warning signs. Yet she developed cancer.

Long Island supposedly now has two and a half times the national average of breast cancer. So we're left asking the question why is this. What is in our environment? Of course, it's impossible to nail it down, but you and I know there's many things now that affect us. One of them is radiation.

Let's say there's a place to put all this waste. Let's say the plant operates safely as we all hope. Even the normal operation of these plants yields low-level radiation. Where does it go? Where in the food chain does it end up? Milk. Children.

These are two interests of mine. I have a small child. I raise organic goat milk.

I live eight miles just due south of the plant. We wonder. What if there were an unnatural release apart from the small levels of strontium-90 and other isotopes? What if there were some type of an event? Nowadays of course we have to think about terrorism. That is an ever-present reality and what better terrorist target would be a huge pool of high-level radioactive waste in a high population density area?

It's not a pleasant thought. But thoughts like that keep me up at night. I go searching on the internet. There's a website where a young woman took a motorcycle tour of Chernobyl and it's an incredible view. She dares not get off her bike. She carries a Geiger counter with her and she tours the hulk of society which was once Chernobyl. The entire region of course is now poisoned and you might say our technology is better. That would never happen in America. But we know better. Accidents do happen and it could happen and most likely it will happen somewhere in America.

The nuclear industry we all know is a relic. These plants will be closed down. In the course of history, we're looking at a small blip of time until we develop renewable energy. If we don't, we all know what's going to happen to our species and our life as we know it.

So in the interest of long-term longevity of our species, I would say let's shut down the industry and that's going to happen. But why do we need to ring more power out of this plant which is questionable? I'm not a scientist. I can't say it's safe or not safe but maybe it isn't. Maybe it is. There's just too many people, too many small children and goat milk at stake. Thank you for your consideration.

CHAIRMAN DENNING: Thank you. Additional comments?

MS. MILLER: Sunny Miller. I just wanted to mention, Daniel, that there was an article in a paper very recently. A goat in Connecticut confirmed a level of radiation known to be hazardous for an area which is under consideration for development for a little tract of houses, about 15 houses, a little subdivision plan to be built there and that email just came yesterday. So you'll probably be seeing that and you could check at our website for such news at traprockpeace.org.

And we should put the New England Coalition website on the record for those of you don't know, NECNP.org. A new website that I just discovered recently is evacuationplans.org. How many of you have seen that one? Lots of good information there. Real news and the NIRS, Nuclear Information and Resources website, NIRS.org. Citizens Awareness Network has their website nukebusters.org. And the Union of Concerned Scientists I believe is USAUCS.org. Are there any others we should be paying attention to?

CHAIRMAN DENNING: Sure. If anybody else wants to make any announcements, feel free.

MS. MILLER: Radiation.org. Great. Unfortunately since no one knew, not many people knew in the community you would be here this evening. They're at home.

CHAIRMAN DENNING: Questions? Comments? I didn't mean questions. I take that back. Comments from anybody else? We'll have a moment of silence.

MS. MILLER: Well, how about something cheerful.

CHAIRMAN DENNING: Yes.

MS. MILLER: This one is from Sweet Honey in the Rock and you can sing along. I'll do the hand motions just so you can catch the words easily if you'd like. (Singing.) "Step by step the longest march can be won, can be won. Many stones to form an arch singly none, singly none. And by union what we will can be accomplished still. Drops of water turn the mill, singly none, singly none."

We need all of us. All of us together. Ready? Can you sing? You love to sing. Come on. Let's start together. "Step by step the longest march can be won, can be won. Many stones to form an arch singly none, singly none. And by union what we will can be accomplished still. Drops of water turn the mill, singly none, singly none."

CHAIRMAN DENNING: Can I sing? I doubt it, Tom.

MEMBER WALLIS: That's a good note to end on.

CHAIRMAN DENNING: Our official NRC representative says we must wait until 7:30 p.m.

MEMBER WALLIS: Maybe there's more songs.

CHAIRMAN DENNING: You guys don't have to wait.

MEMBER WALLIS: We must sit here until 7:30 p.m.

CHAIRMAN DENNING: Yes, we must sit here. Thank you again for those of you who are leaving. We do appreciate your comments.

(Pause.)

MR. SIMONSON: I have one other comment if I may.

CHAIRMAN DENNING: Yes. State your name again because all comments must be official.

MR. SIMONSON: The name is Cole Simonson again. And I'll just mention that you guys have to look at a lot of data. You have to stay within specific, careful guidelines and parameters and try to play the game right based on whoever writes the rules what they write.

Ultimately, the true test of character is what you do with all that and the opening quote to *Zen and the Auto-Motorcycle Maintenance* is "And what is good, Phaedras, and what is not? Need we ask anyone to tell us these things?" So truth is something that we're inherently able to recognize if you look within.

It seems to me that there's only one reasonable course of action. There's only one win-win situation here and that is as a minimum to demand an independent safety assessment to give the people what so many of us have called out for. So as I said earlier, please hear the chorus of voices and please help us to be safe. Thank you.

CHAIRMAN DENNING: Thank you.

(Discussion off microphone.)

CHAIRMAN DENNING: With a liberal interpretation of the clock on the wall, we've completed. Thank you. Off the record.

(Whereupon, at 7:25 p.m., the above-entitled matter was concluded.)

CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: Advisory Committee on Reactor Safeguards Subcommittee on Power Upgrade

Docket Number: n/a

Location: Brattleboro, VT

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Pete Holland

Pete Holland
Official Reporter
Neal R. Gross & Co., Inc.

ACRS Subcommittee on Power Uprates

NRC Staff Review of Proposed Extended Power Uprate
For
Vermont Yankee Nuclear Power Station

November 15-16, 2005

Opening Remarks

Cornelius Holden
Deputy Division Director
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Opening Remarks

- VY Proposed Extended Power Uprate (EPU)
  - 1593 to 1912 Megawatts Thermal (MWt)
  - 20% increase (319 MWt)
- 105 power uprates approved
  - 13 of 105 are EPUs
  - 11 of 13 EPUs are for boiling water reactors
  - 7 of 13 EPUs > 319 MWt
  - One other EPU approved for 20% (Clinton)
- Second EPU Review done with RS-001

Opening Remarks

- Review took over two years, 9000 hours
- Technical issues included:
  - Steam dryer integrity (flow-induced vibration)
  - Crediting containment accident pressure
  - Transient testing
  - Analytical methods and codes
  - Engineering inspection

Introduction

Rick Ennis
Senior Project Manager
Divsion of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Background

- Review Used Review Standard RS-001
- Requests for Additional Information (RAIs)
  - 8 Rounds
  - Nearly 400 Questions
- 41 Supplements to Application
- Audits & Independent Calculations & Analyses

Topics for 11/15 - 11/16

- EPU Power Ascension and Testing (11/15)
  - Safety Evaluation (SE) Sections 2.12 & 2.5.4.4
- Credit for Containment Accident Pressure (11/16)
  - SE Sections 2.6.5 & 2.13
- Engineeering Inspection (11/16)
  - SE Section 1.6

Topics for 11/29 - 11/30

- Mechanical and Civil Engineering
- Reactor Systems
- Materials and Chemical Engineering
- Electrical Engineering
- Plant Systems
- Source Terms and Radiological Consequences
- Health Physics
- Human Peformance

VY EPU Schedule

- ACRS Subcommittee Meeting in Vermont (11/15/05 - 11/16/05)
- ACRS Subcommittee Meeting in Rockville (11/29/05 - 11/30/05)
- ACRS Full Committee Meeting in Rockville (12/8/05)
- Issue Final Safety Evaluation (2/24/06)
- ASLB Hearing (TBD)

EPU Power Ascension And Testing

Robert L. Pettis, Jr.
Senior Reactor Engineer
Plant Support Branch
Division of Inspection Program Management
Office of Nuclear Reactor Regulation

EPU Test Program

- Standard Review Plan (SRP) 14.2.1, "Generic Guidelines for Extended Power Uprate Testing Programs," provides guidance for testing programs based on Regulatory Guide (RG) 1.68 and plant specific initial test program.

- EPU test program should include testing sufficient to demonstrate structures, systems, and components (SSCs) will perform satisfactorily at the requested power level.

EPU Test Program - continued

- Staff guidance considers original power ascension test program and EPU related plant modifications.

- Staff guidance acknowledges that licensees may propose alternative approaches to testing with adequate justification. Supplemental guidance provided in SRP for staff evaluation of alternative approaches.

Large Transient Testing (LTT)

- LTT was part of the initial test program.
- Staff previously accepted the following justifications for not performing LTT for EPUs:
  - Licensee's test program will monitor important plant parameters during EPU power ascension;
  - TS surveillance and post-mod testing will confirm the performance capability of the modified components;
  - Operating history and experience at other light water reactors (LWRs).
  - LTT not needed for Code analyses benchmarking.

Large Transient Testing - continued

- Staff requested additional information to support the licensee's basis for not performing LTT.
- The licensee's responses were based on the following factors presented in the SRP and consistent with previous staff approved EPUs:
  - Consideration of industry operating experience, including several unplanned generator load rejections which produced expected results;
  - Analysis of potential unexpected systems interactions;
  - Effects on design margin;
  - Limited scope of EPU modifications for balance of plant (BOP) systems;

Large Transient Testing - continued

- Analyses results bound operational transients experienced at VY and other uprated plants; and
- Conformance to previous NRC staff approved General Electric (GE) Constant Pressure Power Uprate (CPPU) topical report.

Summary

- SRP 14.2.1 allows licensee justification for not performing all initial test program power ascension tests.
- Thirteen domestic LWRs have implemented staff approved EPUs up to 120% original licensed thermal power (OLTP) without performance of LTT.
- Staff considered previous plant operating experience and no introduction of new credible thermal-hydraulic phenomena.
- Limited scope of EPU modifications.

Conclusion

- The licensee's proposed EPU test program, with testing required by license condition for the condensate and feedwater system discussed in SE Section 2.5.4.4, satisfies the staff guidance in SRP 14.2.1.

Test Considerations for Plant Modifications

Steven Jones
Senior Reactor Systems Engineer
Acting Chief, Balance of Plant Section
Plant Systems Branch
Divsion of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

Important-to-Safety Modifications

- Physical Modifications
  - Feed Pump Low Suction Pressure Trip Logic
  - Recirculation Runback on Feed Pump Trip
  - Main Turbine
- Operational Changes
  - Three Feed Pumps Instead of Two at Full Power (Continue to Operate with Three Condensate Pumps)
  - Increased Feedwater and Steam Flow to Support EPU

Scope of Planned Power Ascension Testing

- Measured Approach to Full EPU Power Level
  - Power Plateaus for Stabilization
  - Demonstration of Normal Control System Performance
  - Monitoring Instrumentation In Place
- No Licensee-Proposed Transient Testing
- Staff Identified Need for License Condition for Transient Testing

Operating Experience

- Favorable BWR Post-EPU Transient Response
- Predictable Response and Adequate Safety Margins Have Been Observed
- Exception: Dresden Vessel Overfill Event
  - Incomplete Modeling of Change from Two to Three Operating Feed Pumps for EPU
  - Transient Resulted in Vessel Over-Fill and Water Entry into HPCI Steam Lines
  - HPCI Steam Lines at Dresden Unusual; Separate and Lower than Main Steam Line Penetration into Vessel

VY Transient Testing Review

- Load-Rejection in 2004 Satisfies Many Objectives of Large Transient Test
  - About 80 Percent of CPPU Power Level (100 Percent of current licensed thermal power (CLTP))
  - Many EPU Mods Had Been Completed, Including Mods to Feedwater System and Main Turbine
- Significant Margin to Vessel Overfill Event
- Retains Substantial Turbine Bypass Capability
- Safety-Related System Performance Modeled in Safety Analyses -Adequate Margin Maintained

Vermont Yankee Transient Testing

- Condensate/Feedwater Interaction on a Loss of a Condensate Pump
  - Potential for Loss of All Feed Pumps due to New Common Low-Low Suction Pressure Trip
  - Outside Range of Previous Operating Experience
- Transient Testing License Condition Will Be Added to VY License
- Licensee Identified Calculational Error - Lower Margin than Previous Estimate
- Additional Modification for Direct Trip of a Feed Pump Proposed By Licensee and Currently Under Staff Review

Condensate Pump Trip Test

- Tests Integrated Response of Many Control Systems and Modifications, Including:
  - Recirculation Runback
  - Feedwater Level Control
  - Reactor Pressure Control
  - Feed Pump Suction Pressure Trip Logic
- Design Outcome is Continued Operation at Reduced Power
- Safety Benefit in Demonstrating Proper Transient Response and Maintenance of Normal Heat Removal (Defense-in-Depth) Justifies Operational Impact

Conclusion

- Limited Scope of Test Program Justified
  - Industry Operating Experience
  - VY Load Rejection Event
  - Acceptable Analytical Results and Safety Margins
  - Limited Scope of Modifications
- Transient Testing of Condensate/Feedwater Interaction Necessary
  - Affected By Modifications
  - Outside Bounds of Previous Experience

Crediting Containment Accident Pressure for NPSH

Richard Lobel
Senior Reactor Systems Engineer
Probabilistic Safety Assessment Branch
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

Purpose

- To discuss NRC Staff review of the VY proposal to credit containment accident pressure in determining available net positive suction head (NPSH)

Regulations

- There is no regulation prohibiting credit for containment accident pressure in determining available NPSH for safety-related pumps

NRC Position

- NRC allows credit for containment accident pressure when:
  - a conservative analysis has demonstrated that this amount of pressure will be available for the postulated design basis accident; and
  - When examined from a broader perspective including design basis accidents, the level of risk is acceptable.

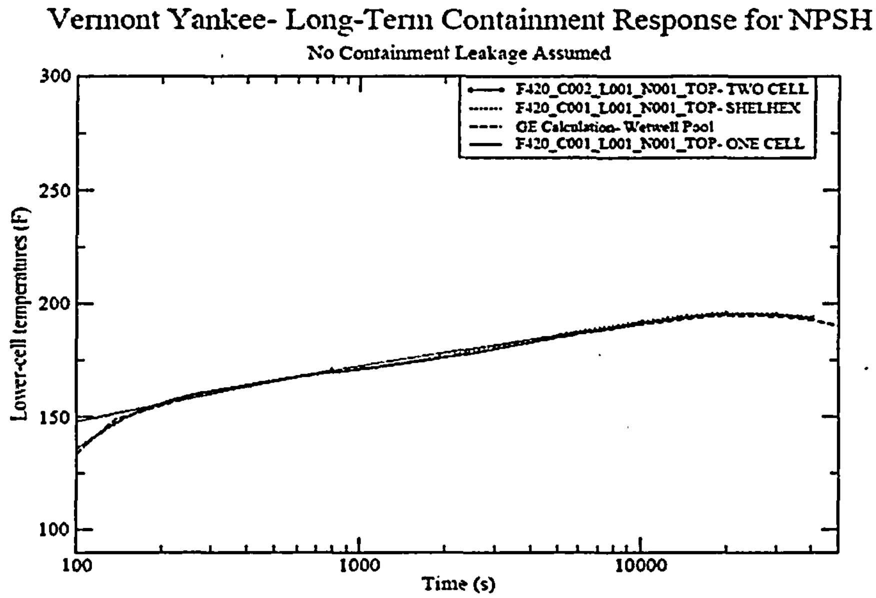
Postulated Accidents That May Require Credit

- Loss-of-Coolant Accident (LOCA)
- Anticipated Transients Without Scram (ATWS)

Calculating Containment Conditions

- SHEX computer code is used for LOCA and ATWS

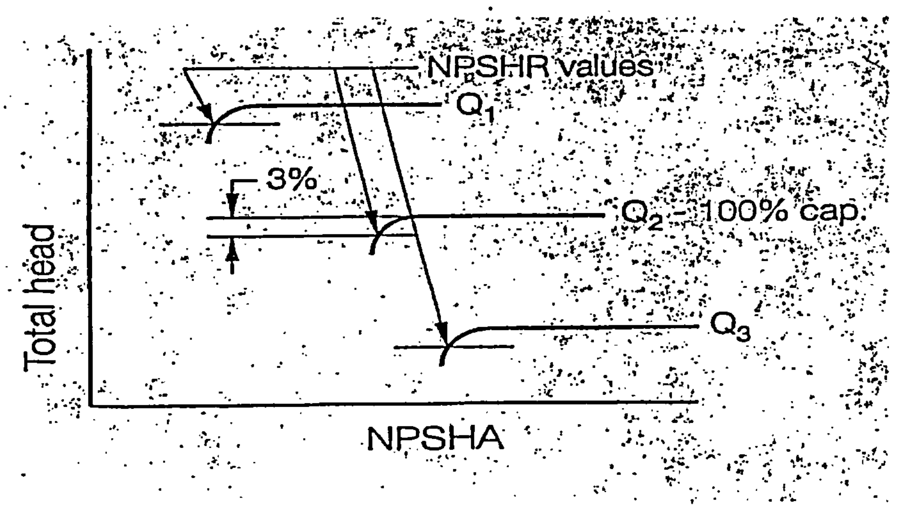
NRC Calculation of Supp Pool Temp



Calculating Containment Conditions

- GOTHIC 7.0 computer code is used for Appendix R and Station Blackout

Required NPSH Defintion



5-9

RG 1.82 Position on Required NPSH

- Credit may be taken for operation in cavitation provided:
  - Protypical pump tests are performed
  - Acceptable post-test examination

5-10

VY Required NPSH

- Based on pump vendor testing and expert judgment
- VY RHR and core spray pumps tested at reduced NPSH conditions - limited number of points.
- Additional data from other pump models
- Pump vendor states that pump design characteristics important to required NPSH are identical for non-VY pumps: specific speed, suction specific speed, blade inlet angle
- Pump affinity laws applied to adjust data
- Time at reduced NPSHR: pump vendor judgment

Conservatism

- VY Response to NRC Staff RAI:
  - "The more conservative initial conditions assumed in the design bases calculations are responsible for identification of the need to rely on containment accident pressure..."

Vermont Yankee TS Change No. 263, Supplement 8, July 2, 2004

LOCA Conservatism

- Reactor power 102% of licensed rated thermal power
- Decay heat at 2-sigma
- Decay heat bounds specific cycle
- Most conservative initial conditions
- All TS parameters at limiting value
- Worst single failure short-term: LPCI Loop Select failure results in pump runout flow

LOCA Conservatism

- Worst single failure long-term: RHR heat exchanger unavailable
- RHR flow through RHR HX minimized
- RHR service water flow (ultimate heat sink) through HX minimized
- Break flow heat and mass transfer with drywell atmosphere minimizes torus pressure
- NPSH calculation based on a suppression pool water volume less than predicted at time of peak temperature

LOCA Conservatism

- Value of ECCS strainer head loss used is greater than predicted
- No temperature correction made to required NPSH
- For the long-term, the distribution of debris on the one active CS strainer and one active RHR strainer will be the amount initially deposited in the short term + redistributed from inactive strainers + amount not removed in short term

LOCA Conservatism

- Strainer temperature for head loss calculations less than predicted suppression pool temperature
- RHR pump runout flow used for long-term LOCA
- Maximum service water temperature
- Continuous spray operation (torus and drywell)
- Peak initial suppression pool temperature (90 F)
- Operation of containment spray is assumed for the duration of NPSH calculation
- RHR pump flow assumed at runout (maximum) value for duration of LOCA - operator never throttles pump

LOCA Conservatism

- Cumulative conservatism due to the assumption that all conservatisms apply simultaneously

LOCA Conservatism

Single Failure Assumption	Peak Suppression Pool Temperature
With RHRHX Failure	195 °F
Without RHRHX Failure	169 °F

LOCA Conservatism

Input Parameter	Conservative Assumption	Anticipated Value	SP Estimated Temp Diff (F)
Decay Heat	Cycle Independent	Cycle Dependent	-2.0
Long-Term Vessel Recovery with Minimum SP Cooling	2 LPCI and 2 CS	1 CS	-8.0
RHR Flow (as it affects RHRHX performance) (gpm)	6,400	7,000	-0.6
RHRSW Flow (as it affects RHRHX Performance) (gpm)	2,700	4,000	-4.8

LOCA Conservatism

- Pre-EPU Peak SP Temperature = 182.6 °F
- Peak EPU SP Temperature = 194.7 °F
- Peak SP Temp − Sum of conservatisms in table
  194.7 °F - 15.4 °F = 179.3 °F
- Peak SP Temperature − Root mean square of conservatisms in table
  194.7 °F - 9.6 °F = 185.1 °F

Conservatism

- An analysis with realistic (nominal) assumptions shows that credit for containment accident pressure is not needed.

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Containment Integrity

- VY design basis analyses assume containment integrity. Based on:
  - VY compliance with 10 CFR 50 Appendix J Leak testing
  - VY compliance with 10 CFR 50.55a inspections
- Walkdowns prior to containment closure
- VY containment is inerted

5-22

Peak Containment Pressure (psig)

Pre-CPPU	CPPU
41.6	41.8

Impact on Operator

- Credit for containment accident pressure does not change VY emergency operating procedures (EOPs). Containment pressure is currently a consideration for NPSH.
- No impact on operator

Conclusions

- Credit for containment accident pressure is determined conservatively.
- A more realistic but still conservative calculation would show that credit is not needed.
- Based on stringent testing requirements, inerting and VY EPU safety analyses, containment integrity is a reasonable assumption
- Credit for containment accident pressure has no impact on the operator
- Staff finds the VY credit for containment accident pressure acceptable

Containment Accident Pressure Credit NRC Staff Risk Evaluation

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Senior Reliability & Risk Analyst
Probabilistic Safety Assessment Branch
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

Presentation Outline

- Overview of risk evaluations to support non-risk-informed license amendment requests (LARs)
- NRC staff scoping risk evaluation of proposed containment overpressure (COP) credit
- Risk insights concerning defense-in-depth
- Risk insights concerning performance monitoring
- Conclusions

Non-Risk-Informed Submittals

- General references
  - COMSAJ-97-08, "Discussion on Safety and Compliance"
  - RIS 2001-02, "Guidance on Risk-Informed Decisionmaking in License Amendment Reviews"
  - Standard Review Plan (SRP), Chapter 19, Appendix D, "Use of Risk Information in Review of Non-Risk-Informed License Amendment Requests"
- The decision to submit a risk-informed LAR is voluntary on the part of the licensee

Process to Obtain Risk Information

- 10 CFR 2.102 gives NRC authority to require the submittal of information in connection with an LAR
- SRP 19, App. D provides the process to obtain risk information about a non-risk-informed LAR:
  - Staff requests risk information
  - If licensee declines, staff must show that the LAR raises questions about adequate protection of the public health and safety in order to require the licensee to provide risk information

Process to Obtain Risk Information (Con't.)

- Licensee needs to address the five key principles of risk-informed decisionmaking given in RG 1.174
- Licensee may decline to provide risk information, but could have its LAR denied
- Specific to extended power uprates (EPUs):
  - EPUs not submitted as risk-informed LARs
  - However, the staff expects licensees to submit a risk evaluation because a proposed EPU could create special circumstances that rebut the presumption of adequate protection from compliance with existing regulations and requirements
  - "Review Standard for Extended Power Uprates," RS-001, Rev. 0, Matrix 13

Five Key Principles in RG 1.174 and SRP 19

- The five key principles:
  - Proposed change meets the current regulations
  - Proposed change is consistent with the defense-in-depth philosophy
  - Proposed change maintains sufficient safety margins
  - Increases in risk should be small and consistent with the intent of the Commission's Safety Goal Policy Statement (51 FR 30028)
  - Impact of proposed change should be monitored using performance measurement strategies
- Acceptability of proposed change is determined by an integrated decisionmaking process

Risk Evaluation Chronology

9/10/03	Entergy submits EPU application
12/18/03	NRC staff sends Request for Additional Information (RAI); Question SPSB-7 asked about overpressure credit in the context of PRA operator actions
1/31/04	Entergy responded to the RAI (Supplement 5)
May 2004	Staff makes scoping risk evalution of overpressure credit
5/28/04	NRC staff sends RAI; Question SPSB-C-1 asked about the overall impact of the overpressure credit on risk
7/2/04	Entergy responded to the RAI (Supplement 8)
12/21/04	NRC staff sends RAI; Question SPSB-C-45 asked about thermal-hydraulic calculations that support PRA success criteria
2/24/05	Entergy responded to the RAI (Supplement 23)
7/19/05	Staff presentation to ACRS Subcommittee on Thermal Hydraulics concerning revision to RG 1.82; discusses initial staff risk evaluation. Subcommittee suggests that the risk evaluation be expanded to include more initiating events

Risk Evaluation Chronology (Con't.)

July - August 2005	Staff expands its risk evaluation by modifying SPAR models
9/8/05	Staff presentation to full ACRS Committee concerning revision to RG 1.82; discusses revised staff risk evaluation
9/10/05	ACRS letter on proposed revision to RG 1.82 recommends that it not be published for public comment without revisions
10/5/05	Staff requests Entergy to provide a risk evaluation of the overpressure credit that addresses the five key principles of risk-informed decisionmaking in RG 1.174
10/7/05	Staff presentation to full ACRS concerning proposed revision of RG 1.82; states intent to consider overpressure credit using risk-inform decisionmaking and make RG 1.82 a risk-informed regulatory guide
10/21/05	Staff completes draft Safety Evaluation; scope of risk evaluation based on NRR RS-001 and SRP 19, App. D
10/21/05	Entergy provides partial risk evaluation (Supplement 38)
10/26/05	Entergy completes risk evaluation (Supplement 39)
TBD	Staff to develop revised draft SE that includes review of Supplements 38 and 39

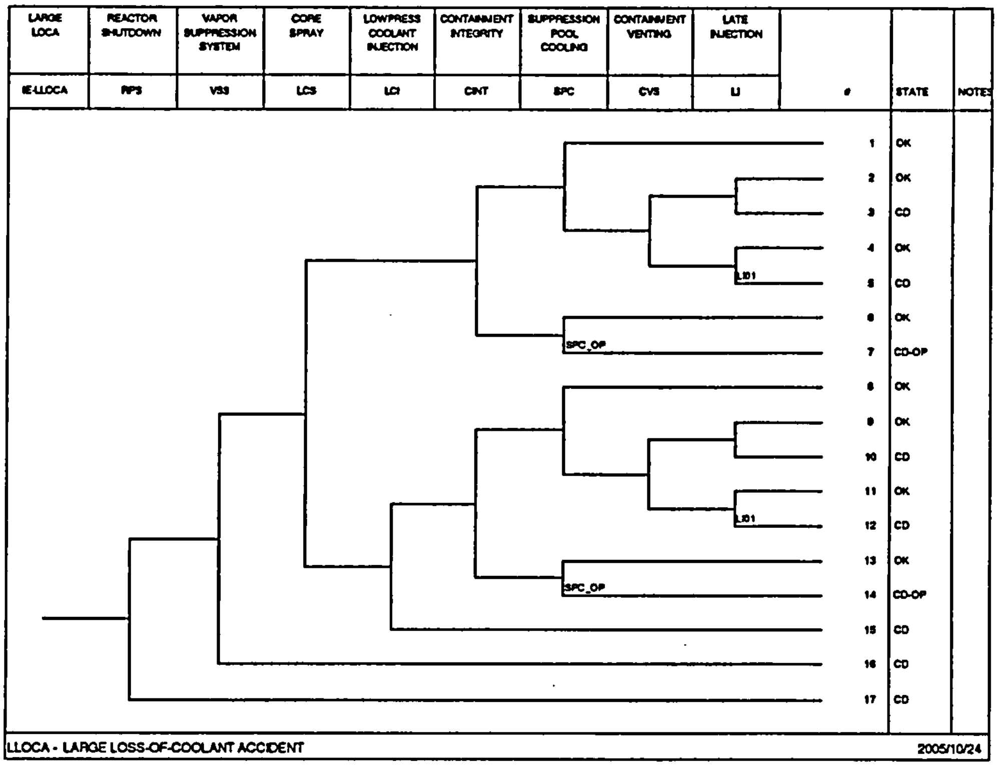
Staff Scoping Risk Evaluation

- Realistically conservative licensee thermal-hydraulic calculation indicates that containment overpressure credit is not required
- Staff risk evaluation assumes that core damage will occur only if all of the following occur:
  - Reactor coolant is discharged to the suppression pool
  - Low pressure core injection (LPCI) or core spray (CS) is required to provide reactor inventory control or decay heat removal
  - Containment integrity is lost (loss of overpressure, which leads to inadequate NPSH)
  - Operator does not initiate suppression pool cooling within four hours

Scoping Risk Model

- Modification of the Standardized Plant Analysis of Risk (SPAR) models developed by the Office of Research (RES). SPAR models are the basis of:
  - Significance Determination Process (SDP)
  - Accident Sequence Precursor (ASP) program
- Considered:
  - 11 transient initators
  - 5 LOCA initiators (including ISLOCAs)
  - Special sequence types
    - Station blackout (SBO)
    - Stuck-open relief valve (SORV)
    - Anticipated transients without scram (ATWS)

Scoping Risk Model (Con't.)



Scoping Risk Model (Con't.)

- Data to quantify loss of containment integrity (including pre-existing undetected leaks and containment isolation failures) obtained from:
  - Licensee's recent submittal for a one-time ILRT extension to 15 years
  - Office of Research (RES)
- Human failure event (failure to initiate suppression pool cooling within four hours):
  - Cognitive Errors: EPRI Cause-Based Decision Tree Method (CBDTM)
  - Action Errors: NUREG/CR-1278, A Technique for Human Error Rate Prediction (THERP)

Scoping Risk Model (Con't.)

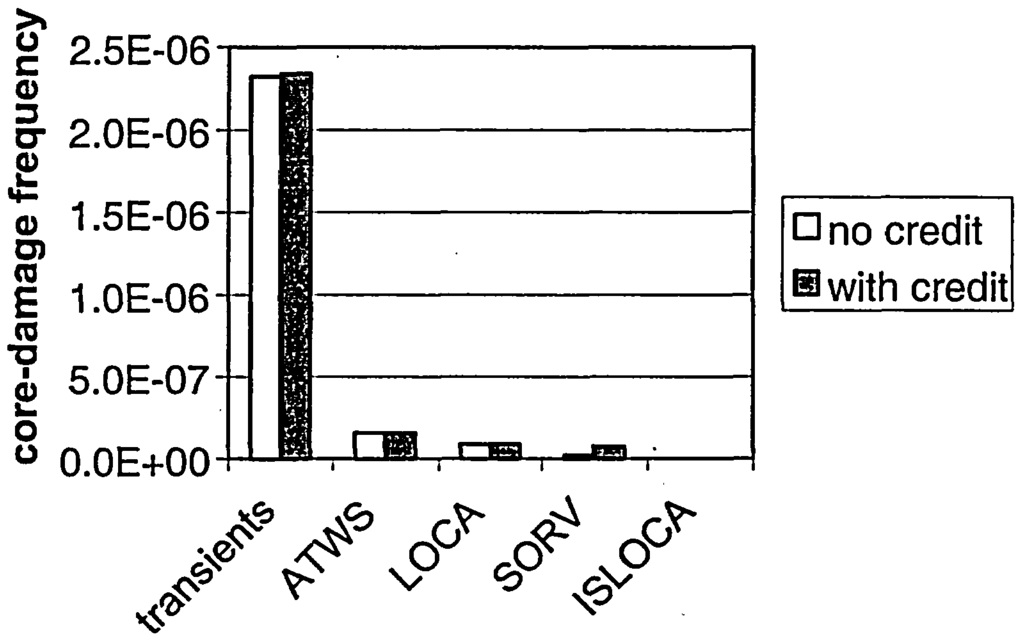
- Quantification method:
  - Truncation limit: 10^{-12} per year
  - 5000 Monte Carlo samples for parametric uncertainty analysis
  - Minimal cut sets regenerated for each sensitivity analysis case
- Uncertainty analysis:
  - Parametric uncertainties
  - Modeling uncertainties
    - Containment leak size
    - Main steam isolation valve (MSIV) success criterion
    - Human reliability analysis methods

Results of the Analysis

	mean	5th percentile	95th percentile
CDF for no overpressure credit	2.6E-06	2.5E-07	8.9E-06
CDF with COP credit	2.6E-06	2.5E-07	8.9E-06
change in CDF due to COP credit	6.2E-08 2.4%	2.6E-10	2.5E-07

- Very small change in core-damage frequency (CDF) using the risk acceptance guidelines in RG 1.174

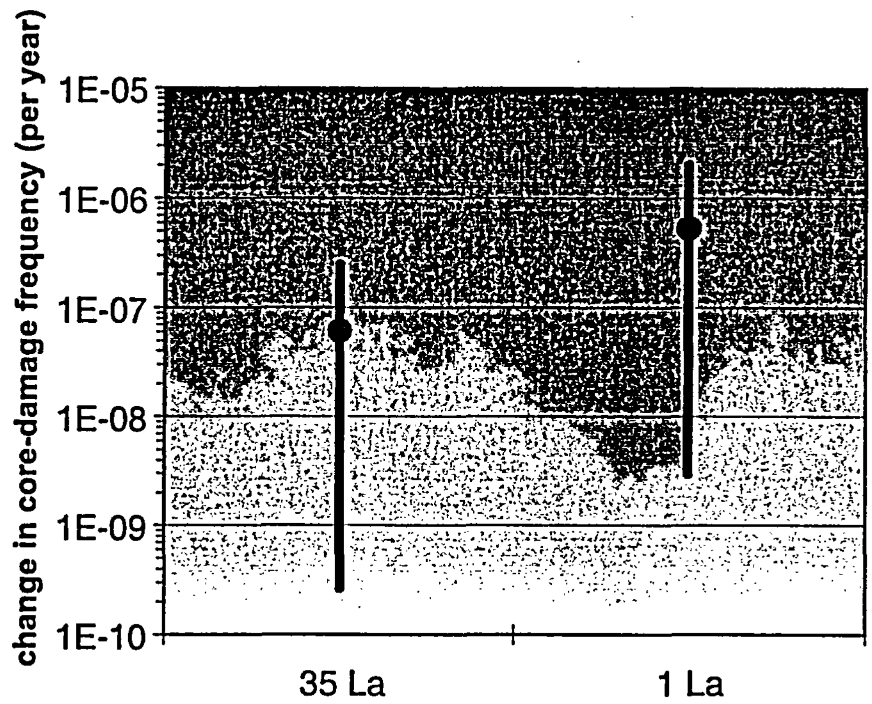
Contributions to Core-Damage Frequency



Importance Measures

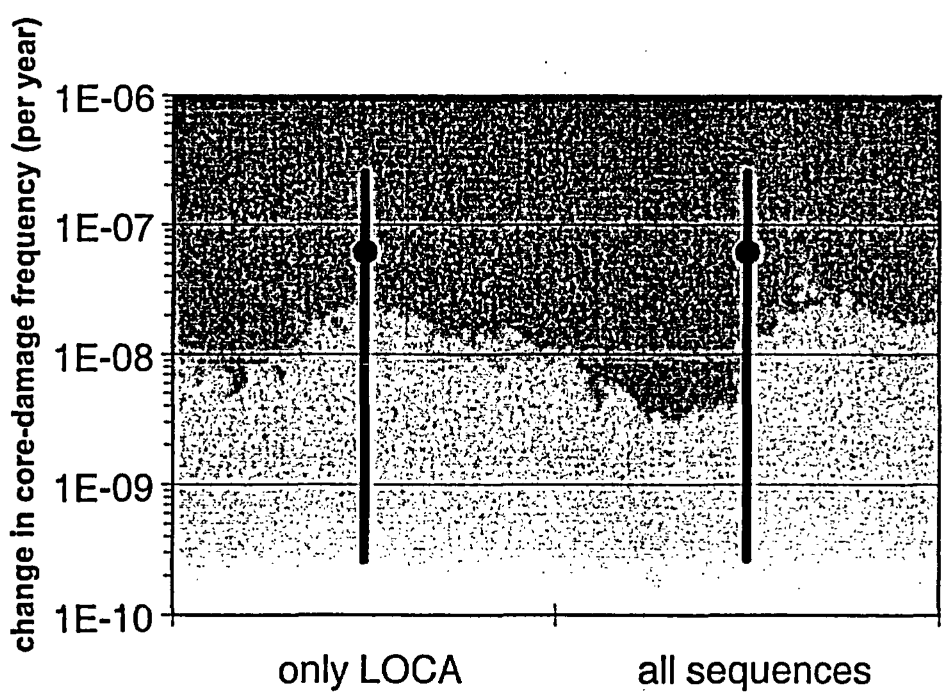
Event	Fussell-Vesely Importance	Risk Achievement Worth
Pre-existing, undetected containment leakage	2.50E-02	2.8
Operator error	8.90E-03	11.3
Containment isolation failure	7.40E-04	2.7
MSIV failures	1.30E-06	1.02

Sensitivity to Containment Leak Size



6-17

Sensitivity to MSIV Success Criterion



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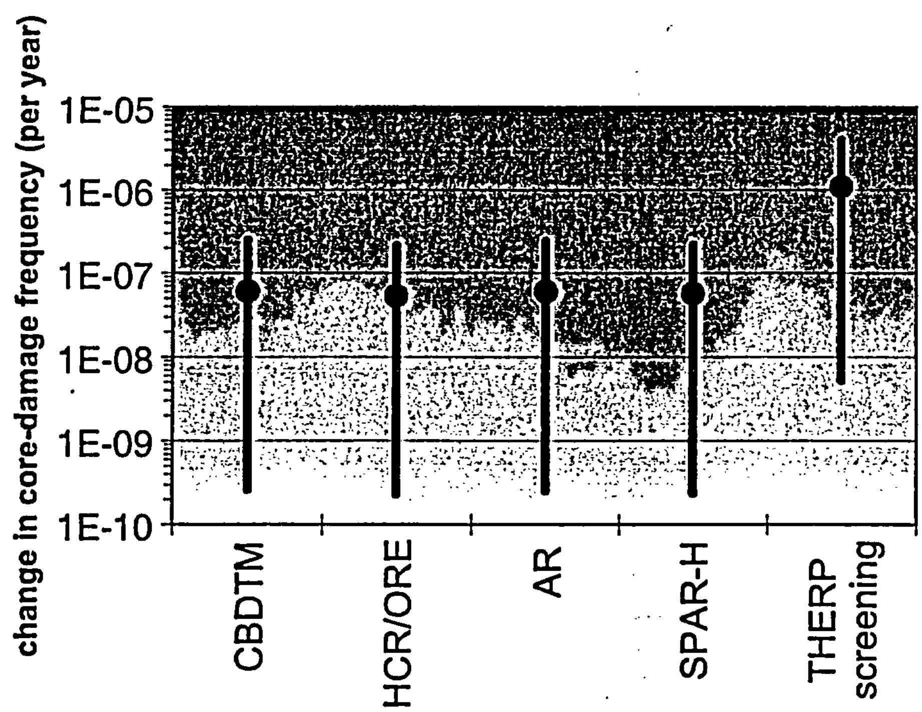
Sensitivity to Human Reliability Analysis

- Alternative methodologies:
  - HCR/ORE: Human Cognitive Reliability/Operator Reactor Experiments, EPRI NP-7183-SL (1990)
  - AR: Annunciator Response, NUREG/CR-4772 (1987)
  - SPAR-H: SPAR-H Human Reliability Analysis Method, NUREG/CR-6883 (2005)
  - THERP: Technique for Human Error Rate Prediction, NUREG/CR-1278 (1983); used for initial screening analysis

6-19

Sensitivity to HRA Method



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Risk Insight: Impact on Defense-in-Depth

- PRA can provide insights about how the proposed COP credit affects the balance between accident prevention and mitigation
- Consideration of this balance is important in weighing the necessity and sufficiency of defense-in-depth measures
- Staff considered how the proposed COP credit would affect the conditional containment failure probability (CCFP) in order to evaluate the balance between accident prevention and mitigation

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Approximate Impact on CCFP

$$CCFP \equiv \frac{\text{accident release frequency}}{\text{core damage frequency}}$$

R_{CCFP} = fractional change in CCFP

R_{CDF} = fractional change in CDF

Since core-damage accidents caused by loss of containment integrity will cause some form of release, it can be shown that:

$$R_{CCFP} = \frac{1-CCFP}{CCFP} \times \frac{R_{CDF}}{1+R_{CDF}}$$

6-22

Approximate Impact on CCFP (Con't.)

NUREG-1560, "Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance," Table 12.7 indicates that the CCFP for a BWR plant with a Mark I containment is generically about 0.6:

$$R_{CCFP} = \frac{1-0.6}{0.6} \times \frac{0.024}{1+0.024} = 0.016 = 1.6\%$$

This result suggests that the proposed COP credit does not significantly change the existing balance between accident prevention and mitigation.

SRP 19 Defense-in-Depth Objectives

- The LAR does not result in a significant increase in the existing challenges to the integrity of barriers.
- The LAR does not significantly change the failure probability of any individual barrier.
- The LAR does not introduce new or additional failure dependencies among barriers that significantly increase the likelihood of failure compared to the existing conditions.
- The overall redundancy and diversity among barriers is sufficient to ensure compatibility with the risk acceptance guidelines.

SRP 19 Defense-in-Depth Evaluation

- The proposed COP credit has no effect on LOCA or transient-induced SORV frequencies because it does not affect normal plant operating conditions.
- The proposed COP credit has no effect on the probability of containment failure because it does not affect normal plant operating conditions.
- Under the assumptions of the design-basis accident (DBA) analysis, the proposed COP credit introduces a dependency between the fuel and containment barriers; however, this does not appear to be probabilistically significant.

SRP 19 Defense-in-Depth Evaluation (Con't.)

- Realistically conservative analyses indicate that no COP credit is needed. Even if the COP credit is presumed to change PRA success criteria, then:
  - There must be at least three failures to cause a core-damage accident:
    - LOCA (or SORV, which requires multiple failures)
    - Loss of containment integrity
    - Loss of suppresion pool cooling
  - The mean change in CDF is very small and meets the RG 1.174 risk acceptance guidelines
  - Results are robust in terms of uncertainties and sensitivities to key modeling parameters and assumptions

SRP 19 Defense-in-Depth Evaluation (Con't.)

- The scoping risk evaluation, based on the assumption that the proposed COP credit changes the PRA success criteria, indicates that the proposed COP credit does not significantly change the CCFP. Hence, it does not significantly change the existing balance between accident prevention and mitigation.
- Therefore, the proposed COP credit meets the four defense-in-depth objectives in SRP 19.

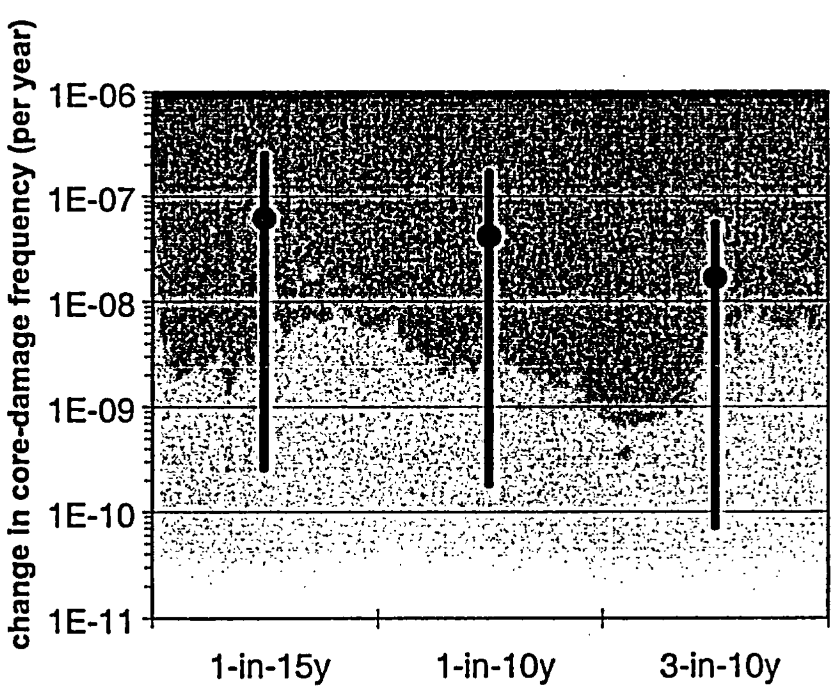
ACRS Comments on Defense-in-Depth

- ACRS letter of May 19, 1999
  - Expressed concerns about "arbitrary appeals to defense in depth" to avoid making changes to regulations and regulatory practices that seem appropriate in light of PRA results
  - Expressed the notion that there should be an inverse correlation between the uncertainty in PRA results and the extent to which defense in depth is applied
- Position reiterated in joint ACNW/ACRS letter of May 25, 2000

Risk Insight: Performance Monitoring

- The probability of pre-existing, undetected containment leaks used in the scoping risk evaluation is conservative:
  - The VY containment is inerted with nitrogen
  - Probability was estimated from results of Type A integrated leak rate tests (ILRTs) for the entire U.S. commercial nuclear industry
  - More realistic approach would be to reduce this probability since inerting provides a continual means of detecting loss of containment integrity
- A sensitivity study was performed to assess the impact of the ILRT frequency on the change in CDF

Sensitivity to ILRT Frequency



Conclusions

- Draft staff safety evaluation (SE) is based on consideration of adequate protection
- Staff will revise its SE after considering latest licensee supplements
- Staff scoping risk evaluation indicates that the proposed COP credit:
  - Has very small risk, even after considering parametric and modeling uncertainties
  - Does not significantly change the existing balance between accident prevention and mitigation
  - Meets the defense-in-depth objectives in SRP 19

Engineering Inspection

Larry Doerflein
Chief, Engineering Branch 2
Division of Reactor Safety
Region I

Agenda

- Introduction - Larry Doerflein
- Inspection Background - Larry Doerflein
- Engineering Inspection - Jeff Jacobson
- Followup of Inspection Issues - Larry Doerflein
- Impact on EPU Amendment Review - Rick Ennis
- Questions and Comments

Inspection Background

- Biennial Safety System Design and Performance Capability Inspection Scheduled
- Request for Independent Safety Assessment
- Conditions Different than Maine Yankee
- New Inspection Procedure
- Team Independence
- Vermont State Nuclear Engineer Participation

Vermont Yankee Engineering Inspection

Jeff Jacobson
Team Leader
Vermont Yankee Engineering Inspection

Inspection Background

- VY inspection was responsive to the Vermont Public Service Board request to conduct an independent assessment and provide the inspection results to the ACRS for review
- VY inspection was part of a pilot program developed to improve the effectiveness of NRC engineering/design inspections
- VY inspection was the first of four pilot inspections
- The inspection involved about 900 hours of direct inspection versus 475 for a normal engineering team inspection

Inspection Staffing and Scope

- The inspection team included an NRR team leader, four NRC regional inspectors, and three highly qualified independent contractors
- All team members were independent of any recent oversight responsibilities of VY
- The inspection team focused on components and operator actions that represented high risk and had the lowest relative safety margins
- Low margin areas were identified in part by consultation with NRR technical staff

Inspection Scope (continued)

- Forty five components, operator actions, and operating experience samples were reviewed in detail
- The components reviewed were part of the following plant systems
  - On-site and off-site electrical systems
  - Reactor core isolation cooling system
  - Residual heat removal system
  - Safety relief valves
  - Reactor feedwater and condensate systems
  - Other risk significant systems

Pilot Inspection Areas of Review

- Visual signs of degradation, installation errors, interference issues, environmental concerns
- Design and licensing basis documentation
- Review of design assumptions, system interfaces, failure modes
- Component history including maintenance, corrective action, and testing records
- Operating procedures
- Focus on functionality of equipment

Additional Reviews Conducted Specifically for VY Inspection

- Comparison against current and uprated power levels
- Assessment of design control processes applied to power uprate

Inspection Results

- Eight findings of very low risk significance (Green)
- Findings did not result in system inoperability either as compared to current or uprated power levels
- Findings were not indicative of any programmatic breakdown
- The inspection approach used during the four pilot inspections was determined to be more effective than the system based vertical slice approach that is part of the current baseline inspection program
- Plans are to adopt this low margin inspection approach into the baseline engineering inspection program beginning 1/1/2006

Inspection Findings

- Capability of Vernon Hydro-electric station to supply power to VY in event of a regional blackout*
- Adequacy of procedure used to monitor operability of offsite power
- Lack of degraded voltage analysis
- Reactor Core Isolation Cooling pressure control valve - reliance on instrument air
- Reactor Core Isolation Cooling pressure control valve - automatic operating mode inoperable

* EPU related

Inspection Findings (continued)

- Non-conservative input for condensate storage tank temperature used in transient analysis*
- Safe shutdown analysis used incorrect time for initiating reactor core isolation system from alternate control panel*
- Insufficient acceptance criteria and unverified diagnostic equipment used in motor operated valve testing*
- In addition to 8 findings, one unresolved item (URI) - ungrounded 480 VAC electrical system

* EPU related

Required Corrective Actions

- The licensee is required to enter all the identified inspection findings into its corrective action program
- Corrective actions for all eight findings will be reviewed as part of the NRC's baseline inspection program -detail to be provided by Larry Doerflien
- In addition, corrective actions to the four findings that relate to areas covered by the NRC's power uprate were reviewed by the NRC's technical staff as part of the licensee's overall power uprate submittal - detail to be provided by Rick Ennis

Followup of Inspection Issues

Larry Doerflein
Chief, Engineering Branch 2
Division of Reactor Safety
Region I

Status of Inspection Issues

- All Eight Inspections Findings Received Followup
- Inspection completed
  - IR 2005-002
    - RCIC startup time line
    - Procedure for assessing operability of off-site power
  - IR 2005-004
    - Degraded Relay Setpoint Calculations
    - CST Temperature
  - IR 2005-006
    - Availability of Power from Vernon Hydro Station
    - MOV Testing

Status of Inspection Issues

- More Inspection Needed
  - Design of RCIC pressure control valve
  - Non-conforming operation of RCIC pressure control valve
- Other
  - URI on Ungrounded 480V System - Task Interface Agreement (TIA)

Engineering Inspection Impact on EPU Review

Rick Ennis
Senior Project Manager
Divsion of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Findings Related to EPU Review

- The findings that impacted the EPU review were:
  - Station Blackout
  - Appendix R Timeline for Reactor Core Isolation Cooling System (RCIC) Initiation
  - Periodic Testing of Motor-Operated Valves (MOVs)
  - Condensate Storage Tank (CST) Temperature

Station Blackout (SBO)

- Finding impacts Safety Evaluation Section 2.3.5, "Station Blackout"
- Coping analysis performed to address finding (Supplement 25 dated 3/24/05)
- Review of coping analysis determined for 2-hour coping period:
  - Adequate condensate inventory;
  - Adequate battery capacity;
  - Equipment operability with loss of ventilation;
  - Containment isolation maintained; and
  - NPSH met without crediting containment accident pressure.
- Staff concluded VY will meet SBO requirements under EPU conditions

Appendix R Timeline for RCIC Initiation

- Finding impacts Safety Evaluation Section 2.11, "Human Performance"
- Time to core uncovery:
  - 25.3 minutes (current power level)
  - 21.3 minutes (EPU level)
- Time to place RCIC in service for Appendix R:
  - 15 minutes (1999 analysis)
  - 21 minutes (inspection team finding)
- Procedure revised to address finding.
- Results of timed operator crew walkthroughs of revised procedure submitted in Supplement 22 dated 12/8/04:
  - Times ranged from about 12 to 15 minutes
  - Average time about 13.5 minutes
- Staff concluded that sufficient margin exists to place RCIC in service during an Appendix R event under EPU conditions

Periodic Testing of MOVs

- Finding impacts Safety Evaluation Section 2.2.4, "Safety-Related Valves and Pumps"
- Licensee did not manage commitments and conditions in SE for GL 96-05 MOV Periodic Verification Program
- Supplement 16 dated 9/30/04 committed to revise MOV Periodic Verification Program
- Supplement 32 dated 9/10/05 stated commitment is complete
- Staff concluded safety-related valves will continue to meet applicable requirements following EPU implementation

CST Temperature

- Finding impacts Safety Evaluation Section 2.6.5, "Containment Heat Removal"
- Supplement 18, dated 10/5/05 revised ATWS analyses for EPU
- Increase in CST temperature increased suppression pool temperature from 190F to 190.5F
- Peak suppression pool temperature for limiting event (LOCA) is 194.7F
- Staff concluded effect of CST temperature change is acceptable since limiting temperature will not be exceeded

Conclusions

- Licensee submitted supplements to EPU application to address all 4 findings
- NRC staff has reviewed information and concludes the issues have been adequately addressed

Engineering Inspection Summary

- Engineering inspection was responsive to the Vermont Public Service Board request (hours spent, scope, independence)
- Inspection approach considerd an improvement over vertical slice approach
- All of the inspection findings were of low safety significance
- All inspection findings have received followup inspection for corrective actions
- Findings impacting the EPU have been adequately resolved as addressed in the NRC staff Safety Evaluation

Entergy Vermont Yankee

Extended Power Uprate

Presentation to the
Advisory Committee On Reactor Safeguards
Extended Power Uprate Subcommittee
November 15-16, 2005

Introductory Remarks

Jay Thayer

Entergy VY Site Vice President

Introductory Remarks
Role of Vermont Yankee

- Key supplier of Electricity in Vermont
- Stable price point
- Economic benefit to State, Towns, & People

Introductory Remarks

Power Uprate Key Points

- Part of Entergy Strategic Plan
  - Feasibility/Due Diligence
  - Modifications/Modernization
- Entergy Fleet Participation
- EPU Implementation
  - Plant readiness
  - Personnel/Operations Readiness

Overview

Craig Nichols
EPU Project Manager

Overview
Entergy EPU Project Plan

- Dedicated EPU Project Team
- Approved all Vendor Task Scope, Design Inputs and Task Output
  - Entergy Interdisciplinary Review
- Performed Technical and QA Audits of Vendor Files

Overview

Benchmarking and Operating Experience

- Benchmarked Recently Performed BWR EPUs
- Insights in following areas
  - EPU Analysis
  - Modifications
  - Operational Events
  - Power Ascension Monitoring
- Formal EPU OE Program

Overview
Implementation Approach

- Current VYNPS Operation
  - 1593 MWt Current Licensed Thermal Power (CLTP)
  - 18 Month Operating Cycle
  - Fuel – GE 14 (10 x 10) – 368 Assemblies
- EPU Operation
  - 120% of Current Licensed Thermal Power to 1912 MWt
  - No Reactor Pressure Increase
  - No Change in Fuel Type or Cycle Length
  - No Change in Licensed Maximum Core Flow

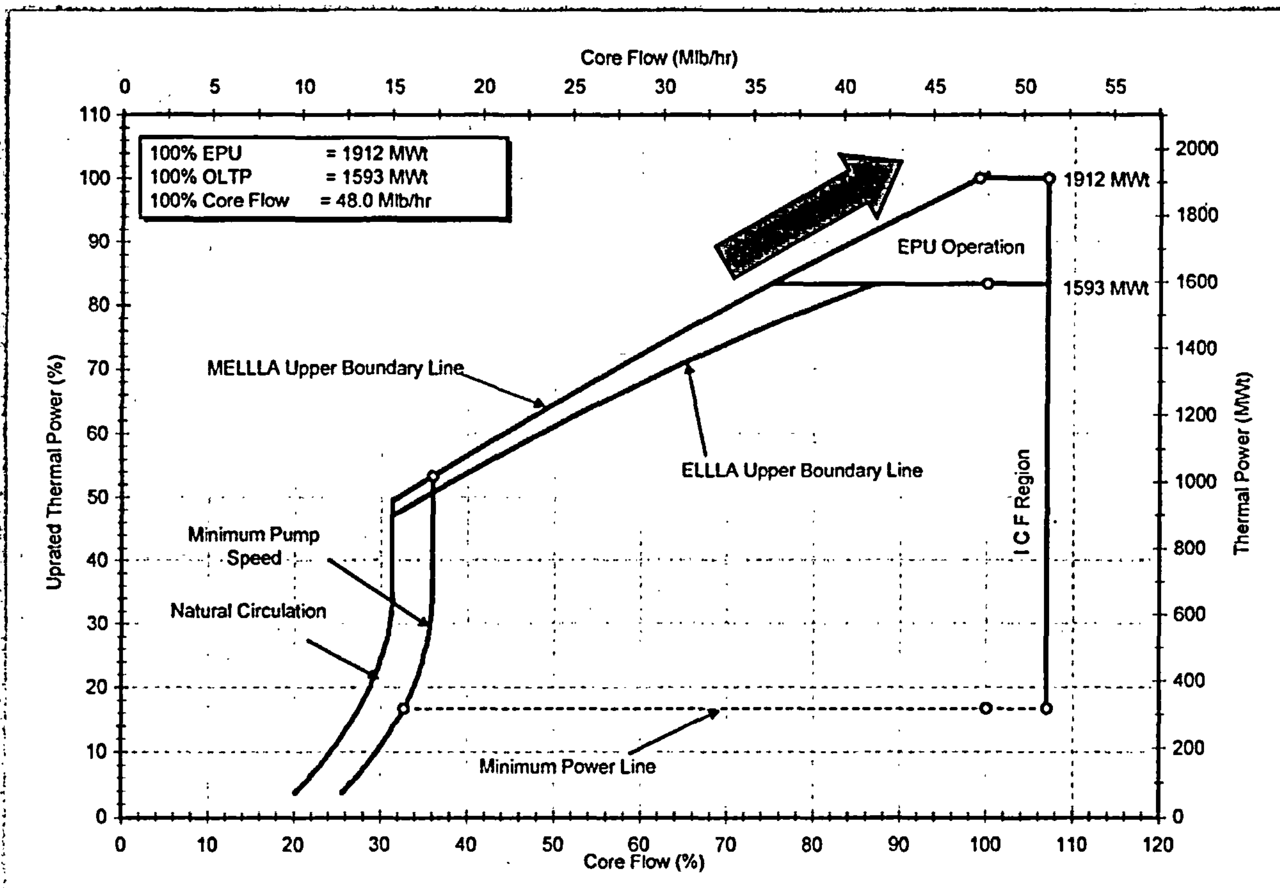
Entergy

Overview

Parameter Comparison

Parameter	CLTP	EPU
Reactor Thermal Power (MWt)	1593	1912
Reactor Steam Flow (Mlbm/hr)	6.4	7.9
Reactor Dome Pressure (psia)	1020	1020

Overview
Power Flow Map



Increase Power by increasing core flow along existing MELLLA boundary

Overview

Plant Modifications – Increase Generation

- Replace High Pressure Turbine
- Main Generator Stator Rewind
- Main Generator Rotor Reinsulation
- Electrical Distribution
  - 60 MVAR Capacitor Bank
  - Protection Upgrades
- Replace Generator Isophase Bus Duct Coolers
- ARTS/MELLLA
- Condensate Demineralizer Filtered Bypass

Overview

Plant Modifications – EPU Effects

- Steam Dryer Strengthening
- RHRSW Motor Cooling Return Line
- NSSS Pipe Supports
- EQ Upgrades
- High Pressure Feedwater Heaters (4)
- Recirc Runback/Feedwater Pump Logic
- Cross-Around Relief Valves
- Main Condenser Tube Staking
- Low Pressure Turbine 8th Stage Diaphragms
- Alternative Source Term

Overview
Additional Aspects

- Application of Constant Pressure Power Uprate LTR (CLTR)
- Grid Stability Study Includes 2003 Regional Blackout Consideration
- Risk Informed Approach to COP
- Full Operating Cycle with Majority of EPU Modifications Installed

Overview

License Conditions

- Additional Safety Limit MCPR Margin (0.02)
- Steam Dryer Monitoring
- Condensate and Feedwater Pump Trip Tests

Overview
Conclusion

- Performed in Accordance with Approved Topical Report
- Comprehensive Plant Wide Effort
  - Plant Reliability Will Remain High
- Plant Safety Systems Maintain Margins
  - Not a Risk Significant Change

Power Ascension and Testing

Craig Nichols
EPU Project Manager

Entergy

Power Ascension and Testing

- Test Plan
  - Based on Original Plant Startup
  - Test Selection Guidance
    - SRP 14.2.1
    - CLTR Requirements
    - Large Transient Testing

Power Ascension and Testing

Power Ascension Program

- Past Data Taken
  - 0-100% CLTP
- Power Ascension Timeline
  - 5% Power Increase Plateaus
  - ~96 Hour Hold at Each Plateau
- Monitoring/Tests to be Performed
  - Steam Dryer
  - Piping Vibration
  - Pressure Regulator Control
  - Feedwater Level Control
  - Feedwater and Condensate Pump Trip

Power Ascension and Testing

Feedwater and Condensate Pump Trip Tests

- EPU Operating Configuration
  - Three Feedwater Pump Operation
  - Recirc Runback on Pump Trip
- Trip of a Condensate Pump at 120% Power Level
- Analysis and/or Test – No Automatic Reactor Shutdown on Feedwater Pump Trip

Power Ascension and Testing

Large Transient Tests

- Generator Load Reject and Closure of All Main Steam Isolation Valves
  - Industry Experience and Modeling Validation Demonstrate Predicted Plant Performance
  - Analyzed Event More Conservative than Test
  - Unnecessary Plant Challenge

Power Ascension and Testing
Conclusion

- Slow, Controlled Power Ascension
- Appropriate Testing to Confirm Performance

The Vermont NUCLEAR ISSUE

A Publication of the New England Coalition

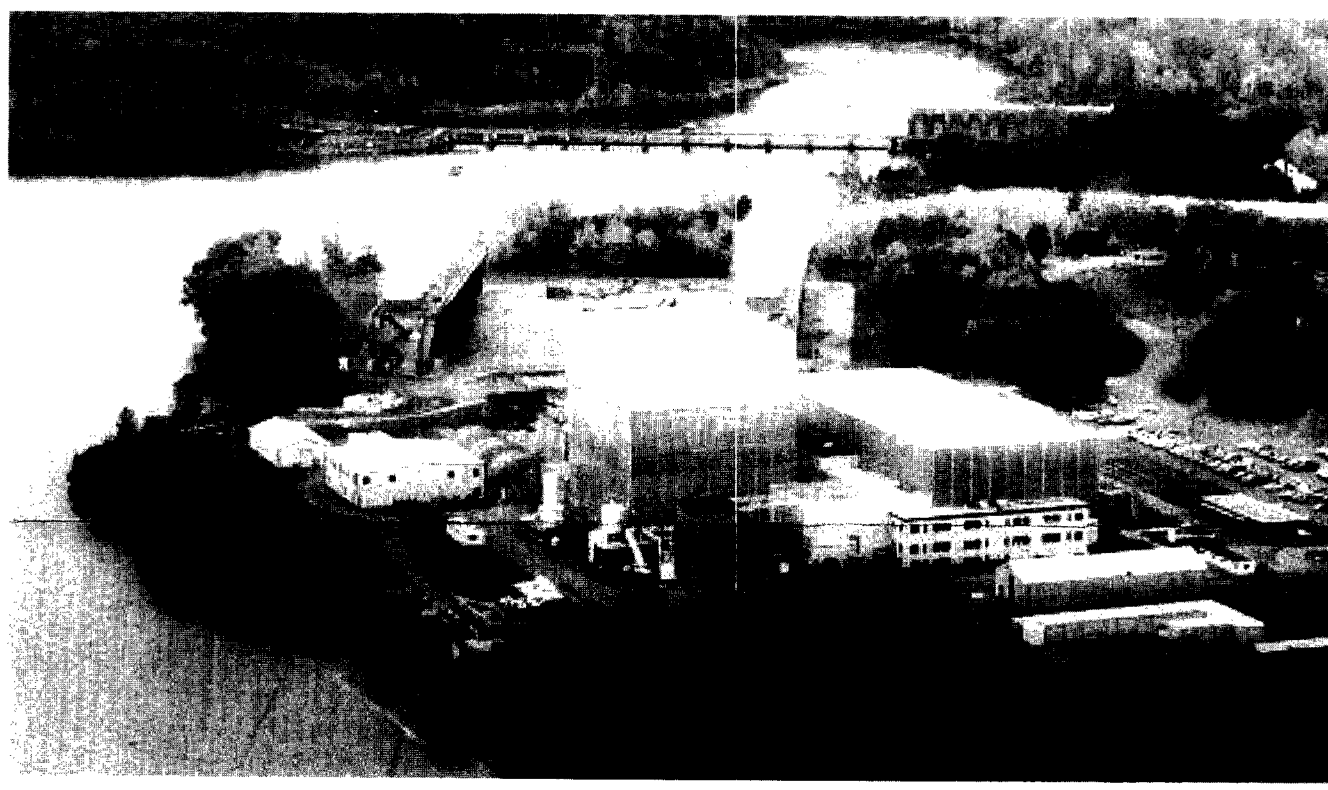
Advocating safe, secure, sustainable energy since 1971

Post Office Box 545, Brattleboro, Vermont 05302

UPRATE EDITION

SUPERCHARGE?

NO! NO! NO!



NO POWER BOOST FOR THE ANTIQUATED VERNON REACTOR

FEDERAL EXPERTS OUTLINED SAFETY CONCERNS WITH 1ST EXTENDED UPRATE

On October 17, 2001, the Advisory Committee on Reactor Safeguards of the U.S. Nuclear Regulatory Commission reviewed NRC Staff approval of a 15.3% power boost at the Duane Arnold Energy Center. Coupled with an earlier uprate, this was the first 20% and largest extended power uprate in the nation.

They found five technical issues to be of special concern:

1. Susceptibility of the plant to ATWS (Anticipated Transients Without Scram)
2. ATWS* recovery
3. Reduction in some of the times available for operator actions because of higher decay heat
4. Material degradation due to irradiation-assisted stress corrosion cracking (IASCC) of reactor internals and flow-assisted corrosion and fatigue of feedwater piping.
5. Containment response to accident events involving higher decay heat levels.

Explanation of ACRS Concerns

ACRS 1,2) - Anticipated Transients are those events, which are expected to occur once or more during the life of a reactor and to interrupt its normal operation. Without scram means that it is impossible to (completely or rapidly, as required) to insert control rods.

Some simple examples include a trip of the turbine (sudden closure of stream valves, stopping rotation of the turbine), or a loss of off-site power, which leads to tripping (sudden shutdown) of the primary system pumps, or a main steam line break.

For some transients it is important that the control and safety rods be rapidly inserted into the reactor core to shutdown the nuclear chain reaction.

In a Boiling Water Reactor (BWR), such as Entergy's Vermont Yankee, several kinds of transients can occur that result in blocking steam flow from the reactor core to the turbine. The resulting increase in reactor pressure can then collapse steam bubbles in the reactor core leading, absent a scram, to a sudden reactor power surge. BWR operators would then have only seconds to take additional emergency action before catastrophic failure.

Transients requiring scram are expected to occur about once per reactor/year.

In April 2004, Entergy Nuclear Vermont Yankee (ENVY) experienced short circuit and turbine trip (due to deferred maintenance and coolant flow increase in preparation for EPU). The plant was scrammed.

In July 2005, ENVY had a "catastrophic failure " of an original equipment (1971) transformer insulator and turbine. Emergency Operating Procedure Number 3 was initiated and the reactor was scrammed.

Thus, ENVY scrams appear to be occurring at the expected rate of one per reactor year.

At the time that Vermont Yankee was licensed, ACRS consultants estimated that scram system unreliability smaller than one in 10, 000 could not be expected because of systemic failures. Thus, a resulting core melt and major release of radioactivity could occur with a probability greater than one in 10,000 per reactor year. At this rate, over forty reactor years, the probability (without uprate) becomes one in 250.

ENVY is now operating with defective fuel that, according to supplier, GE, could result in "shadow corrosion" that has the potential to distort and bind

Continued on Page Two

-01

Continued from Page One

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS OUTLINES SAFETY CONCERNS

control element blades. A GE-provided surveillance program has been put in place.

A second batch of defective fuel, one in which poorly designed metal fuel spacers can result in fuel deformation and binding of control elements, has also been loaded by ENVY. Unable to adequately analyze chances and effects of this fuel's failure, ENVY has offered to "burn" this fuel at less than its full potential.

In sum, running with defective fuel increases the likelihood that in the event of a severe transient, operators may not be able to be insert, fully insert, and/or rapidly insert control rods.

In addition, reactor internal components were never designed to withstand the distortion and wear effects of increased heat and flow required for extended power uprate.

Increased potential for reactor internal components to fail and/or become distorted under uprate conditions further increases the likelihood of failure to scram. [1]

ACRS 3. There will be a reduction in time available for some operator actions because of higher decay heat.

20 % more electricity means 20% more steam means 20% more fissioning of uranium, means 20 % more fission products. Fission products are intensely radioactive. As fission products discharge their radiation or 'decay', they also discharge heat, called, 'decay heat.'

While decay heat is only a small fraction of the heat generated by a reactor under full power, it is sufficient on shutdown to destroy fuel cladding in short order causing a surge in radioactivity and over time to melt fuel causing a meltdown.

Higher decay heat means less time between operating temperatures and temperatures at which fuel damage and a surge in radioactive releases begins.

ACRS 4. The metal in reactor internal components (fuel carriers, control element guides, core shroud, steam separator, etc.) reactor penetrations (seals, flanges, bushings, and guides) and the reactor vessel itself are bombarded with more high intensity radiation and neutron flow.

This bombardment 'hardens' the surface of the metal causing a web of tiny cracks in which sub-surface corrosion begins increasing crack size and stress. Increased flow of water to the reactor abrades and roughens internal feedwater piping surfaces permitting pitting and corrosion to begin. As surfaces roughen, the rate of flow-assisted corrosion increases.

Increased flow rates cause increased vibration transmitted throughout the system. As pipes vibrate (move), metal fatigue is induced[2], wherein metal 'tires' of being worked; then hardens, granulates, and breaks.

ACRS 5. Containment may not be able to respond to accident events involving EPU higher decay heat levels.

Early BWR plants, like Vermont Yankee, feature suppression systems, huge water-filled containers intended to receive and condense steam from the reactor in over-pressure situations. Performance of these systems has been determined to be marginal. With the added decay heat of uprate, performance margin may be eliminated.

[1] Facts and some of the language regarding ATWS are drawn from the book, Nuclear Reactor Safety, David Okrent, University of Wisconsin Press, 1981. The book also details a telling example of failure of control rod insertion at the Browns Ferry Unit 3 BWR reactor on June 28, 1980 when operators were unable to fully insert 76 of 185 control rods. Fortunately, Okrent notes, this occurred during routine shutdown and not under the kind of reactor transients that call for rapid scram.

[2] Increased flow steam and increased moisture 'carryover' also affect erosion-corrosion in steam piping in ways that are not easy to predict. Steam lines ruptured killing workers at Surrey (VA.) Nuclear Plant in 1978 and at Mihanna Nuclear Plant in Japan in 2005.

My experience leads me to believe that an Independent Safety Assessment is the best regulatory tool the NRC has to ensure that Vermont Yankee can operate safely at the proposed uprated power levels. More to the point, I firmly believe that safety cannot be adequately assured by the NRC without an Independent Safety Assessment."

David Lochbaum
Nuclear Safety Engineer
Union of Concerned Scientists
March 12, 2004

A PRO-NUCLEAR ENGINEER'S CONCERNS

An open letter,

With the Nuclear Regulatory Commission's (NRC) approval of Vermont Yankee's (VY) Extended Power Uprate (EPU) apparently imminent, I write to you as the only private Vermont citizen who has been accepted as an Expert Witness before both the Vermont Public Service Board and the NRC's Atomic Safety and Licensing Board for the EPU at VY. I support the continued operation of VY at its existing power level until its license expires after 40 years in 2012. I am not a member of any of the organizations opposing VY's existence, but I am very concerned about the EPU.

I voice my technical concerns about the EPU for what will most likely be the final time. To me, increasing the horsepower of a 33 year old nuclear reactor by an additional 450,000 horsepower needs to be reexamined for three broad reasons: reduction of safety margins, aging of the plant's critical components, and the inability of the EPU design to cope with what is termed, a "single failure."

My first concern is that the margin of safety at Vermont Yankee will be reduced if the Extended Power Uprate is approved. In the event of an accident after a 20% EPU, there is an international consensus that the amount of radiation available to be immediately released will increase by more than 40%. To avoid exceeding allowable exposure limits to the public after the EPU, the NRC allowed VY to lower the theoretical radiation releases at VY's present power level by about 40%. This 40% theoretical reduction offsets the real 40% net increase. This shell game is called the "Alternate Source Term." The real net effect after the EPU is that the actual radiation released from an accident will be 40% more that that which might have been released had the EPU not been approved.

In the PSB hearings of 2003, Entergy's own expert witness acknowledged that the likelihood of an accident after the EPU will be 25 percent higher than if the EPU were not approved. If the likelihood of an accident increases by 25% and the consequences of an accident increase by more than 40%, it is clear that safety margins will be significantly reduced.

My second broad concern is with age related problems at VY, which will be compounded if the EPU is approved. During the PSB hearings, VY's own expert witness acknowledged that VY would also become less reliable after the EPU. The industry record of EPU related failures elsewhere is replete with five steam dryer failures, two cracked turbine generator shaft failures, and numerous other failures of aging equipment after uprates.

But we need not look to other reactors to identify that age related equipment failures are already affecting the performance of VY. VY's steam dryer is already cracked, the Main Steam Isolation Valves are no longer able to meet their original leak criterion, and the condenser is so old that VY staff has stated that it is "lucky to withstand gravity". Remember last year's fire, which shut down VY for almost three weeks? In a direct quote to the NRC about what really caused the fire, VY stated, "The root causes of the event were determined to be inadequate preventative maintenance ...and failure to monitor age related degradation." VY then goes on to state, "... performing preventative maintenance necessary to monitor age related degradation could have detected degradation and allowed replacement prior to failure." I must note that the preventative maintenance to which VY refers was know throughout the industry for 14 years, but ignored in 2004 by VY as it rushed to prep for uprate.

My question remains, "What will break next in an old plant under new EPU stresses?" There is a way to check the safety of the plant under EPU stresses, called Full Power Transient Testing, which the NRC originally stated was an EPU requirement and I have also endorsed. However, VY has sought an exemption to these tests, and with one minor exception, the NRC now appears to have allowed VY to avoid these rigorous tests.

My final broad concern is that with the EPU, but not as VY now operates, any one of several small single failures within the containment system must inevitably also cause the failure of the emergency cooling systems. This is the "NPSH problem". Containment failure simultaneous with emergency core cooling failure is not a good thing, yet it becomes likely with the EPU. Because of the extra heat generated by the EPU, the emergency pumps will not be able to get suction unless the containment is absolutely leak tight. The ACRS has published a written directive prohibiting any long-term credit for containment over-pressure. The NRC itself published a written Regulatory Guide prohibiting any long-term credit for containment over-pressure. Yet the NRC now ignores to both in order to get the EPU approved for VY.

If there is an accident, even a small one, all that we hold true about the purity of our natural life style may be lost forever. Vermonters are risking our reputation for the integrity of our dairy, produce, recreational, and tourist industries ...to me; the few benefits do not exceed the many risks.

Arnold Gundersen

Writer Arnold Gundersen, now a teacher in Burlington, is a nuclear engineer and former nuclear industry executive with more than 30 years of reactor and power plant experience. He is an accomplished nuclear safety consultant and volunteered as an expert witness for the coalition on the EPU

COALITION LISTS ENVY EPU ISSUES............

Entergy Nuclear Vermont Yankee's outmoded design could not be licensed today

1. NRC approval for the maximum attempted uprate is going forward without a thorough physical, systemic, and diagnostic examination of New England's most veteran commercial reactor.

NRC relies on its routine reactor oversight process to establish that the plant is well maintained, that proper analysis has accompanied plant modifications, and so on.

To satisfy State concerns that uprate may mean more breakdowns and a less reliable electric source, NRC has offered a pilot-program, engineering inspection.

This inspection of only 45 selected items found 8 safety-related defects.

The inspection was less than 5% of the scale and scope of the 1996 Maine Yankee Independent Safety Assessment – a team diagnostic inspection requested by Maine's Governor in order to assure citizens that Maine Yankee was safe.

It wasn't that Maine Yankee was a bad plant.

At the time Maine Yankee had NRC performance scores superior to those of Vermont Yankee.

2. Under extended power uprate, Vermont Yankee will be pushed to 120% of its carrying capacity for water and steam flow and for heat removal.

3. In the event of an accident, more than 40% additional radioactive material (fission products) will be available for dispersal to the environment.

Even without an accident, under extended power uprate this plant will generate up to 40 % more radiation than it does at 100% operation.

4. Vermont Yankee should be required to submit all of its safety related components to full transient testing at 120% (or uprate conditions) prior to operating at uprate.

Instead ENVY has gotten NRC exemptions and amendments which permit it to double the leakage rate for safety critical Main Steam Isolation Valves (MSIVs).

These valves serve, in the event of an accident, to hold fission products in containment.

Vermont Yankee proposes to catch radioactive steam, gases, iodine, and so forth that passes through leaking MSIVs at the plant's steam condenser- a heat exchanger that Vermont Yankee (pre-Entergy) estimated in such poor condition that with care it would barely survive to 2012 (at normal power).

5. ENVY proposes and NRC orders ascension power testing for its steam dryer- testing as power is increased in stages.

These huge steel hoods are located in the reactor vessel and perched above the reactor core. At two other extended power uprated plants (and there are only a dozen or so) steam dryers have torn apart, in one case sending a heavy piece of steel measuring 9 feet by 18 inches hurtling down a steam pipe at the speed of a shotgun slug. No analysis to date has answered why this has happened and no analysis, including ENVY's can predict when it will happen again.

Measuring stretch, vibration, and moisture carry-over as the reactor ramps up says little about how the dryer will behave a month or a year from now. Instead of experiments and analysis in our national laboratories, NRC and Envy propose experimenting on the banks of the Connecticut.

6. Envy proposes to allow accident pressures to build up in containment so as to force water to its emergency core cooling pumps.

Where exceptions have been made to allow this (theoretical, untested) procedure for up to 45 minutes in the past, ENVY proposes to require operators to balance pressure from a nuclear accident against maximum sustainable containment pressure for up to 48 HOURS!

7. In testimony before the NRC Atomic Safety and Licensing Board, the Vermont Department of Public Service made it clear, " "there's no compelling reason that requires the Applicant (Entergy Nuclear) to request a 20% power uprate of Vermont Yankee...There is no power shortage in New England. There is no way that Vermont Yankee's 20% uprate could be found to be necessary"[3]

[3] VPSD, Notice of Intent to Participate & Petition to Intervene (before NRC), August 30, 2004

A Swiss study cited by NRC/ACRS found that for a 14.7% power uprate, more than 30% additional fission products (radioactive poisons) would be available (to the environment) in a core-melt accident. Vermont Yankee intends to increase power by 20%.

Nuclear Power Plants With Extended Power Uprates

Source: US NRC WEBSITE, as of March 2003

E=Extended Power Uprate S=Stretch Uprate MUR= Measurement Uncertainty Uprate

No	NRC #	PLANT	1st Year Comm. Op	% UPRATE	Mwt Added	UPRATE APPROVED	TYPE	TOTAL % UPRATE	Plant Specific COMMENTS – See note below table for general comment
1	43	Monticello	06/30/71	6.3	105	09/16/98	E	6.3	
2	27	Hatch 1	12/31/75	5	122	08/31/95	S	8 EPU, 14.5 Combined	
	44			8	205	10/22/98	E		
	97			*1.5*	*41*	*9/23/03*	*MUR*		
3	28	Hatch 2	09/05/79	5	122	08/31/95		8 EPU, 14.5 Combined	
	45			8	205	10/22/98	E		
	98			*1.5*	*41*	*09/23/03*	*MUR*		
4	*8*	Duane Arnold	*02/01/75*	*4.1*	*65*	*03/27/85*	*S*	15.3 EPU, 19.4 Combined	Warm weather heat removal issues affecting circulating water temps and demineralizers
	69			15.3	248	11/06/01	E		
5	70	Dresden 2	06/09/70	17	430	12/21/01	E	17	Units 2&3 –steam dryer cracks 2005 -gen. Rotor cracks
6	71	Dresden 3	11/16/71	17	430	12/21/01	E	17	EPU related reactor overfill incident 2005-gen. Rotor cracks
7	72	Quad Cities 1	02/18/73	17.8	446	12/21/01	E	17.8	Steam dryer cracks
8	73	Quad Cities 2	03/10/73	17.8	446	12/21/01	E	17.8	Steam dryer fractured, 2 incidents
9	75	Clinton*	11/24/87	20	579	04/05/02	E	20	
10	78	ANO-2	03/26/80	7.5	211	04/24/02	E	7.5	*Not a BWR, it is only PWR EPU NRC listed*
11	*36*	Brunswick 1	03/18/77	*5*	*122*	*11/01/96*	*S*	15 EPU, 20 Combined	
	81			15	365	05/31/02	E		
12	*37*	Brunswick 2	11/03/75	*5*	*122*	*11/01/96*	*S*	15 EPU, 20 Combined	
	82			15	365	05/31/02	E		

- **Prior to Vermont Yankee (NRC application 1/31/04) only Clinton has sought a 20% EPU in a single application.**
- NOTE: General Comments: The EPU program is relatively new; the first EPU exceeding 15 % percent dates from 2001. Thus issues continue to emerge. Several reactors have had outages resulting from broken internal components, including steam dryers and instrumentation, due to unanticipated EPU increased flow-induced vibration. Several reactors have had problems maintaining reactor vessel water levels because of instrumentation and equipment controls inadequate to EPU conditions. In older plants, heat removal issues have forced periodic power reductions under EPU.

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What Are The Chances ?

The following exchange took place between Congressman and Committee Chairman Ed Markey and the NRC at an NRC Authorization Hearing April 17, 1985:

Question 21: Chairman Markey: "What does the Commission and NRC staff believe the likelihood of a severe core melt accident to be in the next twenty years for those reactors now operating and those expected to operate during that time?"

Answer: "The Staff has available to guide its judgment on this matter close to two dozen plant and site-specific probabilistic risk assessments [PRAs]. The most complete and recent PRAs suggest core-melt frequencies in the range of 10 to the minus 3 per reactor year to 10 to the minus 4 per reactor year. A typical value is 3 times 10 to the minus 4, were this the industry average. then in a population of 100 reactors operating over a period of 20 years, **the crude cumulative probability of such an accident would be 45%"**. [Emphasis added]

NRC Commissioner Asselstine then adds the following: " The PRA estimates given above have substantial uncertainties that span a factor of 10 above and below the reported values. I believe it is mandatory that consideration of these uncertainties be factored into any application of such point estimates. Thus, the cumulative probability of a core meltdown accident in the next 20 years, based only on PRA estimates and their uncertainties, ranges anywhere from 0.99 to 0.06."

In 1996, the "Yankee family" of nuclear plants was so badly run, that owners and regulators coined the term,

"Yankee Disease." For four of nine New England plants it was fatal.

▪ Of nine commercial nuclear reactors sited in New England, four have permanently shutdown. None of the four reached the end of its licensed lifetime. That is, all were forced to shutdown prematurely. All had good operating records and were said by their owners to be good candidates for relicensing. All underwent intensive examinations just prior to shutdown. All were found to be riddled with safety defects. After Yankee Rowe shutdown in the early 90's, other Yankee owners assumed that Vermont Yankee would be the next to permanently shutdown.

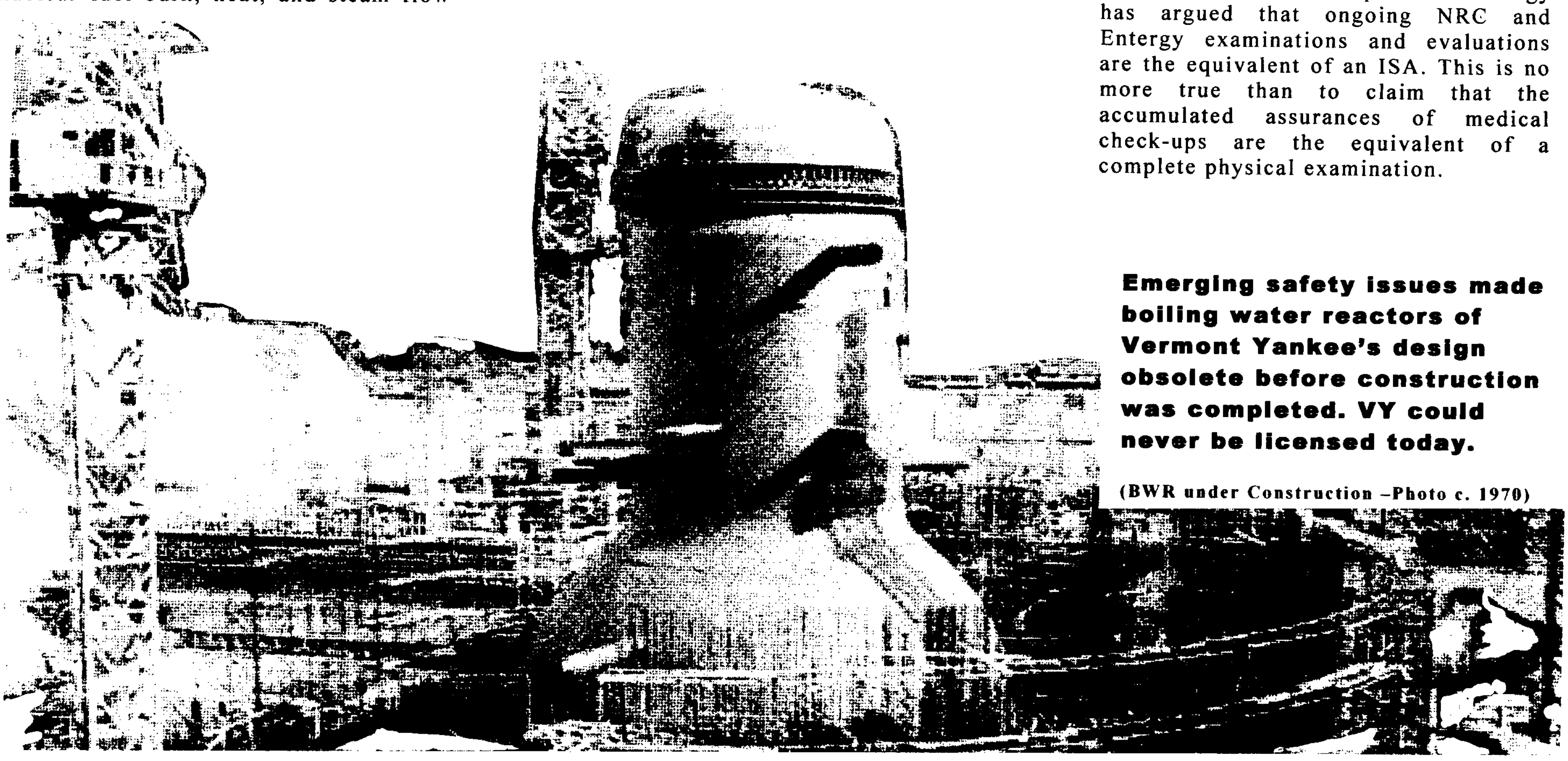
DOES VY DESERVE AN INDEPENDENT SAFETY ASSESSMENT?

Wrong question. Entergy and Vermont's Nuclear Engineer have argued that an ISA was appropriate to Maine Yankee because it was a "troubled" plant and that Vermont Yankee is an "exemplary" plant, therefore does not need an ISA-type of examination. This argument is deliberately misleading. New England Coalition has called for an Independent Safety Assessment, not because a comparison of Vermont Yankee to Maine Yankee is particularly appropriate, but because the type of examination and assessment done at Maine Yankee is appropriate.

Only the most credulous and naïve person could believe that increasing nuclear fuel burn, heat, and steam flow to 120 % of original license limits in New England's oldest reactor will not result in reduced safety margins and a depletion of engineering conservation. Both state and Entergy experts have admitted that Vermont Yankee will be broken down more often under uprate conditions. People are right to reject the affront to common sense that attempts to entirely divorce more frequent breakdowns and unplanned shutdowns from diminished safety. Under extended power uprate, Vermont Yankee will be less safe.

It is the people of Vermont who deserve an "Independent Safety Assessment" at Vermont Yankee. It is they who are asked to bear the burden of the increased likelihood of a nuclear accident and increased consequences should an accident occur.

An **Independent Safety Assessment** after the manner of NRC examinations performed at Millstone and Maine Yankee nuclear power plants incorporates a top-to-bottom examination, review, and analysis of several, selected plant safety-related systems and an across-the-board review of plant management, maintenance, engineering, documentation, and analysis by a team of independent NRC inspectors (on the order of 25). An ISA is peer-reviewed and, in the case of Maine Yankee, was done with oversight by a State team of experts. Entergy has argued that ongoing NRC and Entergy examinations and evaluations are the equivalent of an ISA. This is no more true than to claim that the accumulated assurances of medical check-ups are the equivalent of a complete physical examination.



Emerging safety issues made boiling water reactors of Vermont Yankee's design obsolete before construction was completed. VY could never be licensed today.

(BWR under Construction –Photo c. 1970)

The proposed extended power uprate will needlessly increase risk to area people;

1. **increase the likelihood of a nuclear accident,**
2. **increase the potential consequences of an accident,**
3. **increase the amount of radioactivity produced and released from the plant,**
4. **increase radiation exposure to workers and at site boundaries,**
5. **increase the rate at which high-level and low-level nuclear waste is produced.**